Identifying the Value of Long Distance Rail Services

Current Issues in Transport Assessment and Evaluation

Abstract

In comparison with road mode alternatives, rail services can be perceived as being relatively poor performers and this paper explores the underlying reasons why this might be the case.

Opportunities to identify the potential of rail and to optimise its future contribution within the overall transport system are discussed.

The paper identifies international good practice in assessing and evaluating transport systems, with particular reference to longer distance passenger rail services.

Within the paper, the use of the term 'assessment' is reserved for the broad consideration of issues and strategies, whilst the use of the term 'evaluation' is reserved for the detailed review of proposals including, but not restricted to, economic appraisal and financial analysis.

A review of current practice in New Zealand and responses to common criticism of rail proposals are also included.

The paper concludes with recommendations for improved assessment and evaluation processes.

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Executive summary

Overview

This paper identifies international good practice in the assessment and evaluation of rail investments and services, making particular reference to current practice in New Zealand.

Within the paper, the use of the term 'assessment' is reserved for the broad consideration of issues and strategies, whilst the use of the term 'evaluation' is reserved for the detailed review of proposals (including, but not restricted to, economic appraisal and financial analysis).

The context for this paper is provided by the underlying economic conditions, especially in terms of costs, prices, charges and the imperfect market in which the transport system operates.

A sustainable, integrated, effective and efficient transport system requires decision-making to be supported by strategic assessment and detailed evaluation.

Identifying rail potential

The option of supporting and developing long distance rail services has rarely been investigated in New Zealand and therefore the potential of rail in this respect is largely an unknown quantity.

The consideration of potential improvements and support for long distance rail services needs to be undertaken objectively rather than being constrained by historic funding policies or by the limitations of conventional cost benefit analysis.

The paper suggests that systematic investigations are undertaken to identify potential rail markets and to optimise the contribution of rail to national transport objectives.

Strategic assessment

Good international practice involves the systematic, multi-objective and quantified assessment of transport systems at the strategic level. Strategic assessment needs to be underpinned by a suitable assessment framework and appropriate modelling techniques to assist in the development of a balanced overall strategy.

Detailed evaluation

Good international practice in the detailed evaluation of rail investments and services requires a broad range of factors to be considered. Cost benefit analysis is one very important component of this, especially if it includes all relevant externalities and other effects capable of being monetised. However, detailed evaluation also needs to consider non-monetised factors and these should be quantified wherever possible.

New Zealand practice

The quantified multi-modal strategic assessment of the transport system in New Zealand is limited to regional and sub-regional studies and this does not provide a suitable context for the strategic assessment of longer-distance rail services.

Current practice in the evaluation of rail proposals in New Zealand indicates that:

- Detailed evaluation is not undertaken within the context of strategic assessment.

- The potential value of the rail system is not fully captured in current detailed evaluation processes in terms of economic, social and environmental effects.
- Identifying accurate costs and benefits associated with rail is very difficult unless detailed evaluation is based on full economic pricing of the transport system.
- Detailed evaluation methodologies for the quantification of effects are not co-ordinated, consistent or mode-neutral.

Responses to *criticisms* of rail

Integrated planning for inter-regional travel is not required: Strategic planning is needed to achieve best value for money and it is important that centrally co-ordinated strategic multi-modal network analysis and planning is undertaken. Where this is not the case, significant problems are likely to occur.

Rail investment does not represent good value: New Zealand is unique in the developed world in not recognising the value of long distance rail. There is a good case for allocating government subsidy for long distance rail services on a continuous basis.

Rail is not effective in meeting demand: Longer distance rail services have an important potential role to play for a number of travel purposes, including work, education, and leisure. Rail is also an integral part of 'national identity' and plays an important role in the attractiveness of a country to international visitors. Today's visitors are tomorrow's migrants and business partners.

Rail contributes little to environmental objectives: Rail offers the potential to achieve significant environmental advantages over competing modes, for example, in terms of energy efficiency and emissions (SDSG, 2007). Rail also promotes better utilisation of space in urban areas and more efficient use of existing transport corridors with relatively little environmental impact.

Rail does not achieve acceptable benefit cost ratios: As currently practised, cost benefit analysis tends to undervalue rail proposals and to over-state road proposals. This is partly because the standard consumers surplus measure only represents what people are willing to pay for their actual use of the system and does not include option, indirect use or non-use values. Furthermore, cost benefit analysis should not be used as the sole method of determining rail proposals and non-monetised effects should also be considered during detailed evaluation.

Need for improved processes

National and multi-regional transport planning needs to be undertaken on an integrated multi-modal basis and to be supported by appropriate data, techniques and resources. An open and transparent approach is needed to connect rail planning into mainstream strategic transport planning.

All modes have their niche and it is important to ensure that the potential of the longer distance rail network within the transport system is thoroughly explored. In order to do this, assessment and evaluation procedures need to identify the potential value of rail and to assist in optimising the contribution of rail to national transport objectives.

Strategic assessment should be used to explore options to improve and support long distance passenger services as well as to test possible synergies with the rail freight network. Strategic assessment should also explore how rail could be developed as a long-term strategic alternative to inter-urban private car travel, because of future fuel uncertainties, the potential to reduce emissions and to provide more reliable and higher quality travel choice options.

Detailed evaluation is also important, especially if it takes place within the context of an appropriate strategic context, in order to prevent an overly narrow project-focussed approach being adopted. The detailed evaluation of longer distance rail services, taking into account all relevant factors, should assist in maximising the value of the national rail network by improving usage, optimising outcomes and demonstrating value for money.

Contents

1 Introduction

1.1 Overview

The purpose of this paper is to review strategic assessment and detailed evaluation procedures for rail investment and support, with special reference to long distance passenger rail services. The paper identifies international good practice and compares this to current New Zealand practice.

Within this paper, the use of the term 'assessment' is reserved for the broad consideration of issues and strategies, whilst the use of the term 'evaluation' is reserved for the detailed review of proposals (including, but not restricted to economic appraisal and financial analysis).

Assessment and evaluation needs to be seen in context and applied appropriately in order to produce optimum results.

The context for this paper is provided by the underlying economic conditions (rules, costs, prices and charges) in which the transport system operates. These economic conditions represent an imperfect market for transport with significant interventions by the public sector.

It is important that assessment and evaluation processes quantify monetised and non-monetised impacts as fully as possible and also acknowledge other factors that are difficult to accurately quantify, for example, social and cultural aspects.

The paper reviews the potential of rail in New Zealand and explores how good practice in assessment and evaluation procedures can assist in identifying the future contribution and value of rail.

Current practice in New Zealand is then summarised followed by responses to some common criticisms of rail.

The paper concludes with suggestions for the improvement of assessment and evaluation processes.

1.2 Railways in New Zealand

Railways in New Zealand were owned and operated by the government until 1993 when rail infrastructure[1] and the main freight and passenger operations were sold to Tranz Rail Holdings Ltd (now Toll NZ).

Between 2001 and 2004 the government repurchased the rail infrastructure and established a public corporation, ONTRACK to manage and operate the rail network.

Toll NZ and other operators pay for the use of the network through track access charges administered by ONTRACK. The scale of track access charges has been a subject of dispute and the government is currently in the process of repurchasing freight and passenger rail operations from Toll NZ.

Urban rail networks operate in Auckland and Wellington and these are the only rail services that receive public subsidy. Although rail expenditure in New Zealand has increased recently, this has been mainly for urban rail systems with historic under-investment both increases have been from a low base. New road expenditure has increased by far larger amounts and remains the dominant element in national transport spending.

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[1] The land on which the rail assets were situated which was leased to Tranz Rail Holdings Ltd (now Toll NZ).

