Ministry of Transport
TE MANATŪ WAKA

Understanding Transport Costs and Charges

Phase 1

Final Report

September 2008

Report no: AB000037

Hyder Consulting

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Understanding Transport Costs and Charges (UTCC) Phase 1

Final Report

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1 Introduction

The transport sector imposes potential impacts on society at a local, national, and global level. Therefore, understanding transport costs and charges is critical to developing effective transport policies aimed at enabling the transport industry to operate efficiently and minimise potential economic, environmental and social impacts on society. Congestion, physical deterioration, extent of revenue generation, increased accident and emissions rates and distortions between transport modes reflect, amongst other things, inefficiencies in the transport pricing, charging, and funding arrangements.

This report will first provide a broad understanding of pricing, charging and funding arrangements in the maritime, road and rail transport modes before analysing the gap between costs and charges information requirements and the information currently available. A recommended work plan for estimating and collecting the relevant costs and charges information concludes this report.

The purpose of this project is to develop a recommended work plan for collecting costs and charges information based on the stakeholder priorities of information gaps. Developing this work plan will enable the collection of costs and charges information which best provides government transport policy officials with the necessary means of developing and implementing transport policy within, and between, the road, rail and maritime transport modes.

1.1 Previous costs and charges studies

The Ministry of Transport released an investigation into Surface Transport Costs and Charges (STCC) in March 2005[1] which provided some snapshot estimates of the total, average and marginal costs and charges associated with the road and rail networks for 2001-02.

The reasons for updating costs and charges are that:

1. substantial changes both in the road and rail sectors since 2001-02; therefore STCC estimates and the comparisons between modes may be largely out of date.

2. an absence of costs and charges information for the maritime sector which makes it difficult for the industry and the policy makers to understand the opportunities for increasing coastal shipping as a means to transport domestic freight.

[1] Booz Allen Hamilton (2005)

The UTCC project follows up on the STCC study and aims to provide an understanding of current funding, pricing and charging arrangements across the road, rail and maritime transport modes.

1.2 Purpose

The purpose of this project is to provide a recommended work plan for collecting costs and charges information based on the stakeholder and policy priorities of costs and charges information gaps. This work plan is to be of a dynamic nature so that the costs and charges information can be collected in phase 2 of this project and then periodically updated. Completion of phase 2 will result in a costs and charges information base which is consistent and comparable across the three transport modes and can be used by government policy and industry stakeholders, in tandem with other information, to efficiently set pricing, charging and funding arrangements.

1.3 Scope

Pricing, charging and funding arrangements will be outlined, described and drawn diagrammatically to a detail which provides Ministry of Transport with a broad overview of how funds flow from the introduction of funds by the government through to the charge placed on the end transport user and the pricing and charging arrangements which contribute to this flow of funding.

Pricing, charging and funding arrangements will be outlined for the three transport modes, being maritime, road, and rail transport. Alternative transport modes, such as walking and cycling, are to be covered within the road transport mode. Air transport is outside the scope of this project.

A critical appraisal of each pricing, charging or funding arrangement will not be carried out at this stage as the purpose of the phase 1 project is only to provide a broad overview of the arrangements in place in each transport mode as well as between the transport modes.

The scope of providing funding, pricing and charging arrangements does not include the collection or estimation of quantitative information. The aim of this project is solely to provide a recommended work plan for collecting costs and charges information.

1.4 Project phasing

Collecting the costs and charges information required for transport policy development, implementation and evaluation is an intensive process. To maximise the potential value of costs and charges information collected, the UTCC project adopts a two-phase process which consists of:

- **Phase 1** – a stock-take of the current domestic transport funding, charging and pricing arrangements and a gap analysis to identify

transport costs and charges information needs. A recommended work plan that encompasses the priority, desirability, and practicality of further data collection and estimation will be developed.

- **Phase 2** – data collection and estimation of costs and charges for the three modes, in light of the work plan and priorities identified under Phase 1. This phase is likely to involve a series of work streams to ensure costs and charges information is collected and estimated at the appropriate level of segmentation.

The expected date of completion is July 2008 for phase one and December 2010 for phase 2.

1.5 Report structure

The report is structured as follows:

- **Section one – Introduction, purpose, and scope of UTCC**
- **Section two – Executive summary**
- **Section three – Methodology**: this section outlines the general methodology used in the project.
- **Section four – Overview and critical appraisal of Surface Transport Costs and Charges (STCC)**: this section outlines the methodology and conclusions provided in the original costs and charges study completed in 2005.
- **Section five – Stocktake of funding, pricing and charging arrangements**: outlines the industry structures of the three transport modes and how the industry structure, and government intervention, influences the funding, pricing, and charging arrangements. The differences in industry structure also have a direct influence on the costs and charges information requirements and level of difficulty in collecting further information.
- **Section six** – **Gap analysis**: outlines costs and charges information prioritisation criteria that are used for identifying costs and charges information gaps to appear in the recommended work plan for collection. The information gaps identified from consultation with policy agencies and industry stakeholders and from the stocktake analysis are then outlined and evaluated against each of these criteria to form a prioritised list of information gaps which forms the based for the costs and charges information collection work plan.
- **Section seven** – **Proposed work plan until December 2010**: this section concludes by providing a recommended work plan for costs and charges information collection, based on the prioritised list of information gaps previously determined.

2 Executive summary

The transport sector imposes potential impacts on society at a local, national, and global level. Understanding transport costs and charges is critical in developing effective transport policies aimed at enabling the transport industry to operate efficiently and minimise potential economic, environmental and social impacts on society.

Costs and charges information is required so that government policies can be developed which increase the potential for the transport modes to be efficiently integrated. Once government policy has been implemented, costs and charges information is required to evaluate the effectiveness of government policy against pre-determined targets.

The purpose of phase 1 of this project is to provide a recommended work plan for collecting costs and charges information based on the stakeholder and policy priorities of information gaps. This work plan is to be of a dynamic nature so that the costs and charges information can be collected in phase 2 of this project and then periodically updated. Completion of phase 2 will result in a costs and charges information base which is consistent and comparable across the three transport modes and can be used by government policy and industry stakeholders, in tandem with other information, to efficiently set pricing, charging and funding arrangements.

The work plan is formulated by first completing a stocktake of funding, charging and pricing arrangements in each of the three transport modes and then completing a gap analysis.

The modal stocktake outlines the differences in market structure which directly determine the costs and charges information required and the level of difficulty in collecting further information. In particular, the modal stocktake focuses on how the level of government/commercial ownership affects the pricing, charging and funding arrangements within each of the three transport industries.

The gap analysis starts by outlining the prioritisation criteria that are used for developing the collection work plan. The information gaps identified from consultation with policy agencies, industry stakeholders and from the stocktake analysis are then outlined and evaluated against each of these criteria to develop a prioritised list of information gaps. This forms the basis for the costs and charges information collection work plan.

The work plan then uses the prioritised information gaps and sequences information collection in such a way to maximise value for money collection by taking account of how interdependencies between the information may affect data collection and the level of detail sought.

2.1 Stocktake overview

Pricing, charging and funding arrangements are fundamentally determined by the level of government ownership and involvement in the market.

The stocktake in this report outlines the differences in the level of commercial and government ownership in each of the maritime, road and rail markets. This leads to vast differences in the level of pricing, funding arrangements, annual government investment, externalities imposed, direct and indirect charges and operating structures within each of the three transport industries.

The maritime industry is very commercial in nature and is primarily focused on the transport of freight. The majority of infrastructure providers and service operators are commercial organisations (although many ports have a high degree of local government ownership). This results in the market being dictated by commercial charges between infrastructure providers, service operators and end users, with little government intervention or funding.

The maritime industry in New Zealand plays a crucial role in the import and export markets. According to Rockpoint Corporate Finance (2008), New Zealand ports collectively handle 60 million tonnes of cargoes, 66% of which relates to direct imports and exports, with the balance being either domestic cargo movements or transhipments. The maritime sector, however, carries only 15% of domestic inter-regional freight (in tonne kilometres) in New Zealand.

The level of commercial ownership in the maritime transport sector means that further costs and charges information collection may prove to be difficult because of its sensitivity.

The rail sector has experienced several significant changes in ownerships in recent decades. In the 1980s, the railway and ferry operations were owned and operated by a state-owned corporation called New Zealand Railways Corporation. In 1990, the government transferred all of its rail and ferry assets and related liabilities to New Zealand Rail Limited, a limited liability company wholly owned by the government. NZ Rail Ltd was then sold to Tranz Rail Holdings in 1993[2].

The government re-purchased the Auckland rail infrastructure in 2001 and the rest of the national rail network in 2004. The New Zealand Railways Corporation (trading as ONTRACK) has held these assets since 1 September 2004. More recently, from 1July 2008, rail (with the exception of Auckland rail assets) and ferry services were again transferred back into the government's ownership. Now the government is the main provider of infrastructure (through ONTRACK) and the main operator (through KiwiRail).

[2] New Zealand Institute for the Study of Competition and Regulation Inc (1999)

Due to a long period of neglect and deferred maintenance, additional investments are required in order to help improve the effectiveness of the rail network. As a result, the rail transport industry has a considerably higher level of government funding than the maritime industry.

The main charges in the rail transport industry are either track access charges or freight charges and public transport fares. Track access charges exist between infrastructure providers and either: freight transport operators, public transport operators, industrial operators or tourism operators. Freight charges and public transport fares exist between these operators and the end users of rail transport.

Maritime and rail transport infrastructure in New Zealand does not exhibit public good characteristics because users can be excluded from consuming the transport infrastructure.

The road transport industry has a mixture of government and private ownership. The public good characteristics of road infrastructure and the history of and legislation surrounding public road provision mean that the government is the provider. Service providers, however, are private individuals and organisations. The result is that the costs and charges within the road transport industry are a mixture of private and government charges – the government places charges on the user of the transport infrastructure through motor vehicle registration and licensing, road user charges and fuel excise duty. Private users also incur costs of ownership and maintenance of operating their vehicle on the transport network. The remaining charges are between the private service providers and the end users (e.g. freight charges or public transport charges).

Due to the government's high level of involvement in the rail and road transport modes, the costs and charges information is more readily available and less difficult to collect.

2.2 Gap analysis

The gap analysis section provides a prioritised list of costs and charges information gaps that form the basis of the information to be collected in the work plan.

The first step of the gap analysis involves outlining the criteria that are used for identifying costs and charges information gaps and priorities. The evaluation determines whether the information is:

- a priority for policy development and evaluation
- available or soon to be available from other sources
- practicable to collect taking account of technicality, time and budget issues

The information gaps identified from consultation with policy agencies, industry and from the stocktake analysis are then outlined and evaluated against each of these prioritisation criteria.

The major conclusion to come from the consultation process is that a consistent evaluation framework and methodology for estimating costs and charges information would be required before any information is collected.

There are no up to date studies which use a comparable evaluation framework for estimating costs and charges across the three transport modes. There is also no agreed evaluation framework between stakeholders in the three transport modes on which to collect comparable costs and charges information. Therefore, this is a major information gap which is of the highest priority.

In addition to the comparable evaluation framework and methodology for costs and charges information collection, the consultation process resulted in specific costs and charges information which is required by transport policy and industry stakeholders. In the report these estimates are separated into estimates which need updating from the STCC study and estimates that are new requirements.

Major information gaps exist the most in the maritime transport sector. This is a result of the commercial nature of the sector and the fact that the STCC report did not include the maritime sector. Information gaps exist in both the rail and road sector, however, these gaps largely exist due to the information contained in the STCC (2005) being outdated. Costs and charges information gaps which are of the highest priority are:

- Opportunity cost of capital
- End user charges, including a breakdown of commercial charges in the maritime sector
- Costs of emissions
- Costs of congestion

The priority level is based on the importance of each information gap to policy development and evaluation and the practicality of collection (both technical and budget feasibility are considered).

Some information requirements previously outlined are expected to be collected outside the work plan for UTCC, e.g. through NZTA's research programme. It is not cost effective to also include these information gaps in our work plan. The information gaps which we expect are to be collected elsewhere are:

- factors influencing transport demand, including elasticity relationships
- benefits of transport consumption
- costs and charges in the air transport mode

These information gaps are important components for understanding the impacts of costs and charges on transport demand, and modal choice (including aviation) and developing efficient and effective government policy. Therefore, these gaps will be evaluated at the end of the project to ensure that they have, in fact, been collected elsewhere, to the level of segmentation required.

2.3 Work plan

The work plan section concludes this report by providing a recommended work plan for costs and charges information collection, based on the prioritised list of information gaps. The work plan is based on an expected date of December 2010 for completion of information collection.

A critical point for this section is correctly sequencing the work plan to ensure that costs and charges information is collected efficiently, and conclusions can be drawn as early as possible.

The comparable evaluation framework for collection and estimation of costs and charges information is of highest priority and is required before any information can be collected. It should, therefore, be completed first. A consistent comparable evaluation and estimation methodology will be determined for:

- estimating costs, whether it is marginal, fully allocated or average cost determination. This section of methodology will also evaluate the measurement basis e.g. marginal costs per tonne kilometre.
- valuing transport assets, including land and infrastructure assets.
- valuing social costs, including the method for attributing social costs between internalities and externalities
- estimating the opportunity cost of capital for the three transport modes, e.g. the use of opportunity cost method or social rate of time preference.
- determining the distribution of price paid by the end user, i.e. determining which users pay the advertised rack rate and which users pay a negotiation price which is lower than the rack rate.

This will allow the costs and charges within each transport mode to be collected and compared consistently and correctly.

Freight and public transport end user charges should be collected first (and while the framework is being completed) because they are observed, not estimated, and do not require a large framework prior to information collection. Collecting charges in each transport mode will provide the first step in carrying out modal competition analysis.

The maritime transport industry estimates should be completed before the other transport modes. This is due to the fact that there is currently limited costs and charges information available in the maritime industry. Information collected in the maritime industry can then be compared with information currently available in the other transport modes to provide initial conclusions.

Case studies should be completed to gain the marginal costs of transport to the correct level of segmentation. The case studies should be completed after the collection of other costs and charges information so that the correct segmentation level can be obtained and so that any residual costs

and charges information gaps (not collected previously due to methodological constraints) can be estimated.

The collection of costs and charges information should be grouped into broad areas (such as externalities, end user charges, etc) so that the methodology is used consistently within the broad areas to ensure that conclusions are robust.

A general outline of the work plan is provided in Table 1 below. It is assumed that this work plan will begin in December 2008 and be completed in December 2010.

Table 1: Costs and charges information collection work plan overview

Broad costs and charges information groups	**Collection period**
Consistent evaluation framework and methodology for estimating costs and charges	December 2008 – September 2009
Transport charges	January 2009 – August 2009
Transport costs	April 2009 – June 2010
Costs and charges case studies	November 2009 – October 2010
Revenue and funding	May 2009 – October 2010
Other information	June 2010 – December 2010

Throughout the work plan, further work is needed to develop more detailed specifications of the costs and charges information and the segmentations required before it will be possible to judge the efficiency of providing this data. This should be carried out in developing the consistent and comparable methodology for collection of costs and charges information. At that stage it may be necessary to conduct further consultation to confirm whether stakeholders are willing to provide the identified information, what level of segmentation and detail is required and to confirm the relative need for collecting information gaps that are particularly difficult or expensive to collect.

The critics which followed the release of the Surface Transport Costs and Charges (STCC) report in 2005 are addressed in the work plan by:

- completing a detailed comparable consistent evaluation framework for estimating costs and charges
- carrying out continue consultation with government policy and industry stakeholders in the transport industry.

The only critique which is not addressed is the inclusion of transport benefits in the work plan. However, it is expected that the benefits of transport are to be collected in other work streams. An evaluation will be completed at the end of the work plan to determine whether further work is required in this area.

3 Methodology

The methodology outlined below involves an overlapping three step approach. The steps are:

1 Documentation of charging and funding systems

2 Consultation

3 Gap analysis and recommended work plan

3.1 Modal Stocktake of charging and funding systems

Costs and charges in each transport mode will be outlined and drawn diagrammatically. A broad overview of the funding sources and the flow of funds in each transport mode will also be given. This documentation was completed by our team of industry experts for the road, rail and maritime sector prior to the consultation process being undertaken. During the consultation process the stocktake of each mode was discussed with the relevant central government and industry stakeholders in order to finalise the overview of pricing, funding and charging arrangements in each of the three transport modes.

3.2 Consultation

The consultation process involved reporting the demand for, and priority of, costs and charges information for transport policy stakeholders given their current and forecast work programme. This information was then synthesised and prioritised to form the total priorities for costs and charges information.

A mix of workshops, face to face interviews and telephone interviews were carried out to identify costs and charges information priorities and gaps in costs and charges information.

3.3 Gap analysis and recommended work plan

The gap analysis will follow the consultation sessions and will identify the gap between the costs and charges information priorities and the costs and charges information currently available.

Each information gap will then be assessed in terms of its policy priority, availability, and practicality to form a work plan for further costs and charges information estimation and collection.

4 Overview and critical appraisal of Surface Transport Costs and Charges

An overview of the *Surface Transport Costs and Charges* (2005) report is provided below along with an evaluation of the critiques the report received after its release.

4.1 Overview of Surface Transport Costs and Charges (2005)

The original Surface Transport Costs and Charges (STCC) report conducted an analysis of costs and charges within the road and rail transport sectors in order to provide baseline estimates for the 2001/02 year. The baseline data was gathered to assist the government in making decisions on the relative position of road and rail for freight transport and of rail, bus/coach and private car for person transport.

The baseline indicators produced in the STCC report provide a snapshot of private and external costs and charges for infrastructure owners, network operators and end users in the road and rail transport sectors.

Costing methods and concepts

The STCC estimates of costs and charges are separated into:

- total /fully allocated costs and charges - this approach involves assessment of aggregate costs and corresponding charges for the NZ surface transport system overall, divided first into its two main modal components – the road system and the rail system – each of which is then further sub-divided
- marginal costs and charges –this approach focuses on marginal costs for those sub-sectors in which there is the closest competition between modes, i.e. urban person transport, longer-distance person transport and longer-distance freight transport.

<u>Total/fully allocated costs and charges</u>

Fully allocated costs and charges approach allocates the total costs between users on some ‘equitable’ basis. Currently road users are charged under the “pay-as-you go” (PAYGO) road user charging scheme. PAYGO is a special case of fully allocated cost approach (i.e. allocate total costs between users on some predetermined basis). Under PAYGO, investment is charged directly to users in the year in which it is undertaken. In the case of road network infrastructure, these costs are allocated by:

- user groups (trucks and cars)

- road types (state highway and local roads, with each of these categories broken down further between urban and rural areas).

For rail network infrastructure, total costs and charges are allocated across three sub-sectors:

- long distance passengers
- urban passengers
- freight

Marginal costs and charges

Marginal Costs (MC) are the change in total social costs resulting from a unit increase in demand. The term marginal cost is often used interchangeably with marginal social cost, to refer to the sum of marginal private costs and marginal external costs. The STCC analyses focus on short run marginal costs, which assume that the current level of infrastructure provision is fixed.

Under the marginal cost pricing approach, fixed costs are not charged for. Hence, the revenue collected may not be enough to cover all financial costs. To obtain the benefits from marginal cost pricing and to ensure financial cost recovery at the same time, 'marginal cost plus' has been used in practice. The STCC report discussed two common approaches of marginal cost plus pricing, namely Ramsey pricing and two-part tariffs.

Outputs and interpretation

The STCC provides estimates of costs (fully allocated or marginal) and corresponding charges, split between:

A) user/operator resource costs, i.e. those resource costs (including travel time) directly incurred by the user/operator

B) user/operator charges, i.e. charges directly paid by the user/operator

C) provider costs and external costs, separated into 'financial' costs and 'social' costs.

These component estimates are then used to derive:

A+B = total (fully allocated or marginal) costs faced by the user/operator.

A+C = total (fully allocated or marginal) economic costs to society associated with the transport system and its maintenance and operation.

C–B = difference between provider/external costs incurred and charges levied, either overall or at the margin.

- The total user/operator costs (A+B) represent the costs and charges as perceived by the user/operator, which are the key influence on travel decisions, including choice of mode. Thus the modal

comparisons of total user/operator costs are important in understanding choice of mode, including highlighting those situations in which there is close competition between modes.

- Information on the charges (item B) compared with the total costs (A+B) sheds light on the magnitude of charges levied relative to total user/operator transport costs. This is helpful in assessing the likely degree of user/operator response (in terms of mode switching or travel generation/suppression) to any changes in charging policies that might be contemplated.

Information on total user/operator costs (A+B) compared with total economic costs (A+C) gives a measure of 'social cost recovery'. However, there are a number of difficulties associated with such comparisons.

- First, these 'social cost recovery' estimates related to the total economic costs, not just financial costs. If a financial cost recovery approach is of interest, only a subset of these economic costs would be involved.
- Second, the road and rail fully allocated cost analyses are not fully consistent in all aspects. In particular the road system analyses include the resource value of travel time for non-business travel (by car and bus), while the rail analyses exclude this (for rail passenger trips).

In view of the above, the STCC study concentrated on comparisons between the provider/external costs (item C) in each sector and the charges currently levied (item B). This information provides a basis for discussions around appropriate levels of charging.