The long distance rail network in New Zealand is extensive, connects all major centres and ports and is used primarily for freight operations. A commercial rail ferry service connects North and South Islands.

Long distance passenger services have been in decline for many years and are now currently limited to a skeleton service of three main routes with a single train in each direction per day and a few outer-urban commuter services. The further withdrawal of long distance passenger services remains a real possibility in New Zealand.

1.3 Assessment and evaluation

The processes used to support transport related decision-making, fall into two main categories, namely: 'strategic assessment' and 'detailed evaluation':

- Strategic assessment takes into account a broad range of objectives in order to develop strategies and plans within an appropriate and co-ordinated context.
- Detailed evaluation represents a narrower pre-investment scrutiny of proposals.

In effect, this can represent a two-stage approach in the planning of integrated transport investment, the first being strategic and the second more detailed and specific to the precise circumstances of the proposal concerned.

An example of this two-stage approach could involve the strategic assessment used in the development of a national strategy, which could be followed by the detailed evaluation of a particular element of the strategy, prior to implementation.

Consideration of economic and financial aspects is important for both strategic assessment and for detailed evaluation.

Strategic assessment needs to be undertaken within a well-scoped and well-quantified process. This should be multi-objective and be supported by an assessment of value for money, for example, through an outline[2] cost benefit analysis of alternative strategic options.

Detailed evaluation needs to take account of all relevant factors including, but not restricted to, cost benefit analysis[3] and financial analysis.

Cost benefit analysis can be described as the interface between transport planning and transport economics. Cost benefit analysis needs to be applied carefully, taking account of methodology and information limitations. Cost benefit analysis can now include more monetised attributes than was the case in the past. For example, in Europe it is now normal practice, to value noise, air pollution and greenhouse gases. However, the use of cost-benefit analysis, in isolation from other factors, is unlikely to result in optimal decision-making.

Particular care is needed in cost benefit analysis when comparing different modes, especially within a sub-optimal pricing regime. Such a situation can apply to the comparison of rail and road proposals where the pricing regime is not based on marginal social cost (Eddington, December 2006). This is particularly important in New Zealand where cost benefit analysis is often used to establish 'value for money thresholds' in absolute terms for planning and decision-making purposes.

The real purpose behind assessment and evaluation processes is to provide sufficient information to allow objective comparisons to be made between alternative strategies and between competing options.

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[2] Based on strategic data and indicative costs only.

[3] Detailed economic appraisal of proposals, including user and non-user benefits and costs

On the basis that there is a need for all modes to play their part within an integrated transport system, it is important that assessment and evaluation procedures are mode-neutral and that they are also interpreted in context. If this is not the case then proposals for rail modes may 'consistently' fail to meet assessment and evaluation tests. For example, in New Zealand this was found to occur when proposals for 'alternatives to roading' were consistently found to be uncompetitive with 'roading' proposals (Transfund NZ, 2003)

In New Zealand, transport investment and support is failing to meet government objectives as expressed in the New Zealand Transport Strategy with only one out of 12 required sustainable trends being met (MWH, 2006). This meant, for example, that little or no progress was being made in terms of:

- Transport users understanding or meeting the costs they create
- Improving the effectiveness and efficiency of the transport system
- Reducing the impact of the transport system on non-renewable resources or the environment

This indicated a need to review current approaches to the planning and management of the transport system, including the assessment and evaluation methodologies being applied. It is also important that these methodologies are supported by appropriate decision-making processes and that adequate overall funding is made available, in order to make the best use of assessment and evaluation results.

2 Identifying rail potential

2.1 Need to investigate options

The option of supporting and developing long distance rail services is rarely investigated in New Zealand and consequently, the real potential of rail remains an unknown quantity.

All modes, including rail, have an appropriate role to play in the delivery of a national strategic transport system and the real value and potential of each mode needs to be objectively considered.

Long distance rail has several key potential advantages over other modes, including: comfort, reliability, safety and relatively low environmental impact.

The consideration of potential improvements to and support for long distance rail services needs to be undertaken objectively, rather than being constrained by historic funding policies or the limitations of standard cost benefit analysis.

Stated preference techniques could be used to capture the wider benefits of rail, for example to estimate values that are difficult to quantify by other means, such as option, non-use and environmental values.

2.2 Potential markets

The potential markets long distance passenger rail in New Zealand could serve, include:

- Inter-regional travel between centres for business, social and leisure purposes.
- Longer distance outer-urban commuter use, to the main centres, particularly Auckland, Wellington and Christchurch.
- Scenic tourism for global visitors who want to a unique way of experiencing New Zealand.

- Access to smaller centres, local communities, rural regions and remote areas.
- Alternative access when incidents or emergencies affect other modes.

Evidence from the UK (Mackett and Nash, 1991) describes the extent to which people are willing to pay more to travel by rail rather than bus. A European study (Bonnafous, 1987) shows that when rail matches air in door-to-door travel time and fare it dominates the market. A comparison of safety and environmental cost (Sansom et al, 2001) shows the advantages of rail, assuming appropriate loadings, over road.

It is also important to review the potential of rail with appropriate imagination and ambition. For example, long distance rail in New Zealand is not currently competitive with road modes. However, the shortest time for rail travel between Auckland and Wellington was set 40 years ago at 8 hrs 40 minutes, which is comparable with current road driving times. Presently this sort of running time is not achievable due line speed restrictions and this, together with stops for locomotive changes and a refreshment break, means that the current timetabled time for Auckland to Wellington by rail is 12 hours.

The distance between Auckland and Wellington of 660 km, is equivalent to the distance between London and either Glasgow of 670 km, or Edinburgh of 650 km. Conventional (not high speed) rail line travel times between London and the major Scottish cities are less than half that of the current Auckland to Wellington rail travel time. The travel time between London and some Scottish destinations can, under certain circumstances, be competitive with equivalent point-to-point air travel times (Warren, 2007). However, this tends to be on longer routes where rail takes less than 5 hours, whereas in New Zealand, the role of rail may be to compete with air over shorter distances. Between London to Scotland, rail improvements and problems with air security measures are leading to a growing rail market, although air is still the dominant mode on these routes. Results from the UK National Travel Survey for 2003 to 2005 show that air becomes a dominant mode over 560 km. The results below are taken from a summary used in the background material for the UK White-Paper Delivering a Sustainable Railway (DfT, July 2007)

Trip Length	Modal Split			
	Coach	**Car**	**Rail**	**Air**
400-560 km	8%	71%	14%	5%
560 km +	4%	45%	12%	37%

Table 1: Long Distance Modal Share in the UK (DfT, July 2007)

Significant increases in rail mode share are often said to be unfeasible on the basis of past trends, although historically the mode share of rail was much higher than it is today. Rail would have a higher mode share if it had been able to keep up with the changes in other modes, for example by having quicker and more frequent services.

In New Zealand, falling demand for long distance rail services has occurred in response to changes in service levels, convenience, availability and crucially, the pricing of alternative modes. In other words, declining rail demand has been a logical reaction to prevailing conditions, and if conditions were changed in favour of rail, then demand for rail services would grow.

2.3 Investigation checklist

A checklist to support the investigation of future market potential of rail is suggested as follows:

- What is the potential to grow existing long-distance and outer-urban rail patronage through higher frequencies and capacities, faster travel, better reliability, greater comfort, better facilities and lower costs?
- What potential is there for rail in the longer distance travel market for mid-cost and intermediate express destinations, where rail could be competitive with alternative modes in terms of times, costs, reliability and availability? It is important to note that inter-urban trips form a high proportion of the total current New Zealand trip 'market'.
- What is the best way for rail services to integrate with other visitor and tourism attractions?
- How can rail services best support remote communities and provide associated economic development potential?
- In association with rail freight improvements, what opportunities exist for improving or introducing rail passenger services, to maximise synergies and revenues?