Cost estimates

The baseline data for the 2001-02 year relates to the infrastructure and operating arrangements in place at that time, before the Government repurchased the rail infrastructure.

The rail and road sectors differ in the level of ownership by private commercial entities. The road network infrastructure is largely publicly (state) owned and a return on road infrastructure assets is not required to be earned under current funding arrangements. The rail infrastructure, on the other hand, was (at that point in time) owned by private entities which require a return on assets to be earned. In order to compare the two modes consistently, the calculations presented in the STCC report include a return on recoverable assets (i.e. assets which have significant opportunity costs) for both modes, but no return on non-recoverable assets (i.e. assets which have no opportunity costs and costs are sunk).

Total costs – Road[3]

The total cost (excluding capital return on non-recoverable assets) of the road system and its use is $34 billion per annum. Of this, the key elements are:

- User costs (89% of total)
  - vehicle operating costs (including vehicle capital costs) 49%,
  - traveller time costs 33%,
  - additional road accident costs experienced by road users but not internalised within vehicle operating costs 6%,
  - parking costs 1%.
- Provider and external costs (11% of total), including:
  - network operating and maintenance costs (2.6%)
  - capital return on infrastructure assets (2.3%)
  - depreciation costs (0.1%)
  - environment costs (3.6%) – this includes water quality, noise climate change, and air pollution.
  - fire, police and ambulance services (0.6%)
  - additional road accident costs experienced by non road users (1.8%)

The user costs are the direct costs associated with the individual transport user, and are directly paid for by the user.

Provider and external costs total approximately $3.7 billion per annum and account for 11% of total annual costs of the transport system (as outlined above). The financial components of these costs are recovered by way of the following charges on users or the public generally:

- Fuel Excise Duty (FED)
- Road User Charges (RUC)
- Motor Vehicle Fees (MVR)
- Other Charges (Police fines, fire insurance levy)
- Territorial Local Authority (TLA) roading rates

[3] It must be noted that the total costs for road and rail are not directly comparable due to differences in methodologies used.

Total costs– Rail

The total costs of the rail network in the 2001-02 year were $527 million, comprising:

- Operating costs (61%)
- Capital charge on rolling stock (12%)
- Capital charge on infrastructure assets (25%)
- Environmental externalities (2%)

Marginal Cost Analysis – Case Studies

The STCC study analysed eight different cases of urban person transport, long distance person transport, and long distance freight transport. Details of five of these case studies were provided in the Annex of the STCC report.

Urban person transport

Three urban passenger transport case studies are presented:

- Auckland: typical trips, of 10km length, between suburban areas and Auckland CBD, by each of the car, bus, and train modes.
- Wellington: typical trips, of 10km length, between suburban areas and Wellington CBD, by each of the car, bus, and train modes.
- Waitakere – Auckland: typical trips between Waitakere (within easy reach of Waitakere railway station) and Auckland CBD (trip length approximately 20km), by each of the car, bus, and train modes.

These case studies concluded that for cars, "*charges (fuel duty) are only a small proportion of the marginal provider/external costs. The main proportion of marginal provider/external costs for car users is congestion externality. This is true in both peak and off peak"*.

Urban public transport user charges for peak period travel cover approximately 40% of the marginal provider/external costs for bus services and 50%-75% for trains. During the off-peak period, charges (for buses and trains) are substantially greater than marginal provider/external costs.

However, as noted in the STCC report, "*marginal costs do not reflect what charges would be necessary to recover the total costs involved in the existing systems*".

Long distance person transport

Two different cases were analysed for long-distance travel by car, coach and train:

- Auckland – Wellington: typical trips by car (various levels of occupancy), coach and train.

- Picton – Christchurch: typical trips by car (various levels of occupancy), coach, minibus (shuttle vehicle) and train.

These case studies concluded that, for cars, charges (fuel duty) are somewhat less than (on average about two-thirds) the marginal provider/external costs. However, both provider/external costs and charges are small, typically around 5% of total travel costs.

For coach travel, current user charges (fares) are rather less than marginal provider/external costs. For train travel, charges are significantly greater than the marginal costs (this reflects that marginal costs are significantly below average costs).

Freight transport

Short run marginal cost appraisals for long-distance freight movements have been undertaken for three different cases, in each case comparing costs for movements by truck and train:

- Napier – Gisborne: focusing on freight which road and road transport modes are feasible alternatives (in particular future movements of logs and forestry products).
- Auckland – Wellington: focusing on movements of general freight.
- Kinleith – Tauranga: focusing on movements of logs and forestry products.

The major findings from the freight appraisal are extracted below:

- *The main marginal external cost associated with rail freight transport is environmental impacts, although these are small relative to other cost items (most other costs are internalised within the rail business).*
- *For the primarily rural movements analysed, the environmental impact costs are similar in magnitude by the two modes.*
- *Current truck charges (mainly RUC) are in most cases greater than the level of marginal provider/external costs (principally accident externalities and marginal road wear).*
- *For typical longer-distance general freight movements, which can be served by the rail network, both the operator cost rates and the marginal economic rates are quite similar for the two modes. This indicates that the choice of mode will often be finely balanced where it is dictated by either user cost considerations (i.e. time and freight rates) or economic considerations.*

It must be stressed again here that, marginal costs do not reflect what charges would be necessary to recover the total costs involved in the existing systems.

4.2 Submissions on STCC

Following the release of the STCC reports in 2005, a number of submissions were made in relation to the report content, conclusions and interpretation of its findings. Submissions were received from the Road Transport Forum (RTF) of New Zealand, the Automobile Association (AA), and a number of other parties.

This section seeks to summarise and comment on the main points made in these submissions, so that these can be taken account of in future work (to the extent that they have validity). The points made were focused around the following areas:

- Confusion between 'social cost recovery' and 'total provider/external costs to user/operator costs' ratios
- Misconceptions surrounding the link between STCC and transport policy development
- STCC's inclusion of external costs, but not benefits.
- Accident externalities
- Total Cost segregation by vehicle type and routes
- The data produced in STCC dated quickly

A number of comments also queried the current relevance of 2001-02 data, as more recent data are now available. There was also support for the inclusion of maritime transport along with road and rail transport in any future updating work.

The comments made in the submissions have been significant in shaping the future work programme on costs and charges work. The following provides our commentary on each of the main aspects addressed in the submissions.

Aspect # 1: Confusion between 'social cost recovery' and 'total provider/external costs to user/operator costs' ratio

Consultant comments. Due to the implications on efficient charging, the STCC study emphasised on comparisons between the provider/external costs in each sector and the charges currently levied on that sector. Unfortunately, this has been misinterpreted as the level of financial cost recovery and has been used for modal comparisons. The repeated misuses of the study results have led to numerous complaints by both the road and rail sectors.

There are two important points to note here:

1. Extending the comparisons of the provider/external costs and user charges between road and rail are not very informative. Due to the difference in operations, the components included in both sectors are

not identical. For example, operating costs are counted as provider/external costs for the rail sector but it is counted as private costs in the road sector. Such fundamental difference makes such modal comparisons invalid.

2. We need to distinguish the difference between financial cost recovery and social cost recovery. Social cost recovery refers to total economic costs to total user/operator charges ratio. For road transport, a large part of the total economic costs is private costs such as vehicle operating costs. Therefore, the level of social cost recovery for road is relatively high.

   However, there are a number of caveats and difficulties associated with the social cost recovery measure.

   - First, the 'cost recovery' estimates related to the total economic costs, not just financial costs. If the non-financial costs were excluded, the financial cost recovery ratios would rise and the modal comparison would change.
   - Second, the road and rail analyses are not fully consistent in all aspects. In particular the road system analyses include the resource value of travel time for non-business travel (by car and bus), while the rail analyses exclude this (for rail passenger trips).

Aspect # 2: Misconceptions surrounding the link between STCC and transport pricing policy

Consultant comments. The principal objective of the STCC project was to provide baseline estimates of costs and charges within the road and rail sectors in order to assist the government in making decisions on the relative position of road and rail transport. The report was never intended to be used to develop transport pricing policy. Instead it was to be used only to provide base data, for use in subsequent policy development work.

Unfortunately, many readers have linked costs and charges comparisons to pricing policy and the level of charging. It is difficult to avoid such misconceptions in a project, such as STCC or UTCC, which is not developing policies but clearly will have some strong policy implications and is likely to be seized on by others to try to draw policy conclusions. This potential difficulty needs to be recognised both when formulating the work programme and particularly in presenting the findings.

Aspect #3: STCC's inclusion of external costs, but not external benefits

Consultant comments. This comment also indicates misperceptions as to the role, scope and intended application of the STCC reports. These reports analyse the costs of transport and the way these are recovered through charges. They do not examine the benefits arising from the existence and use of the transport system. One submission suggested that

this omission leads "to biased and incorrect inferences and short sighted policy"[4].

Any assessment of the benefits of the transport system was outside the scope of the STCC project: the project's objective was to provide baseline cost estimates of the transport system, as one input to subsequent policy development

As part of its future work programme, but separate from the STCC/UTCC work, it would seem desirable for the Ministry (along with NZTA) to undertake further work on the benefits of transport, so as to better inform future policy development.

Aspect #4: Total cost disaggregation by vehicle type and routes

Consultant comments. The STCC Summary Report provides direct comparison between trucks and trains on whether the charges paid covered the costs imposed. Criticisms have come forward from the Road Transport Forum[5] stating that trucks and trains can not be compared on a national level – because there are actually few places where road and rail are in direct competition. Furthermore, as the truck category includes light vans, the comparison is of limited use in trying to draw any conclusions about the relative performance of the two modes.

This criticism has some validity. As noted above under Aspect #1, the Summary Report is misleading in this regard. When undertaking costs and charges comparisons between road and rail freight, it will be more useful to consider only freight which rail and road are potential competitors.

Such comparisons were in fact undertaken in STCC and are the focus of the freight sector case studies.

In future STCC/UTCC work, it will be important in the development of methodology and interpretation of results to achieve consistent comparisons of costs and charges in each transport mode.

Aspect # 5: The data produced in STCC dated rapidly

Consultant comments. The final report of the Surface Transport Costs and Charges project was released to the public in March 2005. It contained data for the 2001-02 financial year. During the stakeholder consultation process, views were expressed that the information contained in the final report was dated upon its release.

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[4] Infometrics (2005), *A Commentary on: Surface Transport Costs and Charges,* report to New Zealand Automobile Association

[5] McKenzie Podmore Limited, *Surface Transport Costs and Charges,* A discussion for RTFNZ of a Ministry of Transport (MoT) Policy Background report, September 2005.

The fact that the STCC data are now some six years old and there have been major changes in the transport system, its organisation and funding since that date together constitute a major reason for the new UTCC project to be undertaken in the near future. Future publications of costs and charges estimates will be supported by calculation methods to increase the usability period for the information.

Implications for further costs and charges research

It is evident from the above summary the major sources of the criticisms of the STCC study came from misperception of the defined objectives and scope of the original project; misinterpretations of results and unwarranted comparisons between modes.

The following areas need to be considered for future costs and charges work:

- This work is very important, it provides costs and charges information required for assessing:
  - the barriers and opportunities of using transport pricing and charging to influence travel demand and encourage more efficient use of the existing infrastructure
  - the efficiency and effectiveness of use of funds
  - modal competition for freight and passenger transport end users
  - the viability and the desired level of additional infrastructure investment
  - the social costs of transport use by mode in modal shift analyses
- However, to enable robust modal comparisons, a comparable and consistent evaluation framework for assessing and collecting costs and charges information needs to be agreed across the three transport modes prior to collection and estimation of information.
- Therefore, communication with transport stakeholders is important throughout the process of collecting costs and charges information. This will enable an agreed framework for estimation and collection and will result in the conclusions developed being less contentious.

5 Stocktake of funding, charging and pricing arrangements

The level of commercial ownership and government intervention in the transport market directly determines the charging, funding, and pricing arrangements in each of the transport industries.

New Zealand has a predominantly free market economy (i.e. little government intervention) where the outcome for society is determined through the interaction of demand for, and supply of, the goods. However, market intervention is required by the government where the market fails to deliver an outcome which is not financially, culturally or environmentally optimal. The main sources of market failure in the transport market are:

- Externalities – are costs (or benefits) borne by individuals who do not take part in the consumption or production decisions. An example in the transport sector is congestion – when deciding whether to travel on the road the individual user does not consider how he or she is adding to the congestion and increasing the travelling times of all other road users.

  In the case of externalities, government intervention is in the form of regulation, subsidisation (for external benefits) or taxation (for external costs).

- Public goods – the defining characteristic of public goods are (1) non-rival consumption (use by one person does not prevent use by another) and (2) non-excludability (it is difficult to exclude non-payers). Non-excludability results in a 'free rider problem', i.e. consumers can take advantage of public goods without contributing sufficiently to their creation. If commercial organisations cannot capture and/or charge for all the benefits they produce, there will be less incentive for these organisations to enter the market. Further, as some benefits of public goods cannot sensibly be split up and allocated to individuals (e.g. agglomeration benefits), there is no easy way to charge for their use.

  Some transport infrastructure and services have public good characteristics. An example is road infrastructure. It is difficult for a commercial organisation to charge users for all the benefits they produce. Also, provision of road infrastructure produces wider economic benefits which are difficult to divide between users. In this case, the government intervenes.

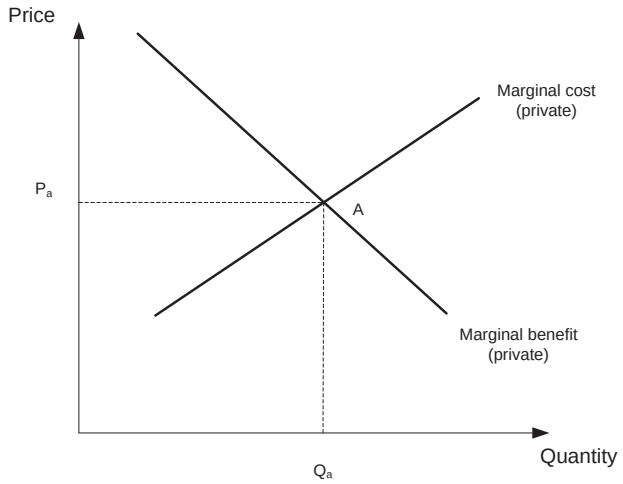
These sources of market failure in the transport market result in a market equilibrium which is not socially optimal. Government intervenes in an attempt to decrease the gap between the free market equilibrium and an equilibrium that is socially optimal, resulting in a change in market structure and to changes in charging, pricing and funding arrangements.

Pricing arrangements

To understand the importance of pricing arrangements in determining optimal demand, we need to start from the well-known market diagram (Figure 1). The

market is said to be at equilibrium at the point where the downward sloping demand curve (or marginal benefit curve) intersects the upward sloping supply curve (or marginal cost curve).

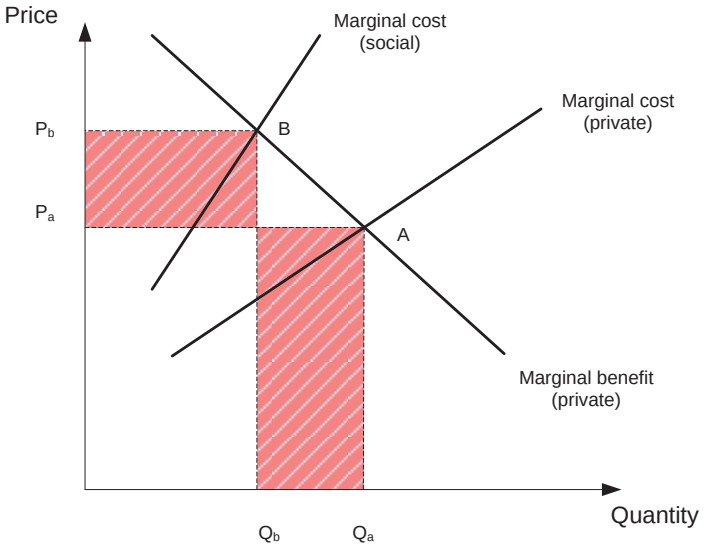
Figure 1: Marginal cost pricing



In a free market economy external social costs do not necessarily come into the pricing decisions of individuals and commercial organisations, leaving the market equilibrium is at point A.

For the case with externalities (external costs or benefits), there will be two marginal cost curves (Figure 2) – one represents the costs perceived by private users or commercial organisations and one represents the total social cost when externalities are considered. For the transport sector, where there is negative external cost, marginal social cost (MSC) is greater than marginal private cost (MPC) and transport demand is higher than the socially optimal.

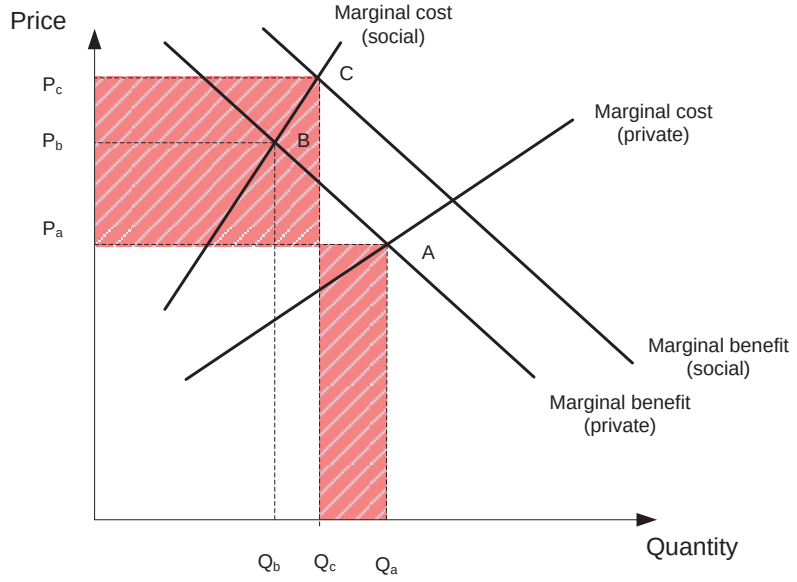
Figure 2: Marginal social cost pricing with negative externalities



Where significant externalities exist, the government intervenes through regulation or taxation (e.g. marginal cost pricing) in an attempt to have users face the marginal social costs (their private costs and the external costs) of their consumption or production decision[6]. The equilibrium, when marginal social costs are considered by the individual or commercial organisations, is point B. At present, external costs are not incorporated in the current pricing/charging arrangements in New Zealand because of information asymmetries between the government and the end transport user on the factors that affect transport demand. Figure 3 outlines the situation when the public good brings a benefit to the national economy, which is not factored into the decision of the private provider.

The government must also consider all social costs when providing transport goods or services as they are required to pursue the social optimal point (point C).

Figure 3: Marginal cost pricing with negative externalities and public good characteristics



Pricing in the transport market is directly determined by the level of government/commercial ownership and the interaction of marginal cost and benefit (or supply and demand). Market failure leads the government to intervene in the transport market where externalities or public goods arise. If marginal cost pricing is used as the intervention tool, at market equilibrium individuals and organisations will factor marginal social costs and benefits into the consumption or provision decisions. The resulting differences in price and quantity in the market will depend largely on the elasticity of supply and demand.

[6] This is sometimes referred to as an "internalisation of the external cost". This does not literally mean external costs are internalised at the individual level because it can be done only if we can correctly identify and charge those who impose the costs. What it means is that to the nation as a whole, all external cost will be explicitly charged for, hence internalised in the national sense.

It must be stressed again here that, marginal cost pricing does not reflect what charges would be necessary to recover the total costs involved in the existing systems.

Funding and charging arrangements

Funding and charging arrangements are a result of the industry structure and market failure. Where significant market failure exists, there will be an increase in the level of government intervention, government ownership and provision of infrastructure and services and government charges.

In a government setting, funding arrangement is affected largely by institutional arrangements. When there is more than one source of revenue and multiple uses of funds, the number of departments or organisations, and the associated administration needs, involved would increase. This, in turn, would increase the complexity of the funding arrangements. Therefore, it is not unusual to find funds being shuffled between organisations before being spent. In terms of charging, the government would typically need to seek a balance between administrative efficiency and equity when making decisions on charging arrangements and levels. Other important factors that the government needs to consider include use of funds, financial cost recovery and externalities.

In a commercial setting, funds typically come from owners of the operation (e.g. shareholders) or from borrowing. On the other hand, charging arrangements are affected by many factors. For example, demand and supply conditions, sensitivity of demand on charges, degree of substitutability and differentiation between services provided by competitors, the ability to price discriminate and profitability, etc. As commercial operators are usually profit driven, social equity and external costs do not come into charging decisions.

The industry structures of the three transport modes which influence costs and charges are outlined below. The differences in market structures and the implications for collecting further costs and charges information are also given. Full descriptions of costs, charges and funding arrangements in each of the three transport modes are outlined in the appendix of this report.

5.1 Maritime transport

Industry Structure

The maritime industry in New Zealand consists of the following key stakeholders:

- 16 ports – New Zealand's 11 principal ports handle a combined 60 million tonnes cargo annually. Of the 16 ports, eight are wholly owned by a single local council.
- Domestic freight shipping companies – currently 12 New Zealand registered coastal vessels operate around New Zealand which collectively carry approximately 12 million tonnes annually[7]. Majority of this is petroleum products and other bulk aggregates such as cement and fertiliser.
- Inter-island passenger shipping companies – Strait Shipping and Interislander shipping companies operate between Wellington and Picton, together provide five return trips daily in Winter, and seven in summer.
- International vessels – carry nearly all New Zealand's container traffic through either direct import and exports or transhipments (import and export cargos being moved between New Zealand ports).
- Freight forwarders – who operate as inter-medians coordinating and managing transactions between shipping companies, ports, and owners of freight.

The maritime industry in New Zealand is different to that of road and rail in that the majority of transport infrastructure providers and operators are commercial organisations, with a large degree of local government port ownership. The maritime industry in New Zealand relies heavily on the international shipping movements of freight. According to Rockpoint Corporate Finance (2008),–New Zealand ports collectively handle 60 million tonnes of cargoes each year, 66% (or 40 million tonnes) of which relates to direct imports and exports, with the balance being either domestic cargo movements or transhipments[8]. Note that the volume of domestic cargo movements and transhipments collectively handled by New Zealand ports does not equate to the amount carried by New Zealand vessels. This is because domestic cargo is typically handled by two New Zealand ports and is therefore counted twice in the above figure. Furthermore, ports also handle domestic cargo which does not involve New Zealand vessels (e.g. transhipment cargo is loaded from truck or train onto international vessels).

The estimates provided above are largely extracted from the Rockpoint Corporate Finance (2008) New Zealand Port Sector Report. The Ministry of Transport, in conjunction with the Ministry of Economic Development and the

[7] This information is gathered from Rockpoint Corporate Finance Limited (2008), page 41. It must be noted that the Ministry of Transport's data suggests that, as at June 2008, the number of New Zealand crewed coastal vessels was in fact 15.

[8] Rockpoint Corporate Finance Limited (2008), June 2008, page 13.

New Zealand Transport Agency, is currently undertaking a National Freight Study which will triangulate these estimates.

Charges

A majority of charges in the New Zealand maritime industry are commercial charges between industry stakeholders, and between stakeholders and end users. The main government charges in the maritime sector are the Maritime Safety Charges, Ministry of Fisheries Bio security Charges, and Customs Import charges. The financial level of government charges in the maritime industry is relatively small in comparison with other transport modes, reflecting the difference in ownership structure of transport infrastructure.

Funding

Although there is limited government involvement in the Maritime sector, the government does provide funding assistance to encourage sea freight development. In the 2006/07 budget, the government allocated $2 million for rail and sea freight initiatives. As discussed in the "Seachange" document[9] released by the Ministry of Transport in November 2007, the government now aims to increase the market share of coastal shipping in New Zealand. As a result, a total of $36 million additional funding has been introduced to fund coastal shipping initiatives over the next four years.

Externalities

The major externality in New Zealand's maritime transport industry is the risk of pollution to the marine environment by harmful substances used or produced by operators in the maritime industry. An accident resulting in substantial maritime pollution could result in large economic and health costs to New Zealand. For foreign ships that also provide coastal services, they also carry bio-security related risk to New Zealand. Direct and indirect charges are placed to internalise some of these externalities through NZ customs charges, MAF Bio security charges, and the maritime safety charge and by acceding to intervention conventions or protocols. Other social costs in the maritime industry are a result of emissions, noise, congestion (for which there are no direct charges) and accidents (for which the charges are not related to an individual's behaviour which results in accident externalities such as pain, grief and suffering caused by accidents).

Stocktake implications for the collection of costs and charges information

There is a lack of information available to the government for evaluating policy strategies and targets pertaining to the maritime industry. Most of the costs and charges information is held by commercial organisations. Government research on maritime costs and charges is limited due to commercial sensitivity of information, and a lack of government funding provided specifically to research and improvement strategies for coastal shipping in New Zealand.

[9] Ministry of Transport (2008a).

5.2 Rail transport

Industry Structure

The rail transport industry in New Zealand consists of the following key stakeholders:

- Infrastructure provider – The main rail infrastructure provider in New Zealand is ONTRACK – the New Zealand Railways Corporation – who look after 4,000km of railway track, 1,787 bridges, 150 tunnels, signalling infrastructure and railway level crossings. ONTRACK is a state owned enterprise with assets valued at approximately $10.6 billion[10].
- Freight transport operator – The Crown is now the major operator in the rail industry. KiwiRail holds assets of approximately $430 million including 180 locomotives, 4200 wagons, one rail ferry, and leases on two other ferries.
- Public transport operators – KiwiRail operates long distance rail passenger transport and Wellington's urban rail passenger transport. Veolia operates Auckland's urban rail passenger transport.
- Industrial operators – There are currently approximately 34 industrial operators in New Zealand. Industrial railway operators serve the needs of factories, stores or other industrial facilities, usually on a localised site with connection to the rail network.
- Heritage and tourist/leisure operators – There are currently approximately 40 of these operators in New Zealand. They usually operate on a short dedicated railway line or tramline, or make excursion trips on the main network.

The relative importance of industrial and heritage operators in the rail industry is small in comparison with freight transport and public transport operators.

The rail industry structure is different to both maritime and road transport in that the majority of infrastructure providers and service operators are Crown entities.

Charges

The main charges in the rail transport sector are track access charges, freight charges and public transport fares. Track access charges are charged on operators by the network providers and are usually fixed annual charges. Freight charges and public transport fares are charged on the end user by the rail operators. Freight charges are variable charges dependent on location, distance and business relationship between the operator and owner of freight. Public transport fares are variable charges dependent on location, trip purpose, and end user.

Track access charges and freight are set commercially through contract negotiations (track access charges) and value pricing principle (for freight charge). The government has an influence in the public transport charge through fare subsidisation and gross/net revenue contracts with urban public transport operators.

[10] ONTRACK (2007)

Funding

The rail sector has experienced several significant changes in ownerships in recent decades. In the 1980s, the railway and ferry operations were owned and operated by a state-owned corporation called New Zealand Railway Corporation. In 1990, the government transferred all of its rail and ferry assets and related liabilities to New Zealand Rail Limited, a limited liability company wholly owned by the government. NZ Rail Ltd was then sold to Tranz Rail Holdings in 1993[11].

The government re-purchased the Auckland rail infrastructure in 2001 and the rest of the national rail network in 2004. The New Zealand Railways Corporation (trading as ONTRACK) has held these assets since 1 September 2004. More recently, from 1July 2008, rail and ferry services were again transferred back into the government's ownership. Now the government is the main provider of infrastructure (through ONTRACK) and the main operator (through KiwiRail).

Due to a long period of neglect and deferred maintenance, additional investments are required in order to help improve the effectiveness of the rail network. As a result, the rail transport industry has a considerably higher level of government funding than the maritime industry. Since the re-purchase of the national rail network in 2004, the government has invested substantially on maintenance and upgrades in order to improve the rail infrastructure. For example,

- In December 2006, the government has approved $120m for the grade separation option for the New Lynn rail station, complementing funding commitments from Waitakere City Council and the Auckland Regional Transport Authority[12].
- In the 2007 budget, the government announced provision of $600 million over six years for improvements in the urban rail development projects in Auckland and Wellington and an additional $50 million for general track improvements to the national rail network over 2008 to 2010[13].
- In the 2008 budget, the government committed $28 million of operating funding in 2008/09 for OnTrack and $65 million between 2007/08 and 2008/09 in capital funding to maintain the national rail network and reconfigure rail land[14].

In June 2008, the government purchased the rail and ferry assets from Toll NZ for a purchase price of $690 million. As noted in the Government Policy Statement on Land Transport Funding 2009/10-2018/19, "*following the repurchase of the rail operations on 30 June 2008, the government is planning a*

[11] New Zealand Institute for the Study of Competition and Regulation Inc (1999)

[12] Source: The official website of the New Zealand Government http://www.beehive.govt.nz/release/120+million+west+auckland+transport+upgrade.

[13] Source: The official website of the New Zealand Government http://www.beehive.govt.nz/release/towards+sustainable+rail+network.

[14] Source: The official website of the New Zealand Government http://beehive.govt.nz/release/record+investment+transport+continues

major investment programme in passenger and freight rolling stock (such as locomotives and carriages) through KiwiRail".

The other sources of funding are businesses, such as Solid Energy, which have an interest in using rail, and have previously contributed funding to specific rail projects.

Externalities

The main externalities in the rail sector are emissions, noise, greenhouse gases, discharges to water, and accidents or loss of efficiency due to interactions between rail and road traffic at level crossings. There are currently no direct charging mechanisms for these costs.

Stocktake implications for the collection of costs and charges information

The financial costs and charges information is readily available and easily collectable in the rail transport sector from rail Crown entities. Maintaining coordination with these rail Crown entities is needed to ensure that the required costs and charges information can be obtained and a suitable level of segmentation achieved.

5.3 Road transport

Industry structure

The road transport industry in New Zealand consists of the following key stakeholders:

- Road infrastructure providers – The New Zealand Transport Agency (NZTA), Auckland Regional Transport Authority, and local territorial authorities manage and provide the road infrastructure through the National Land Transport Programme (NLTP).
- Parking infrastructure providers – investment and maintenance of parking facilities is undertaken by commercial parking operators and local territorial authorities.
- Operators – include commercial freight operators (trucks, couriers etc), public transport operators (buses and coaches) and private vehicles (cars, cycles, and motorcycles).
- End users – owners of freight consignments, users of public transport, and private vehicle users.

The road transport sector in New Zealand is different to both the rail and maritime sectors. Operators are typically commercial operators or private vehicle owners and because the road infrastructure has some public good characteristics – it is non-excludable – the government plays a major role in the investment and maintenance coordination.

Charges

The major government charges in the road transport sector are:

- Road User Charges (RUC)
- Fuel Excise Duty (FED)
- Motor Vehicle Registration (MVR)
- Motor Vehicle Licensing (MVL)

These charges are placed on private vehicle operators and commercial operators. They are administered by the New Zealand Transport Agency through the National Land Transport Programme.

Commercial charges in the road transport sector include motor vehicle operating costs and charges, parking charges and charges to the end user of public transport or the freight owner.

Funding

The main point of funding for road transport in New Zealand is through the National Land Transport Fund (NLTF). All revenue (after administration and collection costs) received from fuel excise duty (FED), road user charges (RUC), and motor vehicle registration (MVR) flows into the NLTF and is governed by the National Land Transport Programme.

The revenue collectively generated by FED, RUC, and MVR was approximately $1,865 million in the 2007/08 year. In addition, the government also injected approximately $235 million to provide funding guarantee for construction programme announced in mid-2006.

Table 2 shows the National Land Transport Programme (NLTP) appropriations for 2007/08 and 2008/09. While actual expenditure may differ slightly from those budgeted, this table shows that the majority of the NLTP funding is spent on construction and maintenance of State Highways and Local Roads.

The government is phasing out Crown appropriations to road transport as it moves towards full hypothecation, or dedication, of all fuel excise duty and road user charges to the National Land Transport Fund (note: RUC is already fully hypothecated). In the past, a portion (18.475 cents per litre of petrol) of the fuel excise duty goes to Crown's consolidated account. This has, to some extent, restrained the level of transport infrastructure investment in the past. With full hypothecation, commenced on 1 July 2008, this means that land transport taxes (fuel excise duty, road user charges and vehicle licensing fees) will be used for transport purposes only.

Table 2: National Land Transport Programme Appropriations (budgeted figures)

		Forecast	
	Activity	2007/08	2008/09
NLTP Allocations		$M	$M
	Local Roads	632	675
	State Highways	1,092	1,261
	Passenger Transport	263	325
	Use of the land transport system*	22	35
	Walking and Cycling	15	18
	Regional Development	20	4
	Research, Education, Promotion	26	28
	NZ Police - road policing	259	273
	Administration	76	87
	Total	**2,403**	**2,705**
Rail Funding (Vote Finance)			
	Rail Network	768	89
	PT Rail	86	297
	Total Rail	**854**	**386**
Other Crown investment			
	Supergold Card PT concessions		18
	Regional Development		10
	Canterbury Transport		5
Totals			
	Roading	**1,724**	**1,946**
	Passenger transport	**349**	**640**
	Total investment	**3,257**	**3,124**

Source: Ministry of Transport

Stocktake implications for collection of costs and charges information

The costs and charges in the road transport sector are complex relative to the maritime and rail costs and charges. However, the government plays a major role within the road transport sector and provides ongoing research on many aspects. Therefore, while the arrangements are complex, information is readily available.

5.4 Intermodal relationships

Exploring intermodal relationships is one of the most important factors to emerge from the workshops and consultation processes. Allocative efficiency is determined by freight and passengers being carried on the most optimal mode given the particular circumstances (e.g. cost factors, timing and environmental issues). Optimal allocation of freight across modes is governed by two aspects:

- Inter-dependencies between modes (when they can act as complementary services).
- Applying time and cost differentials to mode comparisons (the competitive differences that separate the modes as rival service providers).

To illustrate the intermodal relationships between maritime, road and rail transport we provide a case study of the time and costs involved in freighting a container between Auckland and Christchurch. We compare the time and costs of each transport mode getting the freight between the two destinations. Table 4 outlines a worked example of moving a container[15] of freight between Auckland and Christchurch, including the cost and time differences between maritime, road and rail transport modes. It is not applicable to carry out a modal case study for public transport because very few cases in New Zealand arise where the three transport modes directly compete in the public transport market. This is in contrast to the New Zealand freight market.

The maritime strategy recently released by the Ministry provides some indicative figures for the costs and charges of moving freight between Auckland and Christchurch, including estimates of greenhouse gas emissions across the different modes[16]. Understanding the factors that influence modal freight choice decisions will result in a better understanding of general equilibrium across the three transport modes. Table 3 below shows the modal ratios based on the cost information in Table 4.

[15] The example was based around a 20' container with a non-perishable manufactured cargo that weighed 12 tonnes and was valued at USD4,500 or NZD5,960 (based on a vessel exchange rate of USD0.7550).

[16] Ministry of Transport (2008a)

Table 3: Cost information ratios across the three transport modes

Ratio	Maritime	Rail	Road
Days to Deliver	4	2.5	1.5
Costs per tonne	$100	$150	$233
Cost per hour	$12	$30	$78
Times handled	6	4	2

These figures illustrate the time sensitivity and cost factors that form part of the modal decision-making process. Time sensitive freight and just-in-time inventory management techniques are examples that rely on speed of delivery. Road freight is 2.7 times faster than the maritime option and 1.7 times faster than the rail option. However, road costs per tonne are 2.3 times greater than the maritime transport and 6.2 times greater than the rail transport costs, if measured on a per hour basis. On an efficiency basis, as proxied by the number of times a container is handled during the freighting process, road is three times more efficient than maritime and twice as efficient as rail.

The container case study provided above was expanded to investigate the costs of shipping the container from Singapore to Auckland[17]. The shipping costs between Singapore and Auckland were $NZ1,700 (including shipping costs, port service charges, and shipping line fees). The New Zealand landing costs totaled $NZ1, 350 (including MAF Bio security charges, and NZ customs duties). The total shipping costs are $1,200 between Auckland and Christchurch, therefore maritime freight exhibits economies of scale.

The economies of scale in the maritime industry may provide an explanation for maritime transport's low share in the New Zealand domestic freight market. Due to the needs of interchange, which incur additional handling costs, the average trip distance for a freight task would need to be reasonably high in order to make coastal shipping a competitive alternative. As part of the data collection process this theory needs to be more thoroughly researched in terms of its implications for modal competition.

Maritime transport, however, remains an important transport alternative in New Zealand. The unique geographic make up of New Zealand – it is a relatively long country with two main islands – means that maritime transport has a great option value. The low cost and handling efficiency between New Zealand's two islands increases this option value.

In conclusion, financial costs are important in the modal decision for freight transport. However, this section has outlined two factors which are equally as important in this modal decision. One factor is the user time costs of each transport mode, relative to the financial costs. The second factor is the travel

[17] Case study completed by Ministry of Transport, May 2008.

distance which determines the level of efficiency of each transport mode. For example, maritime transport exhibits economies of scale and therefore has competitive advantage when travel distances are high. However, for short distance travel the handling costs involved in maritime transport make it an uneconomic alternative.

Table 4: Costs by mode of Freight Transport between Christchurch and Auckland

Via Sea freight (NZ Coastal vessel ex Auckland)		**Via Rail**		**Via Road** (1,054 km)	
Items	**NZ$**	**Items**	**NZ$**	**Items**	**NZ$**
Cartage ex AKL CY to Auckland	$110.00	Auckland CY to Christchurch rail head (including Fuel Adjustment Factor (FAF) of +19%)	$1,655.30	Auckland CY to door Christchurch warehouse (including MT return to depot)	$2,800.00
Transhipment fee	$56.00				
Vehicle booking system fee	$5.00				
NZ Coastal vessel Ocean Freight – Auckland to Christchurch CY	$770.00				
Christchurch wharfage	$75.00				
Christchurch demurrage	N/A				
Container cartage ex Christchurch port to Christchurch warehouse (including MT return* to depot)	$180.00	Container cartage ex CHCH rail head to a Christchurch warehouse (including MT return to depot)	$150.00		
Total (Excluding GST) (Rounded)	**$1,200.00**	**Total (Excluding GST) (Rounded)**	**$1,800.00**	**Total (Excluding GST)**	**$2,800.00**
Delivery time					
Auckland CY to Christchurch depot	4 days	Auckland CY to Christchurch depot	2-3 days	Auckland CY to Christchurch depot	1-2 days
Singapore to Christchurch depot (providing timely connection)	17-18 days	Singapore to Christchurch depot	15-16 days	Singapore to Christchurch depot	14 days

- When a container has been unloaded or emptied (and under the Terms of the Carriage and the Shipping Company's bill of lading), it is the cargo owner's responsibility to return the empty unit back to a pre-arranged container depot as specified by the shipping line concerned.
- Source: Ministry of Transport, May 2008.

6 GAP analysis – current information and future information priorities

This section provides a prioritised list of costs and charges information gaps that form the basis of the information to be collected in the future work plan.

The work plan is developed through a gap analysis. The first step of this analysis involves outlining the criteria that are used for identifying costs and charges information gaps and priorities. The information gaps identified from consultation with policy agencies and industry and from the stocktake analysis are then outlined and evaluated against each of these prioritisation criteria. The evaluation determines whether the information is:

- a priority for policy development and evaluation of policies (section 6.3)
- available or soon to be available from other work programmes (section 6.4)
- practicable to collect taking account of time and budget issues (section 6.5).

Section 7 then uses the prioritised information gaps to outline a work plan for collecting costs and charges information based on the stakeholder priorities of costs and charges information gaps. In this section we take account of how interdependencies between the information may affect the sequence in which the data is collected in the work plan.

6.1 Prioritisation criteria for information gaps

Prioritisation criteria used to guide the development of the work plan priorities are defined below:

1 Is the information a priority for policy development and evaluation?

The purpose of understanding the transport costs and charges across the three transport modes is to help:

- evaluate the effectiveness of existing or proposed government strategies and policies, in particular the relative cost effectiveness of achieving a wide range of government targets
- assess the efficiency implications, including the allocative efficiency between modes of policy interventions, e.g. subsidising or pricing a particular transport mode.

The information collected should not only be relevant to but also potentially make a material contribution to improving government transport policies, including enabling public and industry group participation in policy development.

2 Is the information already available or soon to be available?

If the information is being collected elsewhere in other work programmes, and it is being collected to the required level of detail, it is not sensible to include collection of the information in the work plan. However, this may raise a range of co-ordination issues between transport agencies or others involved in the

collection of information that need to be taken into account in the development of the work plan.

3 What is the practicability of collecting information at reasonable cost?

While it may be technically feasible to collect any amount of information, it may not be practicable to do so in terms of time frames and budgets. The Ministry aims to have the relevant information collected by December 2010, and operates within budget constraints over this period. An important consideration is whether the information can be collected in a cost effective manner at the desired level of segmentation needed to achieve policy benefits. Is the cost of collecting the information likely to outweigh its usefulness?

The information requirements arising from the stocktake and consultation process are outlined below and then evaluated against the criteria discussed above.

6.2 Information requirements and stakeholder needs

In addition to the information requirements identified in the stocktake, a consultation process involving central and local government agencies and industry organisations was undertaken to identify costs and charges information important for these stakeholders. Stakeholders consulted (See Appendix 2) included:

- Central government policy agencies and transport agencies
- Regional and local councils, including ARTA
- Industry bodies in the maritime and land transport industries and port companies

The consultation process consisted of large workshop forums and smaller stakeholder interviews. The consultation process is outlined in detail in appendix 2. We have organised the information identified by stakeholders into three groups:

1 Consistent evaluation framework for estimating costs and charges information

2 Costs and charges information sought, including the updating of costs and charges information from the original STCC and new information sought

3 Level of detail and segmentation desired

These three groups of information are outlined below.

6.2.1 Consistent evaluation framework and methodology

One of the uses of costs and charges information often cited by stakeholders was to provide a comparative assessment of the relative competitiveness and efficiency for freight and passenger transport modes. This requires comparable and consistent methodologies to be used for assessing and collecting costs and charges information across the three transport modes, otherwise the information will have limited value for policy development. The development of a comparable and consistent methodology for estimating and collecting costs and charges information will include a framework for selecting routes or corridors where road, rail and maritime transport are truly contestable.