In addition, a checklist for how rail could optimise contributions to wider objectives, is suggested as follows:

- How can rail services contribute to long-term sustainability options, carbon neutrality and the ability to cope with oil shocks associated with peak oil?
- What contribution can rail make to reduced emissions targets?
- What potential is there for rail passenger services to support initiatives in connection with transport and land use integration, inter-modal integration, transit-oriented development and other sustainability initiatives?
- What is the potential for rail services to attract people from cars who would not otherwise use alternative (bus or coach) modes, and to thereby effect behavioural change?
- How can rail nodes be used to concentrate development, with higher urban densities, and to support more accessible urban form, including connecting with local walking and cycling networks?

3 Strategic assessment

3.1 Role of strategic assessment

The term strategic assessment is used in this paper to refer to considerations of overall transport system performance and strategic options over large spatial areas.

It is important for multi-modal and integrated strategic assessment to be undertaken prior to the detailed evaluation of particular services or new proposals. This is because no matter how good detailed evaluation processes are there will always be matters that are not covered, such as the potential interaction between individual proposals and the potential cumulative effect of individual proposals on wider outcomes.

It should be emphasised that long distance passenger rail and rail freight services are, by their very nature, 'strategic' and can have significant network effects, for example, when connections with urban rail systems and ports are well developed.

Strategic assessment needs to inform and guide more detailed evaluation by confirming the required nature and scale of future actions required.

Rail needs to be fully considered in strategic assessment, for example:

- Rail considerations need to be fully integrated with other transport planning, rather than being regarded as a special commercial case governed by separate legislative procedures and funding allocation rules, which are the responsibility of non-transport planners.
- The decision making process for rail need to be aligned with broader transport planning procedures and timeframes.
- Information, quantified data and modelling of rail are all needed and these should be made available for wider transport assessment purposes.
- Strategic assessment techniques need to be developed to allow rail to be compared with other modes.
- Participation, resources, funding rules and priorities in the rail sector need to be aligned with the wider transport sector to facilitate dialogue, support integrated transport planning and to assist co-ordinated decision-making.

Strategic assessment is needed to plan long distance rail on a network basis, prior to more detailed route or corridor planning. This is because route or corridor approaches may only be based on relatively limited or localised objectives, for example, to increase rail freight capacity along certain corridors by a certain amount.

If strategic assessment is undertaken comprehensively, it should allow the strategic case for investment in rail to be considered and to be presented on a rational and objective basis.

Problems can arise when rail is seen as a commercial service outside the realm of public sector transport planning but it is worth emphasising that this does not have to be the case, even where rail operations are privatised (DfT, Aug 2007)

3.2 Factors in strategic assessment

Strategic assessment needs to be aimed at describing conditions, identifying issues, testing future strategic options and setting the best future direction for the transport system to achieve outcomes and targets

Strategic assessment needs to consider interactions between interventions, to identify:

- Where interventions will be complementary and positive synergies will be generated.
- That benefits are not inadvertently lost due to conflicts between interventions.
- The scale of the cumulative effect of interventions, so that satisfactory progress is made towards overall objectives.

Assessment should be objectives based. The use of assessment framework methods, such as strategic environmental assessment, could be undertaken at the national and inter-regional scale. Supporting strategic methods could also be incorporated to assist in assessing social, health and economic impacts.

Quantified supporting techniques are needed to support strategic assessment. This is likely to mean developing some form of descriptive and predictive model based on a representation of the transport system which is also responsive to changes in economic and social conditions.

Strategic options need to be designed to be integrated, sustainable and in keeping with national objectives and the options should be responsive to the issues identified in base case and future year business as usual assessments.

The methods used to select a preferred strategy should be rational and transparent. For example, decision-making needs to take into account any matters not covered by the assessment and to lead to the selection of an optimised preferred strategy.

3.3 Good practice examples

Australia: National guidelines for transport system management in Australia (Australian Transport Council, 2006) This is a three stage assessment and evaluation approach requiring: (i) an initial strategic fit assessment (ii) an outline rapid evaluation and (iii) a detailed evaluation. The guidelines require a complex multi-level analytical approach directed by policies and objectives, supported at each level by business case development.

UK: Scotland's National Transport Strategy (Scottish Executive, 2006) An example of quantified multi-modal strategy development, including consideration of rail contributions, to meet assessed objectives. Further development of an implementation plan for strategic aspects, including rail network development, has been undertaken by the agency Transport Scotland.

UK: Delivering a Sustainable Railway (DfT, July 2007) White Paper, Summary of Key Research and Analysis and Rail Technical Strategy. An outline Government rail strategy, supported by a comprehensive analysis of the rail sector in England and Wales and a statement of Government policy with supportive reasoning.

3.4 Findings

Good international practice involves the systematic, multi-objective and quantified assessment of transport systems undertaken at the strategic level.

Strategic assessment needs to be underpinned by a suitable assessment framework and by appropriate modelling techniques.

Strategic assessment also needs to focus on the optimal delivery of objectives through the development of a preferred overall strategy.

4 Detailed evaluation

4.1 Role of detailed evaluation

The term 'detailed evaluation' is used in this paper to refer to the consideration of elements of transport system performance and the potential effects of new proposals.

It is important that detailed evaluation of particular services and new proposals takes place within the context of multi-modal and integrated strategic assessment. This is because, no matter how good detailed evaluation processes are, there will always be issues that are not covered, such as the potential interaction between individual proposals and the potential cumulative effect of individual proposals on wider outcomes.

Detailed evaluation needs to be informed and guided by strategic assessment, which should confirm the required nature and scale of future interventions required.

4.2 Factors in detailed evaluation

Detailed evaluation should be undertaken within the context of an overall strategy, include all factors potentially relevant for decision-making and assist proposals to be optimised.

There are costs and benefits associated with rail, over and above the actual use made of it, although not all of these can be satisfactorily monetised at present.

Detailed evaluation therefore requires the application of a range of techniques, including, but not restricted to, cost benefit analysis in order to consider all relevant matters, including externalities.

Typical factors that detailed evaluation can consider, include

- Capital and operating costs
- Time savings
- Comfort
- Reduced operating costs of other modes
- Safety
- Environmental costs on other modes
- Option values
- Wider economic benefits
- Accessibility
- Social inclusion
- Relief of congestion

Cost benefit analysis

Cost benefit analysis is important and it is only appropriate to invest in rail if either, there is a reasonable cost-benefit ratio, or if this is not the case, that there are compensatory non-monetised benefits.

Virtually all countries use cost benefit analysis, including those elements that can be easily quantified using standard techniques (ITS Leeds, 2007).

For example, cost benefit analysis is likely to take into account the following costs:

- Capital cost (vehicles, technology, construction)
- Ongoing maintenance, operational and administration costs.
- Non-user operating costs
- Non-user time costs
- Safety costs

Some other factors may also be monetised, or otherwise quantified, in some countries, for example:

- User charges and revenues
- Disruption during construction
- Noise
- Air pollution
- Emissions
- Socio-economic impacts

The assumptions used when undertaking the cost benefit analysis can vary considerably from country to country, for example:

- Evaluation periods of between 25-75 years
- Discount rates of between 2-10%
- Methods based on: set values of time, elasticity based willingness to pay estimation or full stated preference.

It is important to incorporate cost benefit analysis into comprehensive rail planning and project management (European Investment Bank, 2005)

There is also a broad international consensus about what should and should not be included in economic appraisal. However, the inclusion, treatment and valuation of individual factors varies from country to country, depending on individual circumstances and methodologies adopted. For example, Transport Appraisal in Other Countries (ITS Leeds, 2007) found that environmental factors are included by some countries and not by others and that a range of values are applied to environmental and accident factors.