A consistent evaluation approach must be used in determining:

a The method for estimating the opportunity cost of capital for the three modes e.g. weighted average costs of capital using an opportunity cost method or social rate of time preference.

b The method for valuing transport infrastructure, e.g. the use of depreciated replacement cost methods or optimal deprival methods taking account of stranded assets and whether only new or existing capital should be recovered. The method needs to take account of all land and infrastructure assets.

c The approach to valuing externalities used – whether qualitative or quantitative approaches are used, including consideration of market/non-market valuation for accident costs, congestion, emissions and other externalities.

d The method of attributing costs of accidents, congestion and other costs, between internalities and externalities. Congestion and accident cost have cost components which are internalised by the consumer as well as external costs.

e Methods to enable modifications to the Cost Allocation Model and dTIMs (maintenance model) to enable estimation and allocation of short-run marginal costs, long run marginal costs and fully allocated costs.

f Approach to estimating the distribution of price paid for freight movements including segmentation of different freight users e.g. 'retail' vs. larger contracts. This requires correctly determining the difference between rack rate publicly available and the contract price paid, in each transport mode to provide a pricing schedule for freight movements.

g Method and measurement base for estimating total and marginal costs of transport (short and long run) in the three transport modes. Factors to consider include comparable basis and lumpiness of infrastructure investment and its impacts on marginal, average, and total costs.

h The approach to estimating external benefits, health benefits from decreases in car demand and increases in the demand for walking and cycling.

While we acknowledge that transport benefits sought by stakeholders are important in developing efficient and effective government policy, estimating the transport benefits is not within the scope of understanding transport costs and charges. Also note that NZTA is researching many of the benefits stakeholders sought.

Developing a comparable evaluation framework prior to data collection enables information to be collected in an efficient and organised manner which will ensure that intermodal efficiency and competition analysis derives clear, unbiased conclusions.

6.2.2 Specific costs and charges estimates sought

The stocktake and consultation process identified specific estimations which are required for the analysis of government transport policy. These estimates are separated into those which need updating from the STCC study and those that are new requirements. As maritime transport was not considered in the STCC, any maritime estimates required are represented in new estimation needs.

Estimates which need updating or enhancing

The STCC report evaluated costs and charges in the road and rail transport sectors for the 2001/02 financial year, which are now dated. The estimates which require updating and are *common* to both road and rail are:

a The opportunity cost of capital in each transport sector

b The value of transport assets in each transport sector

c Operating and maintenance costs of infrastructure in each transport sector

d Operator resource costs in the road transport industry, potentially including (but subject to data availability and methodology) vehicle ownership and operating costs for road transport operators in order to calculate total costs of road transport. The road transport industry is not a commercial environment (like maritime transport), and therefore costs do not always determine the level at which the charges are set. For that reason, these cost components are needed in the road industry to compare the level of costs with the level of charges.

e User resource costs, potentially including (but subject to data availability and methodology):

- vehicle ownership and operating costs for private vehicles in the road transport sector by vehicle characteristic (such as engine size and fuel type)
- travel time costs for freight and passenger movements
- private parking costs and charges

f Distribution of price paid by the end transport users for freight and public transport, dependent on commodity and route, by mode

g The costs of emissions for both local (health) and global (climate change) effects, including estimates for the internalised and external proportion of total costs.

h The costs of accidents (e.g. pain, grief and suffering), including estimates for the internalised and external proportion of total costs

i The cost of noise, including estimates for the internalised and external proportion of total costs.

j Costs of run off and water pollution costs, including estimates for the internalised and external proportion of total costs.

k The level of government funding in each transport industry/mode (through direct funding and subsidisation).

The costs and charges estimates sought by stakeholders in the consultation process, which were *specific to the road transport* sector and need updating are:

l External congestion costs, including estimates for the internalised and external proportion of total congestion costs. In estimating total costs of congestion, benefits such as increased bus patronage (when road transport is high), which may lead to increased services and efficiency in public transport – also known as the Mohring effect.

Maritime estimates required to be collected are covered under the new estimation requirements below.

Estimates which are new requirements

This section outlines the estimates which were not previously contained in the original costs and charges report (STCC).

The estimation of costs and charges common to the three transport modes was relatively more important to transport stakeholders than the estimation of costs and charges specific to one particular transport mode. The new costs and charges estimates sought by stakeholders in the consultation process, which were *common to all transport modes* are:

m The annual infrastructure investment undertaken for each mode, with particular reference to allocating of capital costs of busways between road and public transport modes

n The costs of freight interchange between modes, e.g. the costs of transferring freight from ship to truck or train at port side, including time and resource costs.

o End user time costs – Time costs for the end user are different to traveler time costs under 6.2.2e (or as estimated in NZTA's Economic Evaluation Manual). Time costs for the end user are the additional costs the end user pays to decrease the travel time, and will be dependent on industry type and geography. Our case study in section 0 illustrates that road transport end users pay more than maritime end users to decrease travelling time. End user time also includes predictability and reliability costs for end users/operators in the three transport modes for both freight and public transport

p The elasticity relationship between transport demand and fuel prices within each of the three transport modes as well as cross modal elasticities of demand, which is particularly important for understanding fuel price impacts on modal choice. These elasticities need to be estimated for both freight and public transport.

q User benefits from consuming transport e.g. agglomeration and community access benefits. As mentioned above, these are out of the scope of understanding transport costs and charges.

The new costs and charges estimates sought by stakeholders in the consultation process, which were *specific to the maritime transport* sector are:

r The opportunity cost of capital in the maritime transport sector, specifically the ports and coastal shipping vessels in order to evaluate government maritime policy strategies and targets.

s The value of transport assets, specifically port infrastructure, in order to estimate total costs of transport in the maritime sector, and modal interchange costs.

t The annual level of investment in maritime infrastructure, including government funding and any subsidisation.

u Operating and maintenance costs of infrastructure in the maritime transport sector

v Market entry and operations costs along the maritime supply chain, but with particular emphasis on port and shipping company operations which is relevant to understanding the achievability of the government's targets in the maritime transport sector.

w Breakdown of maritime charges, including wet charges, dry charges, and government charges. The breakdown of costs and charges in the maritime industry should also be segmented between international and domestic shipping companies to determine the level of cross subsidisation of costs and charges.

x Operator resource costs, potentially including (but subject to data availability and methodology) vessel ownership and operating costs for shipping operators. This is needed so that the government's domestic sea freight initiatives can be developed and evaluated.

y End user charges in maritime sector, including all charges and tariffs.

z Costs of emissions, accidents, noise and bio security risks, including estimates for the internalised and external proportion of total costs. The social costs of international vessels entering New Zealand waters should also be analysed to determine the level of cross-subsidisation of costs and charges between domestic and international shipping companies.

aa The level of importance that international shipping vessels represent for setting prices for coastal shipping in the New Zealand maritime industry.

bb The level of government funding in the maritime transport industry/mode (through direct funding and subsidisation).

The collection of costs and charges in the maritime sector will concentrate on ships carrying out domestic coastal routes for commercial freight or public transport operations, and will not include recreational boats. The methodology will evaluate the level to which internationally flagged vessels (which carry out coastal routes) will be considered.

The new costs and charges estimates sought by stakeholders in the consultation process, which were *specific to the road transport sector* are:

cc Land transport funding outside the National Land Transport Programme

The new costs and charges estimates sought by stakeholders in the consultation process, which were *specific to the rail transport sector* are:

dd Intermodal freight peak pricing relationships, including peak pricing relationships with:

- inter-island capacity
- seasonal capacity relative to peak
- line and rolling stock capacity
- distributional issues such as the return haul for empty containers.

6.2.3 Level of detail and segmentation desired

The stakeholders in the consultation process emphasised the importance of costs and charges information segmented by:

- Inter-regional comparisons of passenger transport costs, charges and fare subsidies
- Regional variations in land value influencing the cost of the transport infrastructure
- Heavy vehicle fleet type split between light, medium and heavy trucks
- Engine size contributing to the efficiency of the fleet composition
- Key route segments which do or may potentially experience intermodal competition or suffer transport congestion
- Comparison of charges by freight type, e.g. container freight charges against charges on bulk aggregate freight
- Analysis of public transport costs and charges by passenger type (e.g. age of passenger) or trip purpose (e.g. employment commute)
- Analysis of costs and charges dependent on the time of travel. This needs to be completed on the basis of time of year relative to peak season and time of day relative to peak congestion time
- Fuel type comparison of costs and charges, such as petrol, diesel or electric
- Costs and charges relative to distance between initial and final trip destinations for freight and passengers.

When carrying out analysis of costs, charges and funding arrangements, segmentation of national data is required to ensure that

1. comparative modal evaluation is only carried out only where warranted. e.g.:
    - Rail competes with road on certain routes (e.g. road and rail compete primarily on State Highways, they do not compete on most local roads), and
    - Rail or coastal shipping compete with road where the road freight's time saving is not a comparative advantage.
2. national averages are not used when conducting analysis on issues specific to certain regions. e.g. public transport needs regional segmentation to compare the modal competition because rail urban public transport in New Zealand only exists for Auckland and Wellington.

6.3 Transport policy plans for the next 1 – 3 years

Policy plans affect the kind of costs and charges information required as well as the relative importance of information requirements. Below we outline the policy objectives and targets of the New Zealand transport sector relevant to this project. The policies help form a basis for prioritising information gaps.

6.3.1 The New Zealand Transport Strategy

The New Zealand Transport Strategy describes how an integrated transport system should contribute to New Zealand's broader social, economic, and environment needs. This strategy sets specific transport targets for the government which will help deliver on the government's vision that: "people and freight in New Zealand have access to an affordable, integrated, safe, responsive and sustainable transport system".

The New Zealand Transport Strategy provides five objectives, with specific targets around each of these objectives:

- Ensuring environmental sustainability
  - Halve per capita domestic transport greenhouse gas emissions by 2040.
  - Increase coastal shipping's share of inter-regional freight to 30% of tonne kilometres by 2040.
  - Increase rail's share of freight to 25% of tonne kilometres by 2040.
  - Become one of the first countries in the world to widely use electric vehicles.
  - Reduce the kilometres travelled by single occupancy vehicles in major urban areas on weekdays by 10% per capita by 2015 compared to 2007.
  - Reduce the rated CO_2 emissions per kilometre of combined average new and used vehicles entering the light vehicle fleet to 170 grams CO_2 per kilometre by 2015 with a corresponding reduction in average fuel used per kilometre.
  - Increase the area of Crown transport land covered with indigenous vegetation.
- Assisting economic development
  - For identified critical routes:
    - Improve reliability of journey times
    - Reduce average journey times.
- Assisting safety and personal security
  - Reduce road deaths to no more than 200 per annum by 2040.
  - Reduce serious injuries on roads to no more than 1,500 per annum by 2040.

- Improving access and mobility
  - Increase overall public transport mode share to 7% of all trips by 2040 (from 111 million trips in 2006/7 to more than 525 million trips in 2040).
  - Increase walking and cycling and other active modes to 30 % of total trips in urban areas by 2040.
- Protecting and promoting public health
  - Reduce the number of people exposed to health-endangering noise levels from transport.
  - Reduce the number of people exposed to health-endangering concentrations of air pollution in locations where the impact of emissions arising from transport is significant.

The Strategy's objectives and targets provide general guidance for the transport sector government bodies, including the Ministry of Transport, transport Crown entities and approved organisations (e.g. territorial authorities).

6.3.2 Government Policy Statement (GPS)

At a national level more specific policy setting follows a three-year cycle based on the Government Policy Statement (GPS). The GPS is issued every three years, with release timed around the updating of the New Zealand Transport Strategy (NZTS), which has a six-year lifecycle. The purpose of the GPS is to set in place intermediate steps for achieving the objectives and targets set down in the NZTS.

The current (2009/10-2014/15) GPS has set the following target priorities:

- Reduce kilometres travelled by single occupancy vehicles in major urban areas on weekdays by 10% per capita by 2015.
- Increase the freight mode share for coastal shipping and rail by 2015
- No overall deterioration in travel times and reliability on critical routes by 2015
- Reduce fatalities and hospitalisations from road crashes by 2015
- Increase patronage on public transport by 4% per year through to 2015
- Increase the number of walking and cycling trips by 1% per year through to 2015.

The New Zealand Transport Agency must give effect to the GPS in developing the National Land Transport Programme and in approving funding for activities. Thus costs and charges information that can assist in informing funding decisions relating to the above priorities is of high importance.

6.3.3 The Ministry's Statement of Intent

The Ministry of Transport (the Ministry) is the government's principal transport policy advisor, and works collaboratively across the transport sector, particularly with the transport Crown entities. The Ministry's SOI is a statement about how it intends to carry through on the objectives and targets set under the NLTS and GPS. For that reason, the Ministry's targets directly follow the five objectives set in the New Zealand Transport Strategy. Below we set out information which may be required for policy

development, assessment and evaluation in order to address the Ministry's goals outlined in their Statement of Intent:

Ensuring environmental sustainability

- The main goal of the Ministry in this area is reducing emissions and improving fuel efficiency. To achieve this goal, the Ministry is looking at alternative fleet options, alternative fuel and technology options, developing a standard of fuel economy of light vehicles entering New Zealand. These alternatives, along with the following policy documents, should be considered when prioritising a work plan are: The Electric Vehicle Strategy, Vehicle, Energy and Renewable Group (VERG) publications, and climate change publications.

Assisting economic development

- The Ministry's goal is to achieve major growth in domestic sea freight by 2040. Information should be collected so that policies to achieve this goal can be implemented and measured. In this area we need to reference (but not duplicate) information gathered in the Sea Changes document.
- Regional fuel taxes are also within future policy plans. Information needs to be collected so that the performance of the regional fuel tax policies can be measured.

Assisting safety and personal security

- Information should be collected which enables the evaluation of safety and security in the road, rail and maritime transport modes. The main areas of interest in the Ministry's SOI are around the Rail Safety Strategy, the Road Safety to 2010 Strategy and New Zealand's participation in the Border Governance Group, which will be taken into account when developing the priorities for the work plan.

Improving access and mobility

- The main goal of the Ministry in this area is to improve walking and cycling facilities in an effort to provide affordable and reliable community access. Our collection of information needs to include walking and cycling as optional forms of transport. In this area we need also to reference, but not duplicate information, gathered in "Getting there – on foot, by Cycle Strategic Implementation Plan" developed by the Ministry.

Protecting and promoting public health

- The Ministry's goal within this area is to promote public health by increasing walking and cycling activity. In this area there is a need to ensure that the benefits of walking and cycling activities can be adequately and efficiently quantified, along with the safety level/costs of accidents in walking and cycling.
- The second goal of the Ministry in this area is to improve transport sustainability by reducing noise levels and emissions. Therefore, the work plan should consider measuring the level of noise and emissions for each mode, and balancing this against the benefits/accident risks of walking and cycling.

6.3.4 Information policy priorities

The work involved in collecting costs and charges information is required so that two broad overlapping areas of policy evaluation can be carried out:

- **Policy effectiveness**
  - What is the most cost effective way of achieving government policy targets? Here, cost effectiveness is about maximising the national benefits for each dollar spent.
  - What costs and charges information is needed to evaluate the effectiveness of government policy?
- **Policy efficiency**
  - What is the most efficient way to deliver outcomes with limited transport resources? What is the best way to achieve the greatest potential for value for money in the development of an integrated transport system?
  - What costs and charges information is needed to evaluate the efficiency of government policy?

Based on these two principles, costs and charges information can also help assess the opportunities and barriers of using transport pricing or charging as a tool to influence travel decisions as they can help answer questions such as: Are transport sector 'prices' providing correct pricing signals for transport users? Are government charges set at levels that help achieve revenue needs and wider policy objectives?

Where 'prices' are not efficient what costs and charges information will assist in providing rationale for subsidisation and charges within the transport sector? For example, how much has increased public transport patronage cost the government per passenger and how does this compare to benefits arising from reduced costs of urban congestion?

These issues are not only important for the government, but also for transport industry bodies that need to be informed about the true costs of transporting freight and people. The costs and charges information relevant to informing the efficiency and effective government policy targets is then of highest priority.

Table 5 outlines the information specific estimates required (in generalised categories) for all the transport modes and provides an indication of the government policy area they are required to develop or evaluate policy strategy or targets. A tick indicates that the information is required to evaluate one of the six areas of government policy. TC, AC, MC, or IC indicates that the information is required to be estimated in a total cost, average cost, marginal cost or incremental cost format in order to evaluate the specific area of government policy.

Table 5: Information requirements with respect to government policy, information available, information gaps and practicality of collection

Stakeholder information requirements		Definition provided in report		Areas of Government Policy Strategies and Targets							Information available					Information gaps by sector			Practicality of information Collection (Note 3)	
		Comparable methodology	Specific Estimate	Mitigation & intervent-ions	Modal Shift Analysis	Modal Cost Comparability	Funding Policies	Cost recovery	Charging Policies (Note 1)	level of importance to policy development or evaluation	for road and rail secotrs from STCC (but mostly outdated)	from other sources	for which sector	Is the information from other sources up-to-date?	Is the information available from other sources collected to the required level of segmentation?	Are there any other problems with data available?	Road	Rail	Maritime	Estimated technical difficulties	Expected time and monetary budget required
				TC=Total cost, IC=Incremental cost (Note 2), AC=Average cost, MC=Marginal cost						1= low, 5 = high	✓=Yes ×=No			✓=Yes ×=No	✓=Yes ×=No		✓=information gap exists				
Transport Infrastructure Costs and costs of capital	Opportunity cost of capital in the three transport modes	Section 6.2.1 (a)	Section 6.2.2 (a & r)			✓	✓	✓	✓	3	✓	Rockpoint Corporate Finance Limited, New Zealand Port Sector Report 2008, "Rock the Boat", June 2008.	Maritime Port Sector	✓	✓	No shipping sector	✓	✓	shipping	Low	Low
	The value of transport infrastructure in each transport sector	Section 6.2.1 (b)	Section 6.2.2 (b & s)			✓	✓	✓	✓	3	✓		Maritime Port Sector	✓	✓		✓	✓		High	High
	Operating and maintenance costs of intrastructure in each transport network	Section 6.2.1 (g)	Section 6.2.2 (c & u)			✓	✓	✓	✓	4	✓	various annual reports and NLTF statements	Rail and Road	✓	✓		✓	✓	✓	Medium	Medium/High
Operator costs and charges	The costs of freight interchange between transport modes (not including inter change time costs which are included in user time costs)	Section 6.2.1 (g)	Section 6.2.2 (n)		TC/AC, IC	TC/AC, MC	TC/AC, IC	TC	TC/AC, MC	4	×	No information available					✓	✓	✓	High	High
	Maritime market entry costs (especially for port and shipping companies)	Section 6.2.1 (g)	Section 6.2.2 (v)				✓		✓	2	×	Rockpoint Corporate Finance Limited, New Zealand Port Sector Report 2008, "Rock the Boat", June 2008.	Maritime Port Sector	✓	✓	No shipping sector			shipping	High	Medium
	Operator resource costs, including vehicle ownership costs (for road operators), operating costs such as admin, labour etc	Section 6.2.1 (g & w)	Section 6.2.2 (d & x)	TC/AC, IC	TC/AC, IC	TC/AC, MC	TC/AC, IC	TC	TC/AC, MC	4	✓	No information available					✓	✓	✓	Medium	Medium
	Breakdown of maritime transport charges including wet charges, dry charges, and government charges	Section 6.2.1 (f)	Section 6.2.2 (w)		TC/AC, IC	TC/AC, MC	TC/AC, IC	TC	TC/AC, MC	5	×	various sources	Maritime	✓	✓	Rack rate available but not typically paid			✓	Low	Low/Medium
User costs and charges	User resource costs, including vehicle ownership costs (for private vehicle owners) and vehicle operating costs such as fuel, RUC etc	Section 6.2.1 (g)	Section 6.2.2 (w)	TC/AC, IC	TC/AC, IC	TC/AC, MC	TC/AC, IC	TC	TC/AC, MC	5	✓	Rockpoint Corporate Finance Limited, New Zealand Port Sector Report 2008, "Rock the Boat", June 2008.	Maritime Port Sector	✓	✓	No shipping sector	✓	✓	shipping	High	High
	User time costs including predictability / reliability of transport times for freight and public transport	Section 6.2.1 (g)	Section 6.2.2 (o)	✓	✓		✓	✓	✓	5	partial	see LTNZ's research programme 2008/09	Road			Unclear what estimates will be available	✓	✓	✓	High	High
	End user charges (fares and tariffs)	Section 6.2.1 (f)	Section 6.2.2 (f)	✓	✓		✓	✓	✓	4	✓	various sources	Rail and Road	×	×	can only obtain ranges	✓	✓	✓	Medium	Medium
Social and environmental costs	Costs of emissions - local (health impacts) and global (climate change effects)	Section 6.2.1 (c & d)	Section 6.2.2 (g & z)	TC/AC, IC	TC/AC, IC	TC/AC, MC	TC/AC, IC	TC	TC/AC, MC	4	✓	Health impacts: HAPiNZ (2007) Climate change impacts: Carbon prices as proxy	Road Only	×	×	Recent emphasis issues with reliability of estimates. Climate change impacts: carbon price is not the same as social cost	✓	✓	✓	Low	Low
	Costs of accidents	Section 6.2.1 (c & d))	Section 6.2.2 (h & z)	TC/AC, IC	TC/AC, IC	TC/AC, MC	TC/AC, IC	TC	TC/AC, MC	4	✓	MOT's annual update of the Social Cost of Road Crahses and Injuries	Road Only	×	×	Need to assume that the value of life estimates are not to be updated	✓	✓	✓	High	Medium
	Costs of noise	Section 6.2.1 (c & d))	Section 6.2.2 (i & z)	TC/AC, IC	TC/AC, IC	TC/AC, MC	TC/AC, IC	TC	TC/AC, MC	3	✓	NZTA's EEM	Rail and Road	×	×		✓	✓	✓	Low	Low
	Costs and risks of bio security disaster	Section 6.2.1 (c & d))	Section 6.2.2 (z)	TC/AC, IC	TC/AC, IC	TC/AC, MC	TC/AC, IC	TC	TC/AC, MC	3	×	No information available							✓	High	High
	Costs of run off and water pollution	Section 6.2.1 (c & d))	Section 6.2.2 (j & z)	TC/AC, IC	TC/AC, IC	TC/AC, MC	TC/AC, IC	TC	TC/AC, MC	1	✓	No information available					✓	✓	✓	High	High
	Costs of congestion and Mohring effects (specific to the road transport mode) - Public transport only	Section 6.2.1 (c & d))	Section 6.2.2 (l)	TC/AC, IC	TC/AC, IC	MC	MC		MC	4	✓	see LTNZ's research programme 2008/09	Road	×	×		✓			Low	Low
Revenue/Funding	The level of government funding in each industry (through direct funding and subsidisation)	Section 6.2.1 (c & d))	Section 6.2.2 (k & bb)		✓	✓	✓	✓	✓	4	✓	MOT	✓	✓	×		✓	✓	✓	Low	Low
	Annual level of investment in transport infrastructure for each transport mode	Section 6.2.1 (a & b)	Section 6.2.2 (m)			✓	✓	✓	✓	3	×	various annual reports and NLTF statements	Road & Rail	✓	✓				✓	Low	Low
Other information	The importance of international vessels for setting prices in maritime industry		Section 6.2.2 (aa)				✓	✓	✓	3	×	Ministry of Transport, "Review of Maritime New Zealand", final report, January 2006, completed by PricewaterhouseCoopers	✓	×	✓				✓	Low	Low
	Inter modal peak pricing relationships		Section 6.2.2 (dd)		✓	✓	✓	✓	✓	3	×	No information available						✓		Low	High
	Land transport funding outside the NLTP		Section 6.2.2 (cc)				✓			3	×	No information available					✓			High	High
	Demand elasticity relationship between transport demand and fuel prices		Section 6.2.2 (p)		✓		✓	✓	✓	5	×	Booz Allen Hamilton, *Impacts of Fuel Price Changes on New Zealand transport*, report prepared for Land Transport New Zealand, 2007	Road only	✓	×	not required for estimating costs and charges but required for policy analyses (e.g. pricing) & modelling purposes.		✓	✓	High	High
	Public transport demand elasticity relationships (price and cross elasticities needed)		Section 6.2.2 (p)		✓		✓	✓	✓	5	×		Road	✓	×			✓	✓	High	High
	Freight demand elasticity relationships (price and cross elasticities needed)		Section 6.2.2 (p)		✓		✓	✓	✓	5	×	MOT's study on RUC elasticities	Road	✓	×		✓	✓	✓	Medium	High