There is also a need to consider emerging evidence on option, indirect use and non-use values (Humphreys and Fowkes, 2006: Laird, Batley and Nash, 2006).

Option, indirect and non-use values originate in the field of environmental economics and have only relatively recently been transferred to transport economics. This is because the consumers surplus measure used in cost-benefit analysis does not include option, indirect use or non-use values, and is solely what people are willing to pay for their actual use of the system.

In the UK, the DfT are currently incorporating option values into their appraisal methodology. Option values reflect the willingness to pay of the local population to retain a rail service as a standby facility even when they have no immediate plans to use it, whilst indirect use and non use values reflect benefits from its use by other people, for example, by bringing more people into the area, or from factors such as reduced congestion or environmental damage.

It is particularly important to note the importance of option and non-use values in the appraisal of relatively lightly used rail services serving remote areas, as in this case they form a larger proportional part of the total economic value than in the appraisal of urban rail schemes.

Intangible factors

Other factors are termed 'intangible', in other words they are factors known to have a value and taken into account in the decision making process, but there is no scale on which to monetise them and measurement by other means can be controversial.

Examples of the value of transport investment or support that may not be captured by conventional economic appraisal methods include some environmental and health aspects and the wider importance to non-transport sectors, for example to tourism (Page, 2003)

Current work in the UK is underway to identify wider economic benefits, including agglomeration effects (Eddington, November 2006). Bringing tourism to an area may benefit that area at the expense of other areas, but there can still be a net economic benefit if tourists are diverted to areas where incomes are relatively low or where jobs are scarce and away from areas with relatively higher incomes or with a greater range of alternative jobs.

4.3 Good practice examples

UK: Guidance on Rail Appraisal (DfT, August 2007) A guide to current UK procedures for evaluating specific rail proposals within an overall approach to transport appraisal, using a mode neutral evaluation framework.

UK: The Case for Rail in the Highlands and Islands (Halcrow, 2004) A wide ranging analysis of rail services and their economic, environmental, social and cultural impacts. Network Rail has also undertaken a Route Utilisation Strategy for Scotland.

US/Canada: Alaska Canada Rail Link Phase 1 Feasibility Study (Alcan Rail Link Inc., 2006) An example of an integrated strategic study of rail potential for a new rail link between the US and Canada. Particularly positive aspects are the

integrated approach to testing freight and passenger service potential and the availability of study findings and detailed analysis on the project web-site.

4.4 Findings

International practice in the detailed evaluation of rail investments and services includes a broad range of factors.

Cost benefit analysis is a very important component of detailed evaluation, but this needs to include all relevant factors, for example, option values and all externalities capable of being monetised.

Detailed evaluation also needs to consider other non-monetised factors and these need to be quantified wherever possible.

5 Current New Zealand practice

5.1 Strategic Assessment

A New Zealand Transport Strategy (2003), a national rail strategy (2005) and a national state highway strategy (2007) have been developed, although all of these are non-statutory and have not been developed using systematic multi-modal and quantified strategic assessment techniques. This is partly because suitable data capture, techniques and models have not been developed at the inter-regional or national scale.

The New Zealand Rail Strategy (MoT, 2005) states factually, that 'Long-distance passenger rail services presently receive no central or local government subsidy' although no rationale behind this policy is provided. Two months earlier, the New Zealand Surface Transport Costs and Charges Study (Booz Allen Hamilton, 2005) stated that, for long distance train travel: *''..charges (fares) should be significantly reduced to better align with marginal costs.''*

It is understood that the rail track authority (ONTRACK) has developed a national rail network plan, but it is not known what this includes as to date, it has been treated as confidential and has not been made widely available within the transport sector. ONTRACK also undertakes unpublished commodity, route, corridor and network feasibility and costing type studies, each of which is important but these are not an adequate substitute for strategic assessment or for more comprehensive network planning.

Quantified strategic assessment is undertaken in the three major metropolitan regions of New Zealand, namely, Auckland, Canterbury and Wellington. These and all other regions have also developed regional land transport strategies, which identify some inter-regional issues. However, these strategies do not address longer distance passenger rail or rail freight in any comprehensive sense.

At the sub-regional and urban area scale, several assessment-based initiatives have been undertaken or are underway to develop non-statutory strategies and supporting packages of complementary activities.

The underlying modelling used to develop regional and sub-regional strategies tends to be of limited use for future scenario test purposes, particularly those involving pricing. This can limit the usefulness of these models for public transport purposes. One reason for this is that these models produce relatively 'fixed' demand matrices and are insufficiently responsive to changes in prices and other factors. *''Conventional transport evaluation models tend to undervalue public transport because they overlook many benefits..''* (IPENZ, 2008)

The national funding agency, Land Transport NZ has adopted procedures to evaluate strategies at the regional and sub-regional level and uses this to inform

more detailed funding decisions on individual proposals. However, the spatial area covered by current strategies means that they cannot consider the development potential of longer distance passenger rail and rail freight services.

In New Zealand, 'strategic' value (mainly security of access or investment option value) of projects may be identified if these benefits are not captured elsewhere. (Land Transport NZ, 2006). However, the method of doing this is unclear and tends to be mainly applied to the detailed evaluation of road proposals.

5.2 Detailed Evaluation

Evaluation procedures applied to transport proposals in New Zealand are not co-ordinated, consistent or mode-neutral.

Organisations have developed their own individual evaluation procedures for particular purposes, for example, Treasury and ONTRACK are currently responsible for the majority of rail investment, although these procedures are unpublished and are not widely available within the transport sector.

Other detailed evaluation procedures are applied by Land Transport NZ for the consideration of some rail funding applications.

Published details of the detailed evaluation of rail proposals in New Zealand are rare, two notable exceptions to this being:

- The Southerner Rail Passenger Service Viability Study (Market Economics Ltd, 2001) did not undertake a detailed cost benefit analysis and assumed that externalities would be insignificant. However, the outline economic analysis presented in the report showed that the cost of losing the service was comparable to the regional economic benefit of retaining it. No subsidy was allocated and the service closed the following year.
- The Hamilton-Auckland Rail Service Feasibility Study (Paling and Rutherford, 2006) examined the possibility of reinstating a long distance rail service that had closed five years earlier. The findings of the study were that a service was not commercially viable in financial terms but that on the basis of a limited application of cost benefit analysis and using conservative assumptions, demonstrated that there was an economic case for the proposal, although the service was not reinstated

Both of these evaluations demonstrated relatively marginal economic justifications, but neither evaluation was undertaken within a developed overall strategy. This meant that the decisions to not support these services appear to have been based solely on the results of detailed evaluation.

The national funding agency has procedures for the economic evaluation of multi-modal transport proposals (Land Transport NZ, 2006) using the Economic Evaluation Manual, although in practice this is only applied to rail evaluation, to any significant extent, for the two urban passenger rail systems.

Under current procedures, monetary values can be applied to a range of factors (including emissions, air pollution and noise) for inclusion in the cost benefit analysis of transport proposals in New Zealand. However, the current evaluation rules are permissive rather than prescriptive and in practice, cost benefit analysis is often limited to user travel time values, vehicle operating costs and safety cost savings.

The economic values awarded to environmental effects tend to be relatively low and this may not reflect national policies. There is also difficulty in valuing and applying other potential effects, such as the availability of travel choice, health effects or wider economic considerations such as agglomeration. This can mean that cost benefit analysis is of limited use for strategic decision-making purposes. For example, cost benefit analysis that identified a range of high performing

proposals in cost benefit terms, may collectively prove to e inconsistent with outcomes required by higher-level strategies. This is particularly important in New Zealand, where strategies may have been developed without quantified assessment and where individual projects are often selected solely on the basis of detailed evaluation, the major component of which is informed by cost benefit analysis.

Evaluation procedures for rail projects are required to use 'willingness to pay' and 'consumer surplus' techniques which do not fully identify option values. However, it is also worth noting also that willingness to pay will be low for rail if the service provided is poor compared to its competitors.

The detailed economic evaluation of rail proposals in New Zealand, also suffers from information shortages, the sub-optimal transport costs, and charges regime, difficulties over the allocation of funds to private beneficiaries and inconsistency on the treatment of profits.

Inappropriate cost benefit analysis currently can lead to rail services being unfairly termed 'unviable' or 'uneconomic'.

Procedures for the evaluation of non-monetised effects are included in the Economic Evaluation Manual and in other project evaluation procedures[4] used for funding purposes, although little advice on appropriate methodologies is available and in practice, evaluations tend not to apply quantified techniques to non-monetised effects

5.3 Findings

Although some modelling is undertaken at the national scale in New Zealand, this tends to be undertaken for the analysis of specific issues such as road related emissions, pollution and safety. Quantified multi-modal strategic assessments of the transport system in New Zealand are limited to regional and sub-regional network studies. These do not provide a suitable context for the strategic assessment of longer-distance rail services.

Current practice in the detailed evaluation of rail proposals in New Zealand means that:

- Detailed evaluation is not undertaken within the context of strategic assessment.
- The potential value of the rail system is not captured in detailed evaluation processes. In other words, current methodologies in New Zealand do not fully describe the wider benefits of rail to society, in economic, social or environmental terms.
- The accurate costing of rail and the identification of justified support levels is very difficult unless evaluation is based on the full economic pricing. This means assuming that marginal social cost pricing is introduced, taking account of all externalities, marginal delay costs and any historic under-investment. Alternative approaches, based on either 'business as usual' or 'financial balance sheet' are unlikely to result in optimum outcomes.
- Co-ordinated, consistent and mode-neutral detailed evaluation methodologies, based on the quantification of monetised and non-monetised effects, are not universally applied.

[4] Land Transport NZ allocation process

6 Responses to rail criticism

6.1 Strategic planning

Integrated multi—modal transport planning (incorporating rail planning) at the national scale is not required.

To achieve best value for money, it is important that central government is responsible for ensuring that co-ordinated strategic multi-modal network analysis and that strategic planning is undertaken. Where this is not the case, significant problems are likely to occur. For example, in New Zealand it has been found that: *…'' the sector is not achieving value for money''…''There is a strategic gap between the vision and broad objectives in the New Zealand Transport Strategy and their implementation''….* (Parliamentary Office, 2008)

The planning of rail can be considered in isolation from the wider transport system.

Different regulatory structures for different modes are in many ways an inevitable result of the different operating characteristics of each mode. Modes are often subject to separate legislative and funding arrangements that make the comprehensive assessment and planning of the transport system as a whole difficult. However, these problems are not impossible to solve, providing there is an appropriate degree of analysis, legislative co-ordination and funding policy by the 'centre'. For example, in the UK, comparable approaches are applied across all modes by the DfT. The repurchase by the New Zealand government of rail operations from Toll may provide an opportunity to improve the central co-ordination of multi-modal strategic assessment and rail evaluation procedures.

Multi-modal issues are already adequately addressed at regional and corridor levels.

General transport planners may not have good public transport (especially rail passenger planning) or rail freight planning experience. This may be due to a combination of their training, professional development, industry structure, career opportunities and experience. The reverse can also be true, in that rail authorities and rail operators may also have a shortage of general transport planners with a broad understanding of the transport system. These factors, combined with the strength of the road sector, have contributed to a lack of balanced multi-modal approaches (Mees and Dodson, 2006)

Rail only accounts for a small proportion of national trips, so rail is irrelevant to future transport system planning and rail demand represents only a short period of growth in road traffic.

Faster and more attractive longer distance rail could take a significant proportion of future projected road traffic growth and has the potential to be competitive with other modes, (Warren, 2007). Furthermore, the optimal use of rail would result in improved travel choices, better utilisation of existing capacity and the potential to provide more sustainable additional capacity within transport corridors.

The enhancement of long distance passenger rail would have a minimal impact on transport demand.

All transport investments, even major ones, result in marginal changes when compared with total transport demand. However, marginal changes are important, especially within the context of the long-term need to manage demand sustainably. It is also important to also consider the 'nature' of future transport demand, especially the effect of current road investments in generating additional road traffic growth.

Rail represents only a small fraction of total regional trip making, even where large investments have been made, so rail is irrelevant to future transport system demands.

This sort of reasoning makes the mistake of averaging everything in overall network terms without looking at location specific demand, for example, along capacity constrained corridors where enhanced rail services can carry a high proportion of demand, cater for additional growth in sustainable ways, satisfy specific needs and add real value.

Multi-modal studies (for example, in the UK, which has a highly-developed rail network) have shown the lack of potential of rail to address congestion problems.

The findings from these studies have been criticised (UK House of Commons, 2003) and must be seen in the context of the question asked, which was essentially: *'can improvements to non-road modes (including rail) reduce road congestion?'* A much better question would have been to ask: *'what role can the range of available modes play in achieving objectives?'* There is a need to manage road capacity responsibly and not to rely on improvements to other modes alone to solve road-based problems.

Recent work in the UK (MVA, 2007) has tried to address the source of disparities between the predictions of rail demand made by more strategic tools such as the multi modal studies, compared to the results using rail specific tools such as the Passenger Demand Forecasting Handbook (PDFH, 2007). It is thought that the source of these disparities is in the treatment of external factors. The multi-modal studies tended to treat rail by looking solely at the attributes of generalised cost, for example, in vehicle time cost, waiting time and the demographics of the population. The approach taken in the PDFH includes other external factors, such as economic growth.

Rail data is already available and is well-analysed.

The rail sector often tends to be commercially sensitive and therefore secretive in terms of the publication of data. For example, in New Zealand, there is no information on overall rail policy, assessment, evaluation, strategy or programming, and virtually no project information (ONTRACK, 2008). Similarly, in New Zealand, the rail sector does not tend to have access to public resources for modelling and analysis purposes. These factors mean that even if a public sector transport planner wanted to gain a better understanding of the rail industry, it is very difficult to do so. By contrast, many aspects of road sector planning are publicly funded and associated data and analysis is relatively freely available. The rail sector may be defensive and tactical partly because current assessment and evaluation processes tend to favour road modes. In contrast, the road sector may be relatively open, because transport assessment, evaluation and supporting funding systems have been developed mainly to apply to road-based networks.

6.2 Value and affordability

Long distance passenger rail is not viable.

Virtually all passenger rail services (worldwide) require operational support, usually from the public sector. To say, on this basis alone, that these services are unviable or otherwise represent poor value for money, indicates that a very limited financial viewpoint has been adopted.

Long distance passenger rail is unworthy of substantial amounts of financial support.

All modes have their niche and therefore potential of each mode needs be realised. New Zealand is unique in the developed world in not recognising the value of long distance rail, ''Long-distance passenger services presently receive no central or local government subsidy'' (MoT, 2005). There is a good case for supporting services on a continuous basis under certain circumstances (SRA, 2004).

Rail represents poor value-for-money.

This is an attitude that arises from adopting a very narrow basis for economic evaluation, rather than 'panning-back' to look at the larger economic, social and environmental picture and the broader benefits accruing as a result of well developed rail systems (Newman, 2004)

It has been suggested that rolling stock and locomotives are too old and it is not worth spending the finance needed to replace them.