Notes:
1. Under the current charging policies, marginal cost information is required only for certain components. For marginal cost based pricing, such information is required for all components.
2. Incremental cost can be obtained either using marginal cost or average cost, depending on data availability and application purposes.
3. These are initial comments compiled from existing research and publications and are, to date, the opinions of the authors. A true indication of the difficulty level will be obtained through the completion of the methodology and framework for collection

6.4 Information Currently Available or Soon to be Available

In this section the information currently available is outlined against the charges information requirements extracted from the consultation process.

The information currently available is outlined against the stakeholder demands and is separated into three groups:

1 Consistent evaluation framework for estimating costs and charges information

2 Costs and charges information sought in the consultation process

3 Research strategy and plans which outline the government's perception of information demands

When outlining the information currently available, we will also provide an outline of the level of detail and segmentation available.

6.4.1 Consistent evaluation framework for estimating costs and charges information

There is currently no agreed methodology to provide estimates of costs, charges, or funding across the transport modes. The STCC (2005) study is the only study which has attempted to compare costs and charges across more than one transport mode using a comparable methodology across the rail and road transport modes.

6.4.2 Specific costs and charges estimates and level of segmentation

The specific costs and charges estimates already available, or soon to be available, will not be included in our prioritised information gaps or work plan for costs and charges information collection. Table 5 summarises the specific costs and charges information which is currently available or is soon to be available.

As can be seen, the most significant work has been undertaken in the road transport sector in areas covering externalities, user time costs, and transport elasticities. Otherwise, information that is either currently available or in the process of being collected covers very little of the specific costs and charges information demands that arose out of the stocktake and consultation process, particularly around the maritime and rail sectors. Therefore, prioritising the information for collection must include adequate coverage of maritime and rail transport in order to correctly undertake analysis of modal competition. The costs associated with externalities carry strategic importance and as such form an important component of analysis across the three modes.

6.5 Information Gaps

There are no up to date studies that use a comparable evaluation framework for estimating costs and charges across the three transport modes. There is also no agreed evaluation framework between stakeholders in the three transport modes on which to collect comparable costs and charges information. Therefore there are no comparable estimates across the three transport modes.

Table 5 outlines the information gaps by sector for the information requirements outlined above. As can be seen, information gaps exist mainly in the maritime transport sector. This is a result of the commercial nature of the sector and the fact that the STCC (2005) report did not include it. Information gaps exist in both the rail and road sector. However, these gaps largely exist because the information contained in the STCC (2005) is outdated.

6.6 Information gaps expected to be collected elsewhere

Some information requirements previously outlined are expected to be collected outside the work plan for UTCC, e.g. through NZTA's research programme. It is not cost effective to also include these information gaps in our work plan. The information gaps which we expect are to be collected elsewhere are:

- factors influencing transport demand, including elasticity relationships
- benefits of transport consumption
- costs and charges in the air transport mode

These information gaps are important components for understanding the impacts of costs and charges on transport demand, and modal choice (including aviation) and developing efficient and effective government policy. Therefore, these gaps will be evaluated at the end of the project to ensure that they have, in fact, been collected elsewhere, to the level of segmentation required.

6.7 Practicality of Information Collection

A relative measure of the practicality of collection of each of the information gaps is provided below. Practicality is assessed for both the technical feasibility and the time and cost of collecting the information.

It is not required that we outline the exact technical feasibility and expected cost of collecting each information gap; this will depend largely on the consistent comparable methodology developed prior to the collection and estimation of costs and charges information. In order to prioritise the information gaps for collection, the relative practicality of collection needs to be assessed.

Table 5 outlines the information gaps and evaluates the expected technical difficulty and budget (time and monetary) of collecting the information required to nullify the gap between the information required to evaluate government policy and the information currently available.

As can be seen, all information gaps have some level of potential difficulty for collection. The information gaps are prioritised in section 1.1, with either a low or high level of practicality of collection.

6.8 Prioritised Information Gaps

The information gaps are organised, prioritised and presented in Figure 4, which evaluates each information requirement on the two prioritisation criteria being:

- Is the information a priority for policy development and evaluation?

  When evaluating whether the information demand is a priority, we refer to the questions developed in section 6.3.4.

- Practicality of collecting information at the desired level of segmentation – the practicality of collection for each information requirement is provided in Table 5.

Figure 4: Prioritising information gaps

The recommended work plan for costs and charges collection is developed from the prioritised information gaps. The information gaps in the upper right quadrant of Figure 4 are of highest priority and will be collected first. The information gaps in the lower left quadrant are of least priority and will be collected last.

7 Proposed work plan until December 2010

This section concludes by providing a recommended work plan for costs and charges information collection based on the prioritised list of information gaps previously provided. The work plan is based on an expected date of December 2010 for completion of information collection.

7.1 Sequencing Issues

Correct sequencing of the work plan is required to ensure that costs and charges information is collected efficiently, and conclusions can be drawn as early as possible. The main sequencing issues are outlined below.

The comparable evaluation framework for collection and estimation of costs and charges information is of highest priority and is required before any information can be collected. It should, therefore, be completed first.

Freight and public transport end user charges should be collected first (and while the framework is being completed) because they are observed, not estimated, and do not require a large framework prior to information collection. Collecting charges in each transport mode will provide the first step in carrying out modal competition analysis.

The maritime transport industry estimates should be completed before the other transport modes. This is due to the fact that currently limited costs and charges information is available in the maritime industry. Any information can then be compared with information currently available in the other transport modes to provide initial comments.

Case studies should be completed to gain the marginal costs of transport to the correct level of segmentation. The case studies should be completed after the collection of other costs and charges information so that the correct segmentation level can be obtained and any residual costs and charges information gaps (not collected previously due to methodological constraints) can be estimated.

The collection of costs and charges information will be grouped into broad areas (such as externalities and end user charges, etc) so that the methodology is used consistently within the broad areas to ensure robustness in conclusions.

Throughout the work plan, further work is needed to develop more detailed specifications of the costs and charges information and the segmentations required before it will be possible to judge the efficiency of providing this data. This is carried out in developing the consistent and comparable methodology for collection of costs and charges information. At that stage it may be necessary to conduct further consultation to confirm whether stakeholders are willing to provide the identified information and level of segmentation and detail, and also to confirm the need for information requirements that are particularly difficult or expensive to collect.

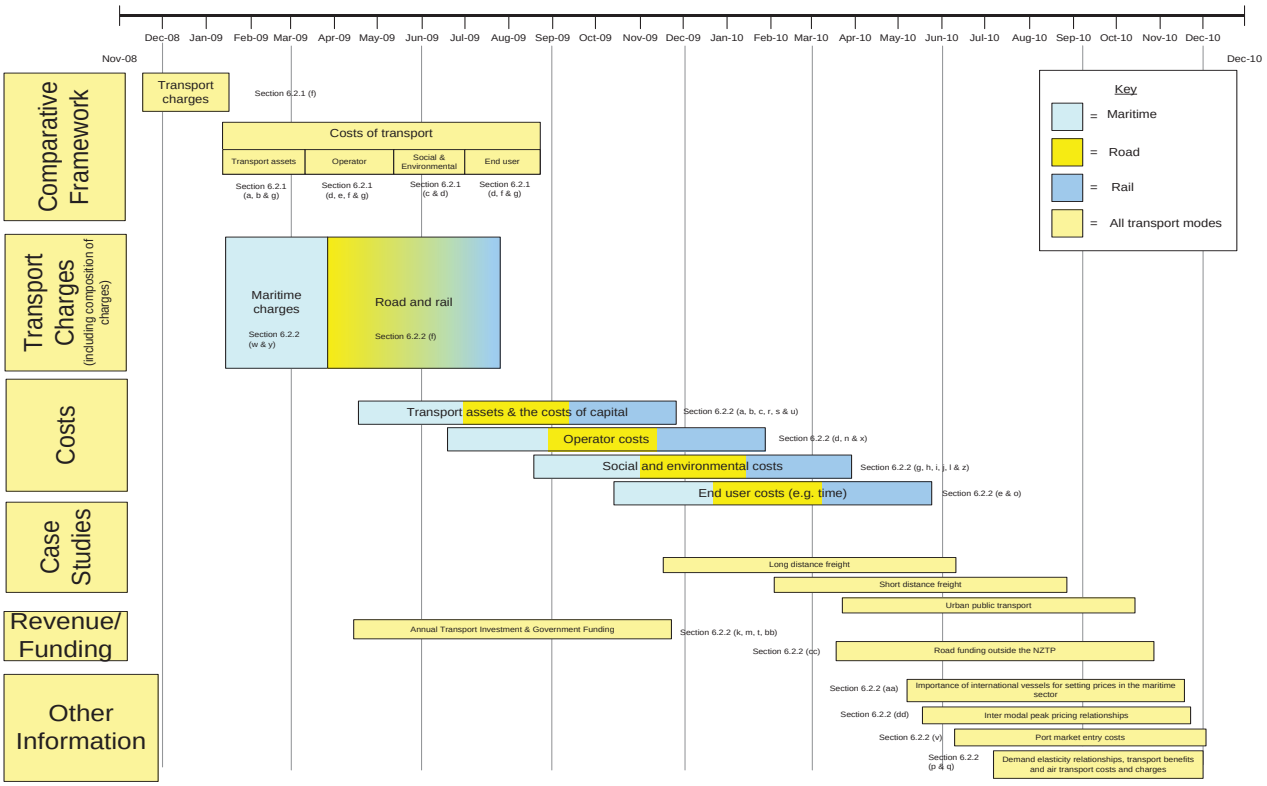
7.2 Recommended work plan

The recommended work plan is grouped into broad areas for collection, which follow the areas (such as transport assets, infrastructure costs, operator costs and charges, end user costs and charges) which have been used throughout the report. However when information is collected, costs and charges would be separated. The broad level areas are:

- Comparable evaluation framework for collecting and estimating transport costs and charges – development of the methodology for information collection.
- Charges – the charges and composition of charges need to be estimated in order to undertake modal competition in the three transport modes. Costs determine the level of end user charge but the modal switching point is determined by charges and end user time costs.
- Costs – collection of costs in the three transport modes using the comparable framework developed. The costs can be divided into:
  - transport assets and the costs of capital
  - operator costs
  - user costs
  - social costs
- Case studies – should be used in order to obtain the marginal costs of transport at the required level of segmentation. The case studies also provide an opportunity to directly compare the three transport modes when they are actually competing. A case study for long distance public transport is not necessary because it is not an area of significant modal competition. Case study analysis should also be used to determine the marginal costs of congestion.
- Revenue and Funding – documenting the level of funding (through revenue generation, private sector investment or government subsidisation) in each transport mode for both public transport and freight.
- Other areas of costs and charges – which are not of high priority. These costs and charges information gaps are situated in the bottom left quadrant of Figure 4 and should only be collected if time and budget allows. Whether these information gaps are to be collected should be evaluated at the end of the work plan.

The timeline for collection of these broad levels is provided in Figure 5. More comprehensive detail of each of these broad areas is provided in Table in the appendix, along with an outline of the segmentation level to which the information is to be collected.

Figure 5: Costs and charges information collection work plan until December 2010



7.3 Use and dissemination of costs and charges information

The final form of the data will play an important role in determining the usefulness of the UTCC project.

During the stakeholder consultation process, views have been expressed that if data estimation was supported by calculation methods the rate in which the information dated would have been slowed. Therefore, it is important that the comparable consistent estimation and collection framework is included in the final presentation along with any methodology and calculations used.

The consultation process also outlined the lack of knowledge of previous costs and charges work completed by the Ministry of Transport. The final phase 2 report must have a dissemination plan to engage at the local authority level prior to its release. Otherwise, there is a chance that costs and charges data will not be widely used.

7.4 International comparability of costs and charges information

This section outlines the costs and charges work undertaken in other countries, especially Australia. This information will be useful for future comparisons of the level of costs and charges and the current charging, funding and pricing arrangements with other countries.

7.4.1 Costs and charges information available in Australia

Once the information identified in the gap analysis has been collected, it will be more comprehensive than any existing compilation of Australian costs and charges information. Various agencies in Australia have undertaken studies on subsets or aspects of the information considered in UTCC in order to support specific policy developments. However, no comprehensive studies have been done to collate all this information for use as a general policy development resource.

The agencies most likely to collect comparable data are the Bureau of Infrastructure Transport and Regional Economics (BITRE), and the National Transport Commission (NTC). However, neither of these collects the breadth of data covered by the UTCC work plan. The BITRE compiles freight statistics for the three modes: road, rail, and coastal shipping, but the emphasis is on freight volumes rather than costs and charges. The NTC is responsible for determining heavy vehicle road user charges. It assembles detailed road use and expenditure data from throughout Australia for this purpose. The NTC is investigating whether the cost base should be expanded to include externality costs and a return on assets but current charges only cover direct road expenditure.

In 2004 the Australian Transport Council prepared a report (ATC 2004) proposing the development of a National Transport Data Framework to support transport policy decision-making. It is understood that this proved to be too difficult and there has been little further public discussion about developing such a data framework.

At various times different agencies have commented on the lack of comprehensive up-to-date transport data in Australia. For example in a review of rail reform in 1999 the Productivity Commission commented that a lack of up-to-date transport data in Australia has impeded public debate and sound policy formulation. In 2006 the Bureau of Transport and Regional Economics, in a report on freight measurement and modelling, noted the ongoing land freight data deficiencies. It also commented that the issue of rail data is perhaps the most vexing. New Zealand has a rare window of opportunity to improve rail data now that government owns both the above and below track business.

In Australia, no comprehensive project has been commissioned to collate comprehensive surface transport costs and charges data. This suggests that the Australian officials do not perceive the benefits to be sufficient to justify the costs. In fact the Australian Productivity Commission has stated this view in its road and rail freight infrastructure pricing inquiry report (summarised in Appendix 4).

Appendix 4 provides brief summaries of studies that have been undertaken in Australia that required collection of costs and charges information. In all cases the information was collected for the specific project rather than as a resource in its own right, although some, such as the first paper summarised in Appendix 4 – BITRE (1999), have been widely used in other studies. Australian studies have tended to focus on intermodal comparisons between road and rail freight. Urban passenger transport, private and public, has received less attention because the Commonwealth Government has regarded this as a matter for the states.

7.4.2 Costs and charges information available internationally

Apart from the original Surface Transport Costs and Charges study in the UK, no other costs and charges studies covering the range of costs and charges included in the New Zealand STCC study have been undertaken. Nevertheless international studies may provide comparisons and insights for some particular costs and charges.

European Union

Related studies include:

- Handbook on estimation of external costs in the transport sector, Maibach et al, February 2008
- ExternE – Externality costs of Energy
- External Costs of Transport, Update Study, Infras/IWW, October 2004

- HEATCO – Developing Harmonised European Approaches for Transport Costing and Project Assessment, 2006

These studies focus mainly on the costs of transport with little consideration of charges. The studies are to derive cost information necessary for new road pricing structures including environmental costs and for use in project appraisal.

Canada

Estimates of the full costs of transport in Canada, Transport Canada (2008)

Transport Canada has just released a synthesis report summarising findings from an investigation of the full costs of transport in Canada including road, rail, marine and air transport. This is the most directly comparable study to the scope of the New Zealand UTCC and when Phase 2 has been completed it should be possible to undertake comparisons between the two sets of data. The Canadian report includes full cost estimates for all cost components for all modes and modal cost comparisons for urban transport, intercity passenger transport and freight transport. This report is a synthesis of key data from a number of supporting working papers.

Transportation Cost and Benefit Analysis – Chapter 2, Transportation Cost Literature Review, Victoria Transport Policy Institute (VTPI), (2006)

This document provides brief summaries of a large number of transport cost studies undertaken in different countries, including the UK and New Zealand STCC studies.

This report notes that different types of studies have different purposes, which affects their perspective, methodologies and scope. For example, most highway cost allocation and investment evaluation studies are primarily concerned with direct market costs, such as road construction and maintenance, travel time, vehicle operating costs, and crash damages, and how these vary depending on vehicle type and roadway conditions. They assume that the total amount of vehicle travel does not change and so were unconcerned with vehicle ownership and parking costs. Other types of studies incorporate environmental impacts, primarily air pollution, but sometimes also noise and water pollution, and various categories of land use impacts. Some studies have only considered external costs. Their results often differ significantly but these can usually be explained by differences in their methodology and scope.

The VTPI report notes that when comparing cost estimates the following factors should be considered – many of these same issues are identified in the gap analysis section of this report:

- The purpose of the analysis, and therefore its perspective, such as whether it considers only short-run marginal costs, long-run costs, and/or total social costs.

- Categories of impacts considered, including vehicle costs, travel time costs, roadway costs, traffic services, parking costs, congestion impacts on other road users, delays to non-motorised travellers, accident costs, pollution emissions and other environmental impacts.
- Data sources and methodologies used to calculate costs, particularly non-market costs such as the costs of accident injuries and deaths, and environmental damages.
- How possible double-counting is addressed, such as whether taxes are counted as costs or economic transfers, and whether congestion costs are summed with travel time costs.
- Geographic scope, and the monetary exchange rates used if in different countries.
- Driving conditions, such as whether the costs represent urban-peak, total urban, rural or overall average driving conditions.
- The time period evaluated, and what index is used for inflation.
- Differences in measurement units, such as between miles and kilometres.
- The types of vehicles considered, such as whether cost estimates are for cars, automobiles, the fleet of personal vehicles, total roadway vehicles (including freight vehicles) or total motor vehicles (including train, air and marine vehicles).
- Whether cost estimates are point values or ranges.

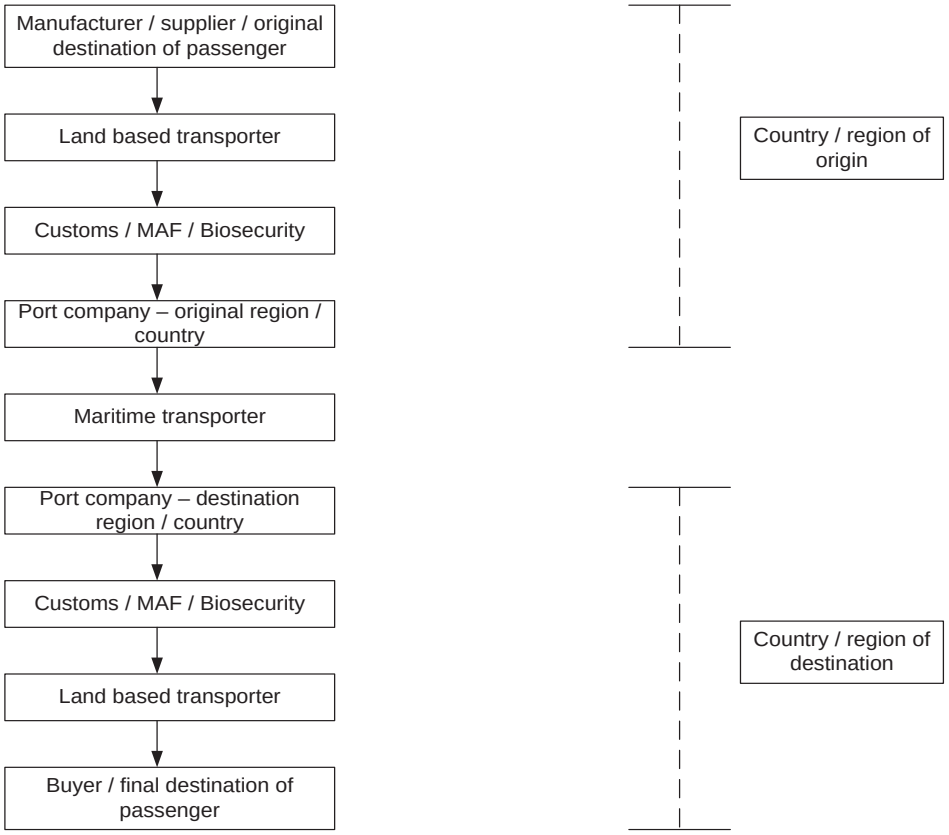
8 Appendix 1: Modal Stocktake

8.1 Maritime

8.1.1 Evaluating costs and charges

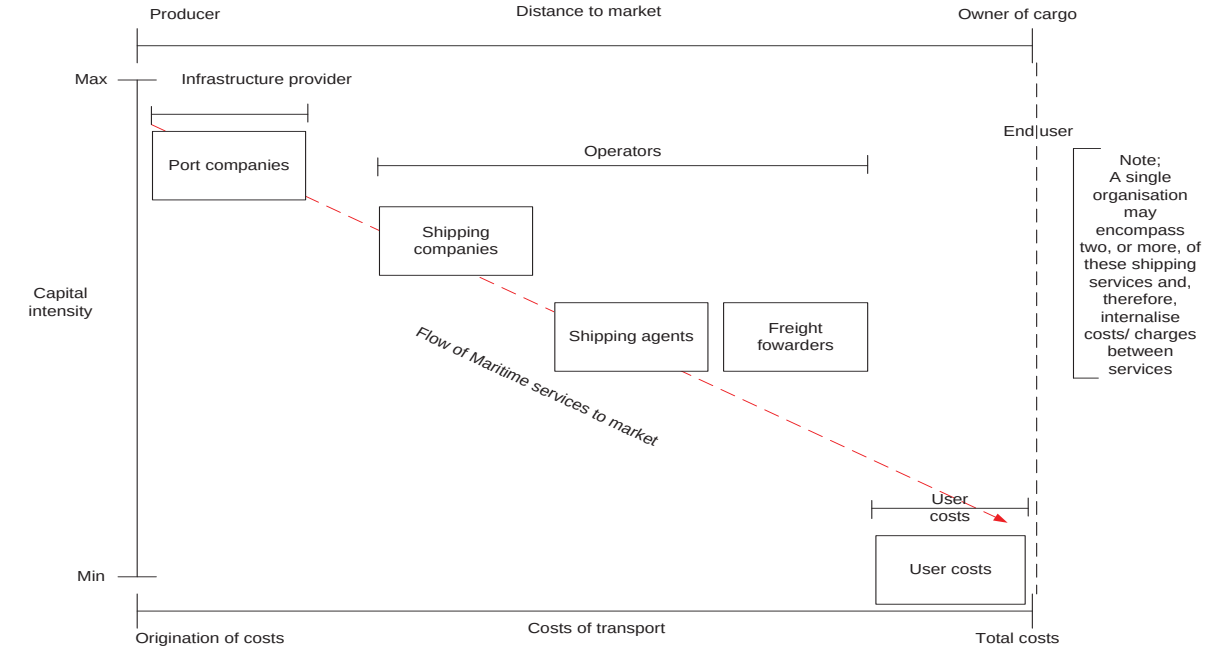
At the highest level, the supply chain of goods between two destinations generally follows the following process:

Figure 6: The maritime supply chain of freight or passengers



The occurrence of costs and charges in the supply maritime proportion of the supply chain is outlined in Figure 7 (on the next page). This diagram outlines the capital intensity and flow of services through the interaction of infrastructure providers, operators and end users in the maritime sector.

Figure 7: Maritime costs and charges arrangements



The maritime freight sector in New Zealand is very large in comparison to the maritime public transport sector. Maritime public transport is largely carried out on the Cook Strait, between the North and South Islands. Maritime freight transport, on the other hand, distributes imports, exports, and domestic produce throughout the country.

Infrastructure provider costs and charges

Infrastructure in the maritime supply chain is largely held by the port companies which provide use of this infrastructure to both land and sea based transport operators.

The maritime transport network infrastructure in New Zealand consists of 16 ports, each with large capital assets required to support international and domestic shipping. Two New Zealand ports (Wellington and Picton) carry out large commercial passenger transport operations between the North and South Islands.

Port companies incur significant costs of capital and land. As outlined in Ports of Auckland's 2007 financial statements[18], finance and depreciation costs accounted for a large part of total expenses. Other costs incurred by port companies include marketing, administration and labour costs. Port companies only incur the Maritime Safety Charge (MSC) if they operate maritime vessels – for example tugs and pilots, etc.

Port companies' charges are broadly segregated by:

1. **Wet charges** – wet charges are all the charges which apply to the ship, irrespective of the cargo which the ship is carrying. These charges include: berthage, linesmen, towage services, navigational dues and pilotage. All these charges (except berthage) are a fixed charge based on Gross Registered Tonnage (GRT). Berthage is calculated by GRT/per 24 hour berthage period.
2. **Dry charges** – dry charges are those charges which apply to the cargo, irrespective of the ship which carries the cargo. These charges include wharfage, stevedoring, storage, electric power and cranes. The dry charges are calculated based on the container size and weight. Different rates also apply to bulk goods, dependent on the make up of such goods.

Wet charges are placed on the vessels entering the port pilotage channel, and are therefore paid by domestic and international shipping companies. Dry charges are placed on cargo loaded and unloaded, and are therefore paid by the shipping companies or in some cases by the shipper / consignee depending on the terms of trade used.

[18] Ports of Auckland (2007), page 19.

Operator costs and charges

The maritime transport market is very segregated, and different operators throughout the supply chain are outlined in Figure 6. Information asymmetries between the two parties at either ends of the supply chain allow several intermediate operators enter the market. Operators which exist in the maritime industry are:

- shipping companies
- shipping agents
- freight forwarders
- shippers
- consignees

The interaction of these parties is diagrammatically outlined in Figure 7.

The end user cannot avoid the costs imposed by operators throughout the supply chain unless they obtain sufficient information to allow them to bundle certain processes within that chain. Some organisations in the Maritime sector integrate two or more of these operations and, therefore internalise the costs/charges which would usually pass between the two operators.

Shipping company

Shipping companies that carry out the physical transport of freight or passengers between two port destinations are the 'maritime transporter' in the supply chain.

Shipping company costs include ship capital investment and maintenance as well as variable costs such as fuel, insurance, labour, administration and registration. They are also responsible for charges accruing from the ever-growing use of transhipment ports in the case of containers.

Shipping companies also pay the Maritime Safety Charge (MSC). This is a levy placed on all foreign going ships calling at New Zealand ports and all domestic ships that operate within New Zealand waters. This includes commercial freight operations, passenger transport and fishing vessels. The MSC pays for services such as coastal navigation aids, maritime distress and safety radio systems, standards monitoring and safety / construction enforcement activities. The maritime safety charge is currently calculated in the following way[19]:

- International vessels – 17.25 cents per unit of gross tonnage for the first New Zealand port entry and 4.31 cents per gross tonnage for every subsequent port entry during that singular voyage.

[19] Ministry of Transport (2006).

- Domestic Vessels – the greater of $12.50 per complete metre of length or $3.75 per unit of gross tonnage as an annual fee.

Ship registration is an expense which applies to only some shipping companies. It is compulsory for all New Zealand owned vessels which exceed 24 metres in registered length, except for[20]:

- pleasure vessels
- ships engaged solely on inland waters of New Zealand
- barges that do not proceed on voyages beyond coastal waters
- ships exempt by the Minister in writing, being New Zealand owned ships operated by foreign residents under a demise charter which are registered under the law of a foreign country.

Any vessel proceeding overseas must be registered, even if the vessel is less than 24 metres in length or a pleasure vessel.

Shipping companies pay the shipping agent a freight commission fee both inwards and outwards.

Shipping agents

Shipping agents organise the commercial business interactions in order for the shipping companies to successfully acquire cargo and pay for local port charges.

Shipping agents provide a similar function to freight forwarders. However, they only organise activities related to maritime transport activities, and are sometimes involved in organising land based transport. This again depends on the terms of freight carriage negotiated between the consignor / consignee and the shipping company.

Shipping agent costs include both wet and dry charges passed on from the port companies, costs of shipping passed on from shippers, administration and labour, as well as a fixed bio-security and/or customs charges.

The shipping agent charges a freight fee to either the end user or the freight forwarder. The charge will be placed on end users if they do not require or are organising their own transport away from the port to their final destination. The charge will be placed on the freight forwarder if they have been contracted by the end user to organise all transport arrangements (including land based transport) between the original and final destinations of the goods or passenger(s).

Freight forwarders

Freight forwarders typically arrange total cargo movement between source and destination. They have the expertise to prepare and process the required documentation together with performing related activities pertaining to international shipments. A majority of freight forwarders

[20] Maritime New Zealand (2008)

include the cargo functions of shipping agents, in which case, they internalise all costs and charges which occur between the operators. They add to the function of a shipping agent by also organising land based transport between port and inland destinations. Large freight forwarders in New Zealand include; Mondiale NZ, DHL Global Forwarding, UTI Worldwide, Schenker DB Logistics and Linfox.

Non-Vessel Operating Common Carriers (NVOCCs) are one type of sea freight forwarders. They book space on ships (through a shipping agent) and sell it in smaller quantities, consolidating freight for transport in standard containers. Smaller end users, with less-than-container-load (LCL) shipments, can take advantage of the lower costs associated with being a big shipper by using NVOCCs. NVOCCs own their own containers but do not own or operate vessels.

Freight forwarders incur shipping agent costs, port dry charges, administration and labour costs. The freight forwarder charges the cargo owner a freight fee which captures all these costs and charges.

Typical shipping routes for all maritime operators in New Zealand are outlined in *Sea Change; Transforming Domestic Sea Freight; May 2008, pages 18-21.*

End user costs and charges

The end user of maritime transport will either be the cargo owner or the passenger.

The owner of cargo may choose to employ either the shipping company or a freight forwarder to transport freight by sea. This will be dependent on the freight owner's ability to prepare and process the required documentation for maritime freight transport. This will also determine the level of the freight fare. The cargo owner will pay a freight fee to either the shipping company or the freight forwarder.

End users, irrespective of the service they consume, incur user costs such as:

- Inventory costs/Transit expenses – the costs of holding the freight, or passenger, while in transit between origin and destination. For example, if the origin and destination are a distance apart which requires the freight or passenger to travel multiple days on end or stop somewhere overnight (to move between transport operators/modes), both freight and passenger incur further costs. The freight incurs inventory (or warehousing) costs. The passenger, on the other hand, incurs transit expenses such as hotel accommodation.
- Time costs – the lost productivity associated with having the freight, or passenger in transit instead of performing the task intended.

- Reliability and predictability costs – the costs associated with making excessive allowance (and therefore waiting) for unreliable travel or the cost of arriving late to the intended destination.

The effect that these user costs have on modal choice depends on the individual consumer's value of time. Examples of user costs affecting the modal choice are:

- Just in time suppliers and producers may pay significantly greater financial costs to ensure that goods arrive quickly and as planned.
- Other producers, who are not as time dependent, may use the transport service which has the longest time between the two destinations as a way to minimise their own warehousing costs – if a large amount of goods are in transit for two days, the producer does not pay the costs of warehousing for two days – this will be especially applicable in this case if the consumer (and not the producer) is paying the cost of transport.
- Some public transport users will pay extra financial costs to ensure that they are not waiting outside (in the cold/rain) for their transport, do not have to walk to their destination or do not have to change transport modes between destinations.
- Some public transport users will pay extra financial costs to ensure that they do not have to stay overnight between destinations.

Externalities

Externalities within the maritime transport sector are:

- Safety
- Environment (e.g. noise, spills, etc)
- Congestion within ports
- Risk of bio-security damage

Direct charges on externalities are carried out by Maritime New Zealand (through the Maritime Safety Charge), Ministry of Fisheries (through charges including import/export bio-security charges) and NZ Customs (through charges including customs duties). These charges have been discussed previously.

8.1.2 Funding arrangements

Maritime transport funding in New Zealand is different from the road and rail funding arrangements, due to the difference in ownership structure. Maritime transport is primarily funded by private sector organisations under commercial settings, whereas there are certain levels of government involvements in the road and rail transport sectors (to be discussed in the following sections).

The key stakeholders within the maritime transport sector funding are:

- Government/Crown
- Ministry of Transport
- Maritime New Zealand
- Local government bodies – owners of certain port companies
- Private Sector Organisations – shipping companies, port companies and freight forwarders.

The Government/Crown

The government's funding role within the maritime sector is to provide funds to search and rescue functions, recreational boating activities, Ministry of Transport maritime policy and the subsidisation for coastal shipping movements.

The Ministry of Transport

The Ministry of Transport's maritime policy team implements maritime transport policy and provides funding to government transport sector organisations.

The demand for international shipping is fast increasing as markets become globalised[21]. To capture economies of scale, international vessels are increasing in size and carrying capacity which places further pressure on port infrastructure. As the size of international vessels increase, the distribution patterns of exports and imports in New Zealand are evolving towards a 'hub and spoke' network whereby international vessels call at fewer ports and rely on domestic freight movements to distribute the goods to and from the port. As this evolution continues, increased pressure will occur on port infrastructure in large ports, while smaller ports may have insufficient demand to fully utilise capital in place. This has resulted in the Ministry outlining several initiatives specific to maritime transport in their *Sea Change* document[22]. This has also resulted in the Crown allocating approximately $36 million to the Coastal Shipping Freight initiatives[23].

Maritime New Zealand

Maritime New Zealand (MNZ) is responsible for promoting maritime safety, environmental protection and security through standards setting, monitoring, education, compliance, safety services and oil pollution response. MNZ is charged with administering the Maritime Transport Act 1994.

[21] Ministry of Transport (2008a)

[22] Ministry of Transport (2008a)

[23] Ministry of Transport (2008c)

Each year, the seven government transport sector organisations administered slightly under $3 billion of transport funding. Of this, approximately $25 million was administered by Maritime New Zealand, the main governing organisation within the maritime transport industry. The funding sources received by Maritime New Zealand for the 2006-07 year are outlined in Table 6.

Table 6: Maritime New Zealand revenues sources for the 2006-07 year

Revenue Source	Amount ($000's)	Percentage of total Revenue
Maritime Safety Charges Revenue	13,426	52.45%
Crown Revenue	7,963	31.11%
Oil Pollution Recovery	2,236	8.74%
Funding from Crown Entities	946	3.70%
Interest Revenue	457	1.79%
Seafarer licensing	191	0.75%
Ship Registration	132	0.52%
Direct User Charges	85	0.33%
Other Income	69	0.27%
Gain on sale of assets	44	0.17%
Sponsorship	24	0.09%
Bad debts recovered	23	0.09%
Total	25,596	100%

Source: Maritime New Zealand Financial Statements 2006/07

Each of these revenue sources are detailed below.

The Maritime Safety Charge – The Maritime Safety Charge (MSC) is a levy placed on all foreign going ships calling at New Zealand ports and all domestic ships that operate within New Zealand waters. These include commercial freight operations, passenger transport and fishing vessels. The MSC pays for services such as coastal navigation aids, the national distress and safety radio systems, advisory services (both technical and management), safety and environmental awareness education, and standards monitoring and enforcement activities. The way in which the MSC is calculated is outlined above in the charges section.

Foreign vessels contribute the majority of MSC revenue (over 85%) to Maritime New Zealand.

An independent review of Maritime New Zealand (MNZ)[24], looked at funding requirements which are needed in order for Maritime New Zealand to carry out its statutory functions effectively. This review outlined the trend of declining revenue collected from the third parties (through the Maritime Safety Charge, seafarer licensing and ship registration), due to efficiency

[24] Ministry of Transport (2006).

gains, changes in ship size and type and fewer port calls in New Zealand's international trades. The Review estimated that, without increases in revenue from third party charges, MNZ's financial deficits would increase over time from just under $1 million for 2005-06 to over $2.5 million by 2008/09.

The Review went on to recommend modifying the basis for calculating the MSC to included the introduction of separate rates for different categories of vessel, in order to counteract the effect of changes in the nature of international shipping and to align the charges paid by different vessel categories with the share of costs attributable to them.

The Review also recommended increasing seafarer licensing and ship registration fees to align revenues more closely with the full cost of providing those services.

In late 2007/early 2008, following further analysis of options for implementing the Review's findings concerning the third party revenue, MNZ consulted with industry stakeholders on options for re-aligning the MSC and licensing and registration fees with the costs of the relevant MNZ services. In May 2008, following advice on that analysis and the consultation process, the government agreed to:

- an increase in direct user charges for fully recovering the costs of licensing and registration services
- a change in the basis for determining MSC for foreign-going non-passenger vessels, from gross tonnage to deadweight tonnes[25]
- new MSC charges specifically for large passenger vessels such as cruise ships and inter-island ferries
- an increase in the rate of MSC for NZ cargo ships, fishing vessels and other commercial vessels (other than inter-island ferries)

These changes will be to align revenue from MNZ third party charges with the costs of the relevant services, protect the MSC revenue base against the impact of shipping trends and align the proportion of revenue recovered from different ship categories more closely with relevant MNZ costs. The regulatory changes necessary to implement these measures are expected to be in effect by 1 September 2008.

Crown revenue – Crown revenue refers to revenue earned on Crown owned assets governed by MNZ. Funding from Crown Entities refers to funding for specific services provided to recreational boating, government relations and maritime security by MNZ.

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[25] Gross tonnage measures the total internal volume of the enclosed spaces of a vessel expressed in 'gross ton' units of 100 cubic feet.

'Deadweight tonnes' is a measure in tonnes of a vessel including its cargo, stores, fuel, passengers and crew when loaded to its maximum summer draught.

Oil pollution recovery revenue – Oil pollution recovery revenue is recovered from the Oil Pollution Levy imposed on all vessels which carry oil as either their cargo (i.e. tankers) or as fuel according to a formula based on the risk of an oil spill from their particular operation. Some offshore installations (such as offshore mining operations) also pay a set levy based on their risk factor[26].

Funding from Crown entities – refers to funding attributable to traffic demand management. These funds are applied to Maritime New Zealand through the National Land Transport Fund (NLTF) in order to provide for an integrated transport system and manage congestion in the road transport mode.

Interest revenue, gain on sale of assets, and bad debt recoveries – are accounting terms which provide revenue based on the asset positioning of MNZ.

Seafarer licensing – refers to the revenue obtained from providing training and qualifications to maritime staff.

Ship registration – refers to the revenue received from the registration of New Zealand vessels. The ship registration charge is outlined in section 8.1.1.

Direct user charges – are funds provided by recreational users for boat registration and licensing fees, etc.

Sponsorship – are funds provided by corporate organisations who wish to promote particular boating activities.

Private Organisations

The funding interaction between shipping companies, port companies, freight forwarders and end users is outlined in the charging section above.

[26] Maritime New Zealand (2006).

8.2 Road

8.2.1 Evaluating costs and charges

Total costs and charges within the road transport sector are outlined in Figure 8 below, which illustrates the interaction of infrastructure costs, operating costs, end user costs and externalities.