The return on this type of investment is seen over a long period of years and reasonable depreciation and asset replacement costs[5] should be built in to avoid these one-off large 're-investment' decisions (INGENIUM, 2006)

Even if rail use were doubled, the cost of doing so would be unaffordable.

This misses the point that, in some circumstances, there may be no growth at all if the potential of rail is not utilised. It is also the case that making better use of existing rail assets is likely to represent much better value than building more expensive and relatively ineffective new roads. The use of existing rail corridors for passenger traffic can often be achieved at marginal cost and may be able to make a significant contribution in dealing with problems within particular corridors where opportunities exist for rail to obtain a higher mode share. Continuing to accommodate future road traffic growth projections on a 'predict and provide' basis is not sustainable and should be something to be prevented rather than encouraged. For example, in New Zealand it has been stated that: *..''it is economically, socially and environmentally unsustainable to continue managing transport on a demand driven basis.*'' (MoT, December 2005)

If the rail services stopped, they are likely to replaced by coaches and excursion trains, virtually all of which would be commercial.

Coaches perform essential roles, especially for lower income travellers and also for the tour group and excursion markets. The role of rail is however, distinctly different from that of bus or coach in a number of ways. For example, rail can provide a more attractive choice for car available travellers, better comfort levels for users, the potential to service 'work in travel' business markets and to target specific tourist 'experience' markets. These opportunities would be almost entirely lost if regular long distance passenger rail services were not available.

Rail also has some potential to accommodate the needs of lower income travellers through the application of 'yield management' systems. However, this requires the availability of sufficient variation in the quality and number of services to allow prices to be differentiated without reducing full fare revenue.

Few people use the train in the small stations that the trains pass through.

This may be true at present, but there is good potential for future growth if services are improved and options to achieve this need to be explored. Those who do use the stations are likely to bring much needed money into remote areas,

[5] Note: Separate consideration of a 'commercial profit' rate of return may be required

through accommodation, retail and tourist service spin-offs. Low populations and incomes results in high sensitivities to relatively small increases in local income streams. The value to the local community of the revenue from rail-based visitors is therefore high, relative to the marginal cost of transporting them.

Revenue from road users should not go to public transport.

Road user revenue is not a 'charge for service' and originated from the logic of maintaining the existing system and mitigating adverse effects, rather than paying for road expansion, which would increase adverse effects still further. It is important that all transport revenues are spent to benefit the public and this should be in keeping with the overall objectives for the transport system. There is no justification to use revenue from road users to promote additional road use. Externalities need to be recognised as costs arising from the transport system and transport system users need to pay towards reducing or compensating for these costs, including support for more sustainable travel choices.

It would be cheaper if everyone used private cars, buses, taxis, motorcycles, as rail is the most expensive mode.

Rail can only be assumed to be the most expensive mode if other modes can provide the same level of service. All modes have their niche, and rail is often the best mode to move groups of people between principal origins and destinations. This is because rail can move high numbers of people along transport corridors with restricted road capacity into central locations, speedily and reliably, within a set period.

Rail can also do other things that road modes cannot, for example, offering 'work during travel' opportunities and providing higher quality travel experiences through remote scenic areas.

In considering the relative cost and value of each mode it is also important to take account of externalities and associated costs. These are relatively low for rail compared with road-based modes.

Money could be better spent elsewhere, for example on road safety or on new roads.

Road safety is by far the biggest transport safety issue and although significant reductions in fatalities and other safety improvements have been achieved over recent decades, many problems remain. In New Zealand, road safety improvement trends appear to have reached a plateau. This is partly because most spending on new roads is directed to achieve (often small) time-savings and an increase in the proportion of road spending directed to safety and from roads to other modes, would assist in improving safety-related outcomes.

The safety record of rail is far better than road, so investing in rail indirectly addresses road safety.

Rail is a monopoly provider who may use this power to protect bad investments.

There is little evidence that this is the case in countries with deregulated rail systems. It could also be said that a monopoly situation currently applies to roads, which carry the majority of traffic. The enhancement of rail would have the effect of widening choice rather than restricting it. The important point here is to make the assessment, evaluation and economic appraisal of investments in both rail and road, a mode-neutral process, to assist the development of balanced transport strategies and better investment decision-making.

Trains are too slow and would take too long to be made viable.

In New Zealand, the inter-urban rail market is dependent on tourism and comfort advantages, rather than speed. However, if rail speeds were increased, there is good potential to develop more inter-urban and outer-urban rail services that would be competitive with other modes. The reason that significant rail investment is needed now, is a result of historic under-investment and the lack of allowance for depreciation and timely asset replacement.

Long distance rail is about freight not passengers.

Freight is the primary user of the longer distance rail network, but this is not a reason to deny the potential value of the network for rail passenger use. If the primary user of rail corridors is freight, then a case exists for considering the expansion of passenger services on routes based on charging only for any marginal costs incurred.

Integrated rail freight and passenger rail investment planning is not required.

Road planning currently takes account of future private travel, public transport and road freight needs. There is a similar need for rail freight and rail passenger potential to be considered together for integrated corridor and route planning purposes. In New Zealand, this is likely to mean that improvements to long distance passenger services (principally on the rail freight network) would need to take account of marginal costs incurred and additional benefits gained.

Helping freight transport will increase GDP and the best way to do this is by road.

Although, there is often a general historic 'correlation' between GDP growth and heavy commercial vehicle travel growth, there is little evidence of growth in road-based freight actually 'causing' significant GDP growth. The international evidence suggests that there is likely to be an increasing decoupling of GDP growth and road-based freight growth trends over time (McKinnon, 2006)) The link between road freight and GDP will become further decoupled as developed economies become more service sector orientated. There are good reasons to steer future growth in national freight volumes towards more sustainable modes, such as rail and coastal shipping.

6.3 Effectiveness

Long distance rail is ineffective, and gives little return in real terms on investment and only benefits a few tourists, backpackers and rail enthusiasts.

Rail sells individual countries to the world by offering unique tourism and leisure travel opportunities. Rail is an integral part of 'national identity' and adds to the attractiveness of a country. Today's visitors (including backpackers) are often tomorrow's migrants and business partners.

However, longer distance rail services also have an important potential role for a variety of trip purposes, including work, education and health. In Europe, rail is frequently the main mode of choice for long distance commuters and business travellers. Some potential also exists to serve this market in New Zealand, but this will require rail to be more competitive with competing modes, especially in terms of journey time.

Rail is inflexible and coaches, buses and trucks represent a more effective way forward.

Coaches, buses and trucks may be more flexible in the sense that they can access a large road network but this also means that they can incur significant delays when using congested urban or inter-urban links.

Because rail represents segregated, managed capacity, it can offer a certainty, safety and reliability that would only be possible on the road network under a completely different type of management system, for example, with full pricing and comprehensive operational control.

Furthermore, rail is flexible in the sense that it can handle both freight and passenger demands and also offers the flexibility of catering for both long and short distance trips on the same service with minimal impact on journey time.

Road congestion is the most significant transport issue and long distance passenger rail is not effective in addressing this problem.

It is true that the issue of congestion is more closely related to urban transit systems (especially urban rail and other modes) rather than long distance rail. However, inter-urban and outer urban rail services can help in supporting urban systems (Laird et al, 2005). Longer distance rail can also assist the operation of parallel road routes, which may be under pressure, particularly during periods of peak demand.

It is also important to recognise that congestion can sometimes be poorly defined and this can distort strategic planning efforts. For example congestion is sometimes defined to include any deviation from free flow speeds (Goodwin, 2003).