Infrastructure provider costs and charges

Road transport sector infrastructure can be separated into two groups:

- Road infrastructure
- Parking infrastructure

Road infrastructure

Road transport infrastructure has public good characteristics – it is rivalrous in consumption but consumers can not be excluded. The government, therefore, plays a major role in the investment and maintenance of the road transport network.

Currently the road infrastructure managers in New Zealand are New Zealand Transport Agency and Territorial Local Authorities (TLAs). The New Zealand Transport Agency was established as a Crown Entity and has replaced Land Transport New Zealand and Transit New Zealand. It has a mandate to give effect to the government's vision that people and freight in New Zealand have access to an affordable, integrated, safe, responsive and sustainable transport system by 2010.

The following charging mechanisms are implemented by the government and are provided to infrastructure providers by way of funds for roads:

- Road User Charges (RUC) – is a charge levied on vehicles weighing greater than 3.5 tonnes (gross laden weight) or are powered by a fuel which is not taxed at a source (such as diesel)[27]. RUC varies with vehicle weight and distance travelled.
- Fuel Excise Duty (FED) – is a tax imposed on motor vehicle fuel. Exemptions for FED exist for agriculture machinery, commercial vessels (which have a Maritime Safety Authority number), and certain fuel such as LPG[28]. Total FED charge varies with fuel consumption.
- Motor Vehicle Registration (MVR) – is the initial recording of a vehicle on the Motor Vehicle Register, and the issuing of registration plates. Vehicles can only be registered after they have been checked to

[27] Land Transport New Zealand (2007a)

[28] Land Transport New Zealand (2007b)

ensure they are safe to be on the road. This is a one off charge, dependent on vehicle type, to get the vehicle added to the register.

- Motor Vehicle Licensing (MVL) – this is an annual charge on road users to ensure their vehicle is licensed and registered to be used on the public road network. The annual MVL charge varies depending on vehicle type, engine size and fuel type, but not on the distance travelled. Further details on the MVL charge can be found at http://www.landtransport.govt.nz/vehicle-ownership/licensing-fees.html .

These charges are placed on private vehicle operators, and NZTA through the National Land Transport Programme.

Furthermore, depending on vehicle type and use, some vehicles may be subject to Safety Standards levies and Audit and Standards levies.

Parking infrastructure

Parking operators face costs attributable to the investment and maintenance of parking facilities such as land and capital, as well as staff and administration costs involved in carrying out the parking business. Parking operators charge for these costs by implementing parking charges and fines on motorists which use the parking facilities. In some cases local government agencies implement parking fares and fines on government land, which are collected by the parking agencies. Local government parking investment, maintenance and administration costs are paid by local ratepayers and national taxpayers.

Operator costs and charges

The operators in the road transport sector can either be commercial freight operators or public transport operators. Irrespective of whether the operator is carrying out public transport activities or freight operations, they incur the following operator costs:

- Capital costs
- Motor vehicle operating costs (including maintenance)
- Labour costs
- Accident Compensation Corporation (ACC) levies
- Further accident costs (see below)
- Motor Vehicle Registration (MVR)
- Motor Vehicle Licensing (MVL)
- Fuel Excise Duty (FED)
- Road User Costs (RUC)
- Time costs

The charging mechanism used by commercial freight operators is a freight charge placed on the owner of the freight. This charge will be variable on the weight, distance, time sensitivity and makeup of the cargo.

The charging mechanism used by commercial public transport operators is a public transport fare on passengers.

End user costs

The End Users of the road transport sector consist of:

- Public transport passengers
- Freight owners
- Private vehicle operators

Costs faced by the passenger are captured in their public transport fares and their user time costs.

The owners of the freight consignment face the freight charges of the commercial freight operator. Freight owners also face user costs associated with using the freight service such as time, reliability and inventory costs.

Private vehicle operators are faced with motor vehicle operating costs, parking charges, FED, RUC, MVL and MVR. Motor vehicle operating costs are variable costs related to fuel, maintenance and compliance costs of the motor vehicle. Parking fares are variable costs dependent on the location and duration of parking. FED, MVR, MVL and RUC have been described in detail at the 8.2.1.

End users, irrespective of the service they consume, incur user costs such as:

- Inventory costs/transit expenses – the costs of holding the freight or passenger while in transit between origin and destination. For example, if the origin and destination are a distance apart which requires the freight or passenger to travel multiple days on end or stop somewhere overnight (to move between transport operators/modes), both freight and passenger incur further costs. The freight incurs inventory (or warehousing) costs. The passenger, on the other hand, incurs transit expenses such as hotel accommodation.
- Time costs – the loss of productivity associated with having the freight, or passenger, in transit instead of performing the task intended.
- Reliability and predictability costs – the cost associated with making excessive allowance (and therefore waiting) for unreliable travel or the cost of arriving late to the intended destination.

The effect that these user costs have on modal choice depends on the individual consumer's value of time. Examples of user costs affecting the modal choice are:

- Just in time suppliers and producers may pay significantly greater financial costs to ensure that goods arrive quickly and as planned.
- Other producers, who are not as time dependent, may use the transport service which has the longest time between the two destinations as a way to minimise their own warehousing costs – if a large amount of goods are in transit for two days, the producer does not pay the costs of warehousing for two days – this will be especially applicable in this case if the consumer (and not the producer) is paying the cost of transport.
- Some public transport users will pay extra financial costs to ensure that they are not waiting outside (in the cold/rain) for their transport, do not have to walk to their destination or do not have to change transport modes between destinations.
- Some public transport users will pay extra financial costs to ensure that they do not have to stay overnight between destinations.

Accident costs and charges

Accident costs in the road transport sector are a mixture of private costs, public costs and externalities. Some are preventive costs and some are consequential costs.

Part of the accident costs are private costs, these include:

- labour and safety costs to prevent accidents (e.g. safety gears and equipments)
- loss of production resulting from accidents
- ACC premium (either under the employers' account (for operators) or the Motor Vehicle account (for end users and operators who pay FED and MVL)
- Other insurance premium (e.g. third party insurance for vehicles).

Some of the accidents costs are public costs, these include:

- public health system costs (These are funded through ACC premiums on FED on petrol, which varies with fuel consumption, and MVL, which varies with vehicle types).
- accident prevention, attendance and investigation costs (these are funded through NTLF from FED, MVR/L and RUC levied on road users)

As ACC premiums are not adjusted for individuals' risky behaviours, they do not provide incentives for individuals to minimise risk. Risky individuals can impose cost burdens on to other road users (either through increasing their risk of injury and/or through increasing their ACC premiums as total

ACC claim costs would be higher with risky drivers). These extra cost burdens are the external components of accident costs.

Finally, there are costs of pain and suffering, to the injured and/or their family, associated with the loss of life and life quality. These costs can be internal or external depending on who is 'at fault' and who get injured.

There are overlaps with the costs discussed above (e.g. public costs are collected from private users and internal and external costs can both be private or public). This should be borne in mind at the data collection stage.

Congestion costs and charges

Currently road users are charged under the "pay-as-you go" (PAYGO) road user charging scheme. PAYGO is a special case of fully allocated cost approach (i.e. allocate total costs between users on some predetermined basis). Under PAYGO, investment is charged directly to users in the year in which it is undertaken. As external costs are not charged for, the current charging scheme has limited ability to influence marginal demand behaviour through pricing (except for the time inefficiencies resulting from congestion).

Individual consumers only consider their own costs and time on the road transport network (i.e. the private cost of transport use). As marginal social cost (i.e. when externalities are included) is greater than the marginal private cost and the resulting market outcome is excessive consumption (also see Figure 3 in Section 5), with network demand being greater than network supply – i.e. congestion.

Like accident costs, congestion costs are partly private costs, partly public costs and partly externalities, with some overlaps.

The private portion is the costs experienced by the road users directly (e.g. time costs).

The public portion is the costs to the government of increasing capacity, and undertaking other measures to restrict the loss of economic efficiency resulting from congestion.

The externality portion is the time delays (and cost increases) which the marginal network consumer imposes on the consumers already using the network.

Externalities

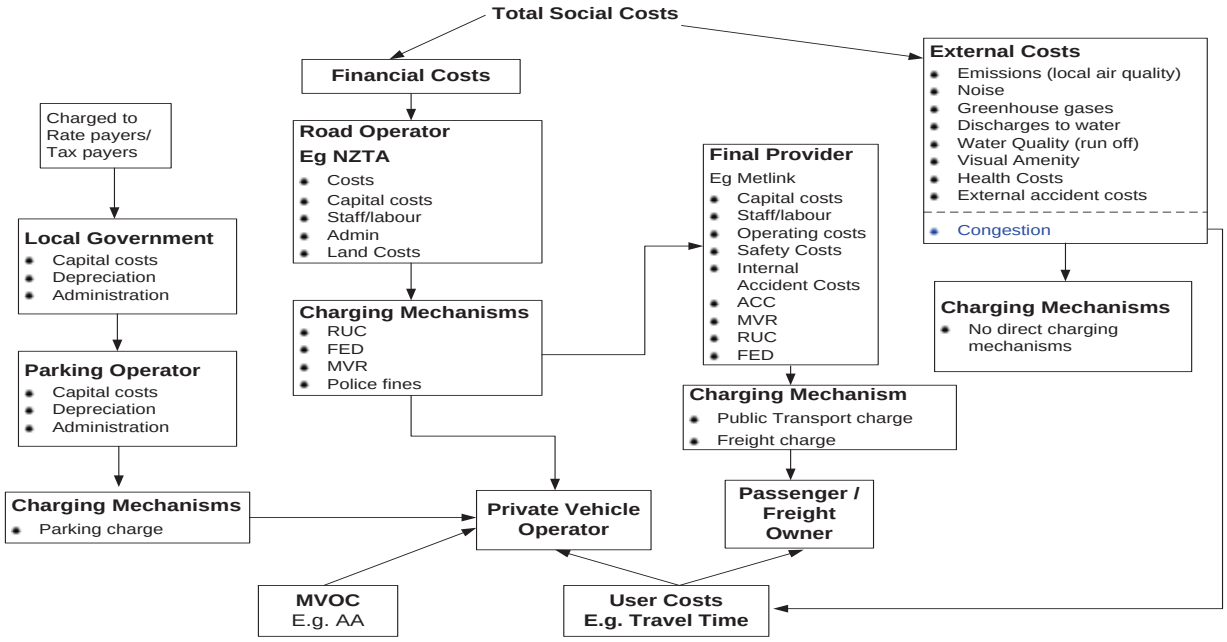
The external costs within the road transport sector are:

- Emissions (local air quality)
- Noise
- Greenhouse gases
- Discharges to water

- Water quality (run off)
- Visual amenity
- Accident costs (covered previously)
- Congestion (covered previously)

Currently there are no direct charging mechanisms for these external costs.

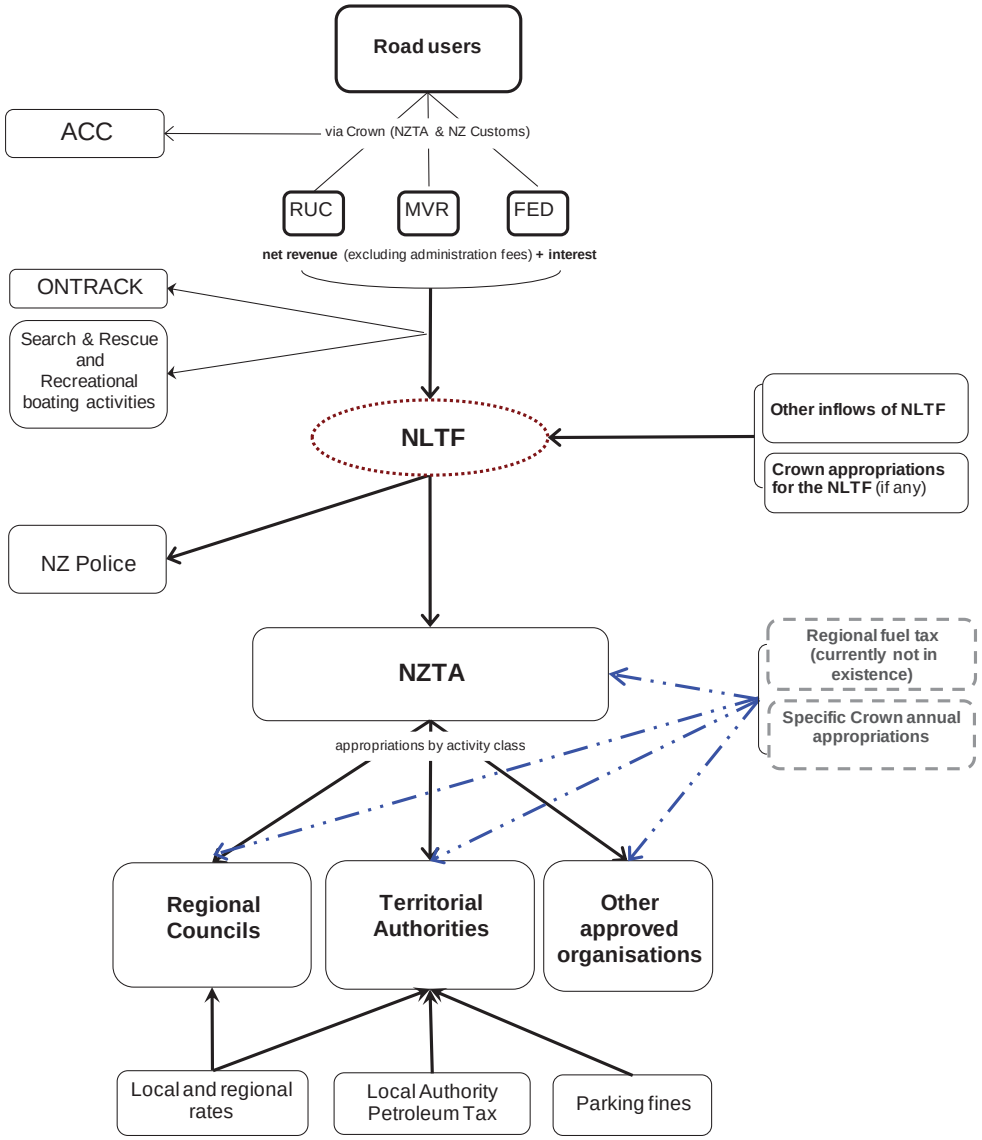
Figure 8: Road transport cost and charges arrangements



8.2.2 Funding Arrangements

Funding dedicated to the road transport sector, in general, flows from Crown appropriations and road users into the National Land Transport Fund (NLTF). The New Zealand Transport Agency (NZTA) then governs and distributes NLTF funds by activity class to State Highway maintenance and construction, Regional Councils and Territorial Local Authorities (TLAs). Full funding arrangements as at 1 July 2008 are outlined in Figure 9 below.

Figure 9: Road Funding Arrangements



The dotted lines in Figure 9 indicate that dollar amounts allocated between the two parties are on a one-for-one basis, with no funds being applied elsewhere or to administration costs.

The main flows of funds in the road transport funding are to and from:

- The National Land Transport Fund (NLTF)
- The New Zealand Transport Agency (NZTA)
- Regional Councils
- Territorial Local Authorities

We now outline the funding flows to and from these major parties and their interactions with minor parties in the road transport sector. It must be noted that only direct funding arrangements within the road sector are discussed in this section. Indirect funding flows (such as GST), and flows from these organisations which do not have a road focus (such as NLTF funding for ONTRACK) are discussed elsewhere.

The National Land Transport Fund (NLTF)

The NLTF is a fund specifically devoted to achieving the government's transport strategy as outlined in the National Land Transport Programme (NLTP). The NLTP details the spending programmes for the National Land Transport Fund (NLTF).

At present contributions to the NLTF are from:

- Crown appropriations
- Net revenue from Road User Charges (RUC), Motor Vehicle Registration (MVR), Fuel Excise Duty (FED)
- Revenue from state highway land management
- Proceeds from the sale of state highway land
- Interest earned on NLTF funds

Crown appropriations are currently being phased out. From 1 July 2008, all land transport taxes (fuel excise duty, road user charges and vehicle licensing fees) will be fully dedicated, or hypothecated, to the National Land Transport Fund for use in the transport sector only.

The specific charges surrounding RUC, FED and MVR are outlined in section 8.2.1, above. The actual funds which flow into the NLTF are the revenue generated from these charging mechanisms minus the administration fees paid to service stations, approved agents and NZ customs. Prior to these funds reaching the NLTF, a portion of the revenue generated by MVR and FED is paid to ACC for transport safety and accident costs.

Land management lease income is generated on all land assets devoted to future road transport needs and flows directly into the NLTF.

The Ministry of Transport

As the government's principal transport advisor, the Ministry of Transport both leads and generates policy and makes transport rules, in collaboration

with the Crown entities. This includes policy and regulatory advice surrounding the NLTF. MoT also represents New Zealand's transport interests internationally. It negotiates an annual Performance Agreement with each entity (including NZTA, Maritime NZ, ONTRACK and KiwiRail) on behalf of the Minister and monitors the entities' performance against that agreement. Regarding the road sector,

The Ministry of Transport is responsible for:

- administering the funds that the government allocates to the transport sector under what is called 'Vote Transport'
- the collection of Crown transport revenue that is used to fund New Zealand's land transport system. The NZTA is contracted to provide these services under an agreement with the Secretary for Transport
- setting criteria for determining the Financial Assistance Rate which affects the amount required to fund from local and regional rates
- determining the levels of expenditure for the NLTP and the likely changes to the duties, fees and charges paid into the NLTP, for the purpose of preparing the Government Policy Statement every three financial years.

The New Zealand Transport Agency

The New Zealand Transport Agency (NZTA) has a mandate to give effect to the government's vision that people and freight in New Zealand have access to an affordable, integrated, safe, responsive and sustainable transport system by 2010. The New Zealand Transport Agency's major roles include:

- National Land Transport Programme operations and funding allocation
- Management of regional fuel tax revenue (in the future) and specific Crown annual appropriations
- State Highway maintenance and construction
- Research, education and training
- Collection of MVR, FED and RUC, as well as ACC proportion of charges.

When deciding how funds should be allocated, NZTA will base their decision on the following activity classes for the 2009/12 NLTP[29]:

- Transport planning
- Sector training and support
- Sector research

[29] Ministry of Transport (2008c)

- Travel behaviour change
- Public transport services
- Public transport infrastructure
- Walking and cycling
- Improvement of state highways
- Renewal of state highways
- Maintenance of state highways
- Improvement of local roads
- Renewal of local roads
- Maintenance of local roads
- Rail and sea freight
- Seed funding for coastal shipping freight initiatives
- Road policing
- Performance monitoring
- Management of the funding allocation system

The amount of funding allocated between these activity classes is required to be published annually by the NZTA. When allocating funds based on the activity classed, the funds can follow these flows:

- under control of the NZTA, for:
  - State highway construction and maintenance. These funds facilitate the previous functions of Transit New Zealand (Transit)
  - Research, Education, and Monitoring – in accordance with NZTA's research programme
- allocate to regional councils or local territorial authorities:
  - These may either be allocated directly to the TLA or to the Regional Council depending on activity class.
  - Regionally distributed funds, are distributed to each region in proportion to its population. This fund will remain in place until 31 March 2015. However, if there are unspent or unallocated funds for a region, these will remain available to that region beyond that date[30].
- allocate to specific, Crown funded purposes throughout New Zealand - Under the amendments to the Land Transport Management Act, the full hypothecation of FED replaces the separate appropriations of Crown funds. However, the NZTA has an obligation to meet the

[30] Ministry of Transport (2008c).

Crown funding commitments for Auckland, Wellington, the Bay of Plenty and the Waikato from the NLTF[31].

- allocate to other approved organisations
  - Appropriations maybe made to organisations such as the Department of Conservation (DoC) to help minimise the environmental impacts of land transport.
  - These appropriations may also be made to maritime and rail organisations as a form of traffic demand management (rail and sea freight development).
- allocate to NZ Police activities for road policing activities

Regional Councils

Regional councils are the primary parties responsible for development of a transport network which aims to achieve the regional land transport strategy and the relevant sections of the New Zealand transport strategy 2008. This also includes the development of public transport infrastructure and rolling stock required to develop an integrated transport system and reduce the congestion on regional roads. Regional councils acquire funds from regional rates, the NLTF and from the Ministry of Education (for school bus operating and capital costs). In future, some regional councils will also acquire funds from the regional petroleum taxes.

Territorial Local Authorities

Territorial Local Authorities (TLAs) are responsible for local road construction and maintenance and local public transport infrastructure. Regional councils provide funding and also govern funding to TLAs in line with the Regional Land Transport Strategy in place in the particular region. TLAs are also funded through Local Authority Petroleum Taxes (LAPT), parking fines and local rates.

Other approved organisations also receive funds from the NZTA through the NLTF to help minimise the environmental impacts of land transport or to provide integration between transport modes.

[31] Ministry of Transport (2008c).

8.3 Rail

8.3.1 Evaluating costs and charges

Total costs and charges within the rail freight transport sector are outlined in Figure 10 below, which illustrates the interaction of costs and charges for infrastructure providers, operators (or final providers), end users and externalities.