Money could be better spent elsewhere, for example on congestion relief.

In New Zealand, many current road investments for congestion relief purposes represent short-term relief measures. This is because the benefits generated by additional road capacity are not 'locked in' by the use of appropriate management or pricing measures. There is high potential to improve the way congestion relief measures are currently addressed, especially through the introduction of managed road network capacity. However, better use of existing rail corridors can also assist by providing an alternative to congested conditions, especially if this is supported by appropriate management or pricing measures to control any induced road traffic effects. In this way, rail investment can effectively address congestion issues.

Rail is not effective in reducing induced road traffic.

Induced traffic can reduce benefits from some road schemes within a relatively short timeframe (DfT, 2006), although this is often not fully taken account of in assessment and evaluation procedures. Induced road traffic is most significant when travel time and costs are reduced for private travel in congested conditions. Rail has the potential to accommodate increased demand sustainably by increasing passenger capacity but without inducing additional road traffic.

Rail is inefficient, for example low loadings and use of land and corridors that could be used more effectively.

Rail has the potential to be far more efficient than alternative road transport modes, in terms of the space utilisation of vehicles, corridors and 'terminal' requirements (Rodrigue et al, 2006)

Low loadings may be a result of funding and fares policies, which may fail to optimise patronage, revenue and broader outcomes. In New Zealand, operational rail support is awarded at the rate of 60% of net costs and there is no centrally developed fares policy. Furthermore, long distance rail services are not awarded

financial support and fares are set by in order to maximise revenue. This means that a spiral of decline can occur of high fares leading to declining patronage, which in turn can lead to cuts in services, which further reduces patronage. It is possible for government action and the injection of an appropriate scale of funding support to reverse this spiral of decline.

6.4 Environmental and social effects

More rail use would not result in any real environmental advantages.

If assumptions are based on low loadings, poor diesel technology and modern cars then the environmental advantages of rail may be reduced. However, rail has the potential to achieve higher loadings and to use modern diesel and electric power, in which case rail would have overwhelming environmental advantage over most competing modes (ATOC, 2007)

Rail also promotes the collective use of vehicles, better use of space within urban areas and better use of existing transport corridors, rather than requiring extensive land take and associated environmental impacts.

Rail cannot contribute to emission reduction targets.

Inter-urban car traffic is a significant factor in total transport related emissions and there is potential to reduce these by the introduction of better inter-urban rail passenger services. For example, a view has been expressed that in order to meet future UK emissions targets there should be more: *..''focus on modal switch from car to off peak rail for long distance journeys''* (UKERC, 2007)

A significant proportion of the future projected growth in transport related emissions in New Zealand are likely to be produced by heavy road trucks. Rail freight can be far more energy efficient than road freight (IPENZ, 2008) and this means that there is potential for emissions reductions to be achieved through the modal transfer of freight from road to rail.

Modern cars are more passenger-kilometre energy efficient compared with buses or trains (unlike in the 1970s) and the energy efficiency gap grows wider by the day.

Comparisons of this kind generally contrast the most energy-efficient cars with under-used and unimproved rail examples. Comparing 'the best of each' used to their fullest potential clearly shows that rail can be more energy efficient. Inter-city travel by rail has been shown to be more energy efficient than competing car and air modes (US DoE, 2007)

Rail does not offer anything significant towards a sustainable future.

Rail can assist in providing for an integrated, versatile transport system in the long term and is more sustainable than road-based modes. It is a basic mistake to think that road offers more than rail in terms of sustainability. Rail offers good potential to assist in reversing some unsustainable trends and to deliver a more sustainable future.

Rail has a limited effect on public health

Rail improvements do positively contribute to public health outcomes and this is recognised in a New Zealand National Rail Strategy objective, namely: *''To promote positive health outcomes through the enhanced use of rail'* (MoT, May 2005). Rail has good potential to be well integrated with walking and cycling networks and when this is the case, increased rail use leads to the greater use of active modes, with associated health benefits.

Road traffic, when compared with rail, has relatively large negative effects on public health. A number of the transport effects on public health can now be quantified, for example in terms of air pollution and noise (HEATCO, 2006) and

further research in this area is likely to lead to increasing recognition and better quantification of health effects in the future.

The main role of public transport is to serve those who do not drive their own vehicle because they are too young, too old, too poor, or are disabled and rail will not address these issues

The role of rail is distinctly different to bus or coach. Passenger rail often addresses the 'car available' market, much of which would not otherwise use public transport. However, rail does have a number of positive social inclusion and equity effects, for example for those who do not wish to drive long distances and for others, particularly in smaller communities and in rural areas, where there may be limited public transport alternatives.

Rail is more easily held to ransom by industrial action.

The same applies wherever there is an industrialised workforce. This is an industrial relations objection, not a transport one. In any case there are few recent examples of significant industrial relations problems involving rail.

6.5 Cost benefit analysis

Current economic evaluation procedures already put road and rail on a level playing field, without further procedures.

When rail and road comparisons are undertaken within a pricing regime that is not based on marginal social cost, evaluation procedures often create an optimism bias for road investments to the disadvantage of rail. In New Zealand, in locations where roads are priced, this has only been achievable at the expense of a public sector grant, with ongoing annual public subsidies (for example, Route 'K' in Tauranga, New Zealand).

Strategic road schemes are often 'justified' in a strategic sense on the notion of assisting longer distance traffic, although this traffic is rarely the primary beneficiary and local traffic time-savings are often the most significant factor in terms of travel time and vehicle operating costs. There is usually no distinction between long distance and short distance travel costs for road.

Other differences in road and rail are evident, for example, in New Zealand, non work user travel time for rail is valued at half the rate of car user travel time (Land Transport NZ, 2006)

Funding rules are applied appropriately across the different modes

The very extensive New Zealand state highway network is funded out of central funds at the rate of 100%, compared with much lower rates of funding for other modes, including rail. *''There are currently inconsistencies in funding and regulatory mechanisms between road, rail and sea and these need to be addressed.''* (IPENZ, 2008)

'Willingness to pay and 'consumer surplus' is already used appropriately to fully evaluate transport proposals.

The application of 'willingness to pay' within a pricing regime not based on marginal social cost is problematic and means that results on this basis of economic appraisal need to be carefully examined and qualified (Wardman et al, 2003) Willingness to pay as applied to road planning may also overvalue individual decision making and not to fully take into account wider factors (Adams, 1993).

The use of associated consumer surplus techniques does not include option, indirect use or non-use values; it is solely what people are willing to pay for their actual use of the system.

There is potential to broaden current procedures through the incorporation of option, indirect use and non-use values in terms of detailed evaluation procedures.

Cost-benefit ratios should be the sole criterion for rail evaluation.

Assuming that a multi-objective strategic assessment has been undertaken, then there will be some issues that do not require re-examination during detailed evaluation. However, it should not be assumed that cost benefit analysis alone will be sufficient for all detailed evaluation purposes. In the case of rail, all types of costs and benefits should be considered, including option, indirect use and non-use values. Furthermore. If there are other non-monetised effects then these should also be taken into account at the detailed evaluation stage.

Transport planning consistently shows that rail 'never gets a decent cost-benefit ratio'.

This is partly because not all potential benefits are included in cost benefit analysis, as discussed earlier.

It is also the case that the short-term (25 year), high-discount (10%), current cost benefit analysis methods used for transport projects in New Zealand can mean that the potential benefits of longer-term transport investments are not fully taken into account.

Conventional cost benefit analysis also tends to over-value elements that favour road and to undervalue rail elements, for example, with respect to travel time valuation. The relatively high cost benefit ratios calculated for road projects may be overstated where induced road traffic effects have not been fully allowed for.

The net effect is that the difference between road and rail proposals, in terms of cost benefit analysis, is not as great as current economic appraisals suggest (Bolland, 2006)

6.6 Findings

Strategic planning is needed to achieve best value for money and it is important that centrally co-ordinated strategic multi-modal network analysis and planning is undertaken. Where this is not the case, significant problems are likely to occur.

New Zealand is unique in the developed world in not recognising the value of long distance rail, ''Long-distance passenger services presently receive no central or local government subsidy'' but there is a good case for supporting long distance rail services on a continuous basis.

Rail sells individual countries to the world through providing tourism and leisure travel opportunities. Rail is an integral part of 'national identity' and plays a role in the attractiveness of a country to visitors. Today's visitors (including backpackers) are often tomorrow's migrants and business partners. Longer distance rail services also have an important role to play for a variety of trip purposes, including work, education and health.

Rail has the potential to achieve overwhelming environmental advantages over most competing modes. Rail also promotes more efficient vehicle use, better use of space within urban areas and the better use of existing transport corridors. Road options tend to require more extensive land take and to generate greater environmental impacts.

Cost benefit analysis cannot be relied on as the only method of determining rail proposals and it is important to consider other effects at the detailed evaluation stage. As currently practised, cost benefit analysis tends to undervalue rail proposals and to over-state road proposals. The net effect of this is that the

difference between road and rail proposals, is not as great as current cost benefit analysis suggests.

7 Need for improved processes

7.1 Analytical framework

Rail potential needs to be considered within an appropriate analytical framework.

Eddington (Dec 2006) suggests that assessment and evaluation processes should be undertaken using the background assumption that an optimal pricing regime based on marginal social cost will be in place in the future.

The marginal social cost analysis undertaken for the New Zealand Surface Transport Costs and Charges Study (Booz Allen Hamilton, 2005) suggests that a subsidy for long distance rail is warranted and these findings are consistent with a similar study undertaken earlier in the UK (Sansom et al, 2001).

Once an appropriate analytical framework is defined, then issues and future development options for the transport system can be considered using assessment and evaluation processes.

The question of the public or private ownership or operation of railways does not materially affect the need for appropriate assessment and evaluation procedures. In all circumstances, it is important that these procedures are co-ordinated with the rest of the transport sector, are consistent with wider objectives and are mode-neutral.

Current New Zealand policy and practice operates on the basis of 'business as usual' assumptions and an analytical framework based on current sub-optimal pricing policies. .

7.2 Options and alternatives

In New Zealand, legislation[6] requires that the early and full consideration of options and alternatives is undertaken. This needs to be undertaken on a comprehensive and open-minded basis, regardless of historic policy stances.

In identifying alternatives and options, the following aspects are important:

- An objective approach should be taken to examining the role of rail at the national and regional scales. Rail alternatives and options need to be integrated with considerations for other modes, including road based public transport.
- A detailed investigation of the future potential of rail is needed (see 2.3 above) to provide a sound basis for the development of options and alternatives.
- Development of macro-scale options and alternatives is needed, for example to take account of the effect of a well-developed national rail network on economic, environmental and safety performance.
- Improved passenger rail services or improved freight facilities should not be considered in isolation. The potential for improved freight and passenger services should be considered simultaneously to establish the best value for money and to obtain the best outcomes for inter-urban corridors (Alcan Rail Link Inc., 2006). In other words, there is a need to look for positive synergies between passenger and freight networks.
- The cost of <u>not</u> investing in the existing rail network and any associated lost opportunity benefits should be considered.
- Comparison between rail proposals and other options to provide an equivalent capacity increase on other modes is needed. For example, where roads are at

[6] Land Transport Management Act

capacity, improvements in rail capacity can often be achieved within existing corridors without requiring new land and associated environmental impacts.

7.3 Strategic Assessment

New Zealand would benefit from adopting good international practice in strategic assessment, supported by appropriate techniques institutional commitment and resources. It is also very important that assessment processes are open and transparent.

Appropriate data needs to be gathered and analysed in support of assessment and evaluation procedures in order to accurately identify and quantify issues.

Models and other techniques are required to test and forecast the effects of options and alternatives. New Zealand does not currently have a national network modelling capability to assist in the development of a national transport strategy or the assessment of associated investments. Furthermore Current transport planning practice in New Zealand is primarily road network focussed and conventional transport modelling at the regional and sub-regional scales in New Zealand, is often of limited use in the evaluation of rail modes.

In the UK, the conventional multi-modals have been found to understate rail demand growth (MVA, 2008). This is due to the underlying structure of conventional transport models, an inadequate allowance for induced traffic and a general problem with large multi modal models in dealing with minority modes. It is also worth noting that conventional transport models tend to ignore issues such as reliability, crowding, and interchanges, all of which are important for rail. Better modelling and analysis of rail issues is therefore required.

Good evidence is available on the determinants of rail demand from econometric studies of actual experience and from stated preference based market research, brought together in the Passenger Demand Forecasting Handbook, which feeds in to UK DfT rail appraisals.

An overall framework for strategic transport assessment is needed, and good examples of this are available elsewhere, including Australia (Australian Transport Commission, 2006)

Test scenarios for assessment purposes are recommended to include comparisons of options and alternatives against:

- Current or recent base year conditions
- All options and alternatives (potential scenarios)to be tested against the background assumption of future optimal economic conditions (Eddington, 2006) in other words, assuming full economic pricing based on marginal social cost.
- Potential scenarios are recommended to include a ‘do-nothing’ scenario and a future ‘business as usual’ scenario, for comparison purposes.

Rail has many strengths, including servicing agglomeration centres, maximising accessibility in particular corridors, providing reliable peak period travel in congested conditions, providing work in travel opportunities and providing a scenic travel experience. In some circumstances, rail may not only be beneficial, it may be essential and if so this needs to be clearly identified during strategic assessment and subsequent detailed evaluation and decision-making processes.

The willingness of the public to support the continuation and improvement of rail services also needs to be taken into account in decision-making processes.

7.4 Detailed evaluation

Good international practice indicates the need to undertake detailed evaluation within the context of a multi-objective strategic assessment, as described above.

Similarly, good international practice in the detailed evaluation of rail investments and services, indicates that cost benefit analysis should include as many monetised factors as possible (ITS Leeds, 2007). Sensitivity testing of the appraisal period and discount rate (10%) in cost benefit analysis is also recommended.

It is important for detailed evaluation to take account of any relevant non-monetised factors and for these to be quantified wherever possible (DfT, October 2007). These additional benefits may include some environmental, health and broader economic effects.

Rail evaluation procedures in New Zealand are not currently coordinated, consistent or mode-neutral.

7.5 Way forward

In New Zealand, national and multi-regional scale transport planning needs to be undertaken on an integrated multi-modal basis and to be supported by appropriate data, techniques and resources.

All modes have their niche and it is important to ensure that the potential of the longer distance rail network is thoroughly explored. In order to do this, assessment and evaluation procedures need to describe and optimise the contribution of rail to national objectives.

Strategic assessment can assist in exploring the potential role of rail, including options to improve and support long distance passenger services as well as to test possible synergies with freight networks.

Strategic assessment should also consider the need for rail to be developed as a long-term strategic alternative to road, because of future fuel uncertainties, emissions reduction potential, and the provision of reliable, high quality travel choice options.

Detailed evaluation is also important, especially if it takes place within the context of an appropriate strategic assessment, in order to prevent an overly narrow and project-focussed approach being adopted.

Appropriate detailed evaluation of longer distance rail services will assist in maximising the value of the national network by improving usage, optimising outcomes and demonstrating value for money.

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