Infrastructure provider costs and charges

Infrastructure providers in the rail transport sector can be segregated in the following way:

- Freight transport infrastructure
  - Network providers
  - Rolling stock providers
- Public transport infrastructure
  - Network providers
  - Rolling stock providers

These areas are detailed below.

Freight transport infrastructure

The main rail infrastructure provider in New Zealand is ONTRACK – The New Zealand Railways Corporation – who look after 4,000km of railway track, 1,787 bridges, 150 tunnels, signalling infrastructure, railway level crossing alarms, and electrification and communication systems. ONTRACK is a state owned enterprise, whose assets are valued at approximately $10,648 million[32].

ONTRACK's major cost in the 2007 financial year was depreciation. Other costs included administration, marketing, rental expenses on operating leases and safety costs at level crossings.

The charging mechanism employed by the rail network owners is a track access charge on the rolling stock owner or the freight operator. Track access charges are a fixed annual charge irrespective of use. In setting access charges, ONTRACK is required to recover the costs of operating the network, beyond the initial government funding of $200 million.

Prior to the government's purchase of the rail and ferry assets, a majority of New Zealand's rail rolling stock was owned by Toll Holdings Ltd. As of 1 July 2008, these assets are now owned by the Crown. The estimated book

[32]ONTRACK (2007)

value of assets purchased is $430 million and includes 180 mainline locomotives, 4,200 wagons, one rail ferry and leases on two other ferries[33].

The major costs for rolling stock owners are depreciation and costs of capital. Others costs include accidents, fuel, staff, ACC, leases and compliance costs[34]. Rolling stock providers charge operators a freight fee based on a value pricing principle. The freight charge is variable dependent on cargo make up, distance, size, weight and the continuing business relationship with a particular customer.

Public transport

The Greater Wellington Regional Council (GWRC) and Auckland Regional Transport Authority (ARTA) provide urban rail public transport infrastructure in Wellington and Auckland.

Public transport infrastructure owners charge rail operators a fixed annual track access charge. The government also provides track access charge subsidies to ONTRACK.

Operator Costs and Charges

According to Ministry of Transport (2005)[35], there are approximately 80 organisations operating railways and tramways in New Zealand. They can be classified into three broad groups:

- Network operators
  - ONTRACK
- Major Train operators
  - KiwiRail (previously Toll NZ) - rail freight operator; long-distance and Wellington urban rail passenger operator.
  - Veolia - Auckland urban rail passenger operator.
- Industrial operators - railways serving the needs of factories, stores or other industrial facilities, usually on a localised site with connection to the rail network. There are currently 34 industrial railway operators.

[33] Helen Clarke (2008)

[34] ONTRACK (2007), page 49.

[35] Ministry of Transport (2005)

- Heritage and tourist/leisure operators - usually operating on a short dedicated railway line or tramline, or making excursion trips on the main network. There are currently around 40 of these operators.

The costs incurred by the operators, or final providers, include track access charges, ACC, safety, marketing and administration.

Nearly all service providers and owner/operators of the rolling stock are the same organisation. They charge a freight charge on the owner of the freight consignment which is variable based on a value pricing principle. This varies dependent on cargo makeup, distance, size, weight and the continuing business relationship with a particular customer. The public transport fare is a variable charge dependent on the location, service offered and distance of the public transport trip.

End user costs

Final end user costs are dependent on the service they are consuming.

If the end users are a freight owner, consuming rail freight movement services, they pay the operators a freight charge which varies dependent on cargo make up, distance, size, weight, and the continuing business relationship with a particular customer.

If the end user is a consumer of public transport they will pay a public transport fare, which will vary dependent on the location, distance of the public transport trip and service offered.

End users, irrespective of the service they consume, incur user costs such as:

- Inventory costs/Transit expenses – the costs of holding the freight or passenger while in transit between origin and destination. For example, if the origin and destination are a distance apart which requires the freight or passenger to travel multiple days on end or stop somewhere overnight (to move between transport operators/modes), both freight and passenger incur further costs. The freight incurs inventory costs. The passenger, on the other hand, incurs transit expenses such as hotel accommodation.
- Time costs – the lost productivity associated with having the freight or passenger in transit instead of performing the task intended.
- Reliability and predictability costs – the cost associated with making excessive allowance (and therefore waiting) for unreliable travel or the cost of arriving late to the intended destination.

The effect that these user costs have on modal choice depends on the individual consumer's value of time. Examples of user costs affecting the modal choice are:

- Just in time suppliers and producers may pay significantly greater financial costs to ensure that goods arrive quickly and as planned.

- Other producers, who are not as time dependent, may use the transport service which has the longest time between the two destinations as a way to minimise their own warehousing costs – if a large amount of goods are in transit for two days, the producer does not pay the physical costs of warehousing for two days – this will be especially applicable in this case if the consumer (and not the producer) is paying the cost of transport.
- Some public transport users will pay extra financial costs to ensure that they are not waiting outside (in the cold/rain) for their transport, do not have to walk to their destination, or do not have to change transport modes between destinations.
- Some public transport users will pay extra financial costs to ensure that they do not have to stay overnight between destinations.

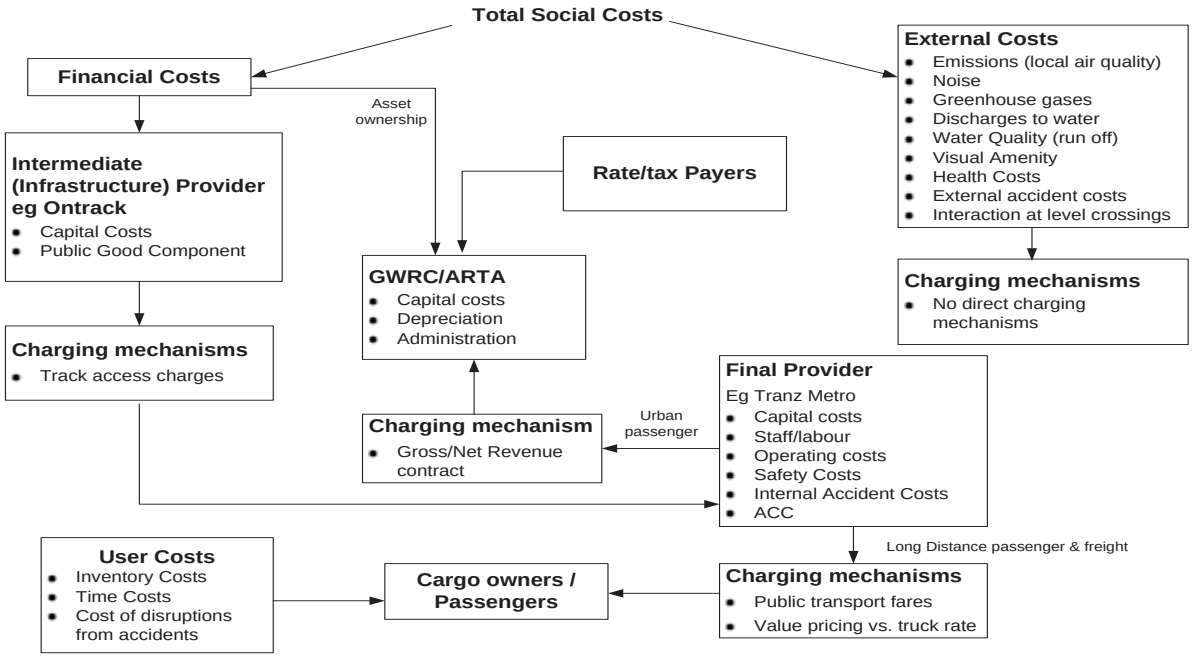
Externalities

The external costs within the rail freight transport sector are:

- Emissions (local air quality)
- Noise
- Greenhouse gases
- Discharges to water
- Water quality (run off)
- Visual amenity
- Health costs
- Accident costs
- Interaction at level crossings

Currently there are no direct charging mechanisms for these external costs.

Figure 10: Rail transport costs and charges



8.3.2 Funding arrangements

Funding arrangements within the rail transport sector can be broadly segregated into three areas:

- Infrastructure and rolling stock providers – ONTRACK, Greater Wellington Regional Council (GWRC) and Auckland Regional Transport Authority (ARTA)
- Organisations which provide and prioritise funding for rail transport infrastructure and operation – Ministry of Transport, Treasury, The New Zealand Transport Agency (NZTA) (formerly Land Transport New Zealand (LTNZ)), Greater Wellington Regional Council (GWRC) and Auckland Regional Transport Authority (ARTA)
- Infrastructure users – Rail operators and Rail users.

Figure 11 outlines the funding arrangements within the rail transport sector.

It must be noted that the funding arrangements discussed here refer to both rail freight transport as well as rail passenger transport. The blue lines are funding flows specific to public transport. The picture for specific rail freight funding is therefore somewhat more simplistic.

Infrastructure Providers

The main infrastructure provider in the rail transport sector is ONTRACK – The New Zealand Railways Corporation. ONTRACK owns and manages New Zealand's rail network on behalf of the Government. As discussed in previous sections, the government's purchase of Toll Holdings Ltd may increase ONTRACK's assets or it may mean the Crown has two governing bodies in the rail transport sector – one to govern the infrastructure and one to govern the Crown owned rolling stock.

As is stands, ONTRACK manage approximately $10.6 billion[36] of rail infrastructure including tracks, bridges, tunnels, signalling infrastructure, railway level crossing alarms, electrification systems and communication systems. ONTRACK is funded by:

- Crown appropriations – for public policy projects
- Crown – for public good activities
- Crown – track access charges subsidy
- GWRC and ARTA – specific capital works
- NZTA via Territorial Local Authorities – for level crossing costs
- Crown – for level crossing costs
- Rail Operators – Track Access Charges

[36] ONTRACK, *Annual Report 2007,* page 37.

- Lease income from Crown owned land devoted to future rail use
- Rail User contributions – for specific capital infrastructure e.g. Solid Energy has funded ONTRACK for some of the capital infrastructure used to transport their coal output in the Westcoast.
- Road Users – contribution to TLAs level crossing costs through FED, MVR and RUC.

ONTRACK then uses these funds to operate and maintain the rail infrastructure network in New Zealand.

GWRC and ARTA provide an amount of public transport infrastructure in Wellington and Auckland respectively, including the some of the rolling stock and train stations.

Organisations which provide and prioritise funding for rail transport

The New Zealand Transport Agency (NZTA) was established as a Crown entity on 1 August 2008. The new agency replaces and combines the functions of Land Transport New Zealand and Transit New Zealand.

NZTA, GWRC and ARTA manage, prioritise and provide funding within the rail transport sector in order to provide rail freight and passenger transport networks to achieve national and regional land transport strategies.

NZTA allocates and manages funding for land transport services through the National Land Transport Programme (NLTP). The NLTP details the spending programmes for the National Land Transport Fund (NLTF). The NLTF (and therefore the NLTP) is funded through Crown appropriations, government fare subsidies, and road users for the 2008/09 and 2009/10 financial year. Road users, in the past, have contributed through fuel excise duty, motor vehicle registration and road user charges. However, under full hypothecation, land transport taxes are spent only for transport purposes.

NZTA provide capital funding to GWRC and ARTA so that public transport in rail can be offered as an alternative to road transport. GWRC and ARTA also manage funding from local rates and Crown appropriations (and in the future, regional petrol taxes) which they use to provide public transport networks, and planning and coordination of the public transport system.

As the government's principal transport advisor, the Ministry of Transport both leads and generates policy and makes transport rules, in collaboration with the Crown entities. This includes policy and regulatory advice surrounding the NLTF. It also monitors the performance of Crown entities on behalf of the Crown.

The Treasury is responsible for providing financial oversight to New Zealand Crown transport interests.

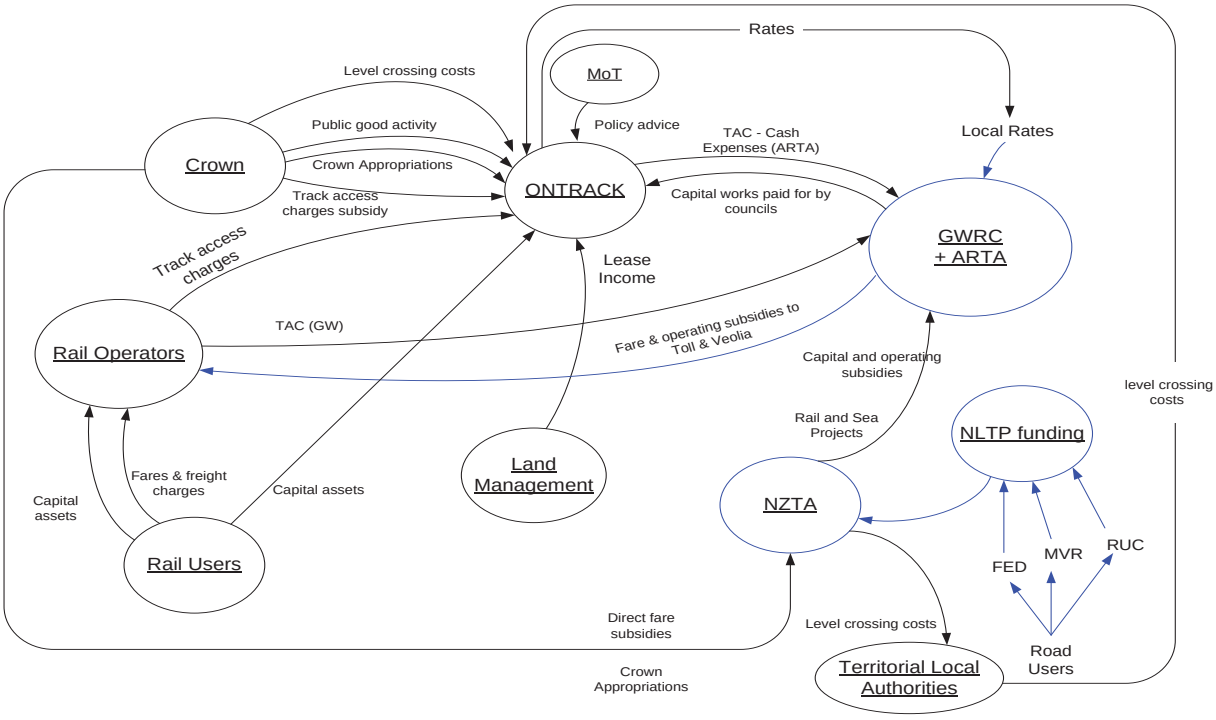
Infrastructure users

The main infrastructure users are the rail operators. The rail operators receive income from:

- Rail users through public transport fares or freight charges
- Fare and operating subsidies from GWRC or ARTA
- Contributions from private organisations from specific rail capital projects
- Income from leases – of land and capital assets such as rolling stock.

The rail operators provide public transport and freight services to the end user and pass funding onto GWRC and ONTRACK through track access charges.

Figure 11: Rail funding arrangements



9 Appendix 2: The Consultation Process

The consultation process consisted of large workshop forums and individual face-to-face or telephone interviews. The targeted audiences of the workshop forums were central government transport policy analysts. In the individual interviews, we talked to representatives from our major stakeholders separately. The stakeholders we have engaged include private sector organisations, central and local government transport policy analysts and modellers.

Workshop forums

There were four workshop forums, one for each of the maritime, road and rail transport sectors, and a cross cutting workshop forum devoted to public transport. The organisations represented at these workshops were:

Table 7: Workshop forums undertaken in the consultation process

Maritime	**Road**	**Rail**	**Public Transport**
▪ Treasury ▪ Land Transport New Zealand ▪ Ministry of Transport ▪ Maritime New Zealand	▪ Treasury ▪ Land Transport New Zealand ▪ Ministry of Transport ▪ The Ministry of Economic Development ▪ Transit New Zealand	▪ Treasury ▪ Land Transport New Zealand ▪ Ministry of Transport ▪ ONTRACK ▪ Toll NZ	▪ Treasury ▪ Land Transport New Zealand ▪ Ministry of Transport

Interviews

As part of the consultation process, we carried out fifteen face-to-face or telephone interviews. The interviews were used to inform the transport stakeholders about the study and to cover specific issues surrounding central government transport policy. The interviews consisted of:

Table 8: Interviews undertaken in the consultation process

Maritime	Road	Rail	Multi-modal
▪ Ministry of Transport – Maritime policy ▪ New Zealand Shipping Federation ▪ Ports of Auckland ▪ Port of Napier	▪ Ministry of Transport – Road User Charges ▪ Road Transport Forum (RTF) ▪ Automobile Association (AA)	▪ Toll NZ ▪ ONTRACK	▪ Treasury ▪ Ministry of Transport – Environmental ▪ Ministry of Transport – Safety ▪ Auckland Regional Council ▪ Greater Wellington Regional Council ▪ Christchurch City Council

In total, the consultation process highlighted 19 sets of costs and charges information demands (one set of information demands from each consultation session). However, many of the costs and charges information demands are broadly similar and have been summarised in Section 6.2.

10 Appendix 3: Segmentation level of work plan

Table 9: Work plan for collection of costs and charges information gaps

Area of information collection	**Key tasks**	**Modal specific commentary on key tasks**		
		Maritime	**Road**	**Rail**
Comparative Framework	The methodology for information estimation and collection will be developed in this section. A comparable evaluation framework for estimating transport costs needs to be established in the following areas: <u>Valuation and treatment of transport assets</u> **Section 6.2.1 (a)** The method for estimating opportunity cost of capital **Section 6.2.1 (b)** The method for valuing transport assets <u>Costs</u> **Section 6.2.1 (c)** The approach to valuing externalities assets used **Section 6.2.1 (d)** The method for attributing costs of accident, congestion, and other costs between internalities and externalities **Section 6.2.1 (e)** methods to enable modification to the cost allocation and dTIMs **Section 6.2.1 (g)** method and measurement base for estimating total and marginal costs of transport. <u>Charges</u> **Section 6.2.1 (f)** approach to estimating the weighted average price paid for freight movements			

Area of information collection	Key tasks	Modal specific commentary on key tasks		
		Maritime	**Road**	**Rail**
Transport Charges (including composition of charges)	**Section 6.2.2 (w, y, & f)** The charges will be observed in the freight and PT sectors. Charges will be evaluated in the follow levels of segmentation: ▪ Tonne/km (for freight only) ▪ Passenger/km (for PT only) ▪ Location ▪ User class (for PT only) ▪ Freight type (for freight only) ▪ Rack rates vs. actual price paid ▪ Time of day ▪ Time of year (for freight only) There is no available information for the maritime industry. The maritime charges should be evaluated first to allow early analysis using the road and rail data already available. Airline end user charges may also be compared.	Maritime charges need to be segmented by: ▪ Port charges (grouped by wet and dry charges) are further separated into port charges on international and domestic vessels. ▪ Shipping charges ▪ Freight forwarder charges ▪ Government charges (including MSC, bio security etc) These estimates will be obtained through a confidential benchmark study with freight forwarders and port companies. Shipping charges will be obtained through the shipping rates passed onto freight forwarders.	Road charges need to be segmented by: ▪ Infrastructure charges ▪ Operating charges ▪ End user charges An outline of whether the charges are commercial or government will also be provided. Road charges have previously been provided. Updating process required. The freight estimates will be obtained through a confidential benchmark study with commercial operators, and supported by the National Freight Demand Study (where applicable). The public transport estimates will be obtained from the relevant regional councils.	Rail charges need to be segmented by: ▪ Infrastructure charges ▪ Operating charges ▪ End user charges An outline of whether the charges are commercial or government will also be provided. Some rail charges have previously been provided. Some updating and some new analysis will be required. The freight charge estimates will be obtained through a benchmark study with KiwiRail and ONTRACK. Public Transport estimates will be obtained through ONTRACK and the relevant council.

Area of information collection	Key tasks	Modal specific commentary on key tasks		
		Maritime	**Road**	**Rail**
Transport assets infrastructure costs	**Section 6.2.2 (a & r)** Weighted Average Cost of Capital in the three transport modes The costs of capital need to be segmented by the users groups which impose the costs on infrastructure, i.e. ▪ Vehicle Type ▪ Freight type	Segmented by: ▪ International vessels ▪ Domestic vessels ▪ Container vessels ▪ Bulk aggregate vessel A distinction also needs to be made between costs of capital on optimised assets and stranded assets.	Vehicle type: ▪ Cars ▪ Light trucks ▪ Medium trucks ▪ Heavy trucks ▪ Buses Freight type: ▪ Bulk aggregate ▪ Container A distinction also needs to be made between costs of capital on optimised assets and stranded assets.	Fuel Type: ▪ Diesel ▪ Electric ▪ Steam A distinction also needs to be made between costs of capital on optimised assets and stranded assets.
	Section 6.2.2 (b & s) Value of transport infrastructure in each transport mode. Segmented by: ▪ Infrastructure Assets ▪ Operator Assets ▪ Private operator assets (such as private cars) A distinction also needs to be made between costs of capital on optimised assets and stranded assets.	Up to date estimates of the value of assets are available for the port sector using the Rockpoint (2008) report. It is essential that road and rail are evaluated using the same framework. These estimates will be obtained through the Rockpoint report, along with the cooperation of NZ ports. If needed, shipping assets will be estimated with the assistance of NZ Shippers Fed.	Estimates of the value of transport assets are available in the STCC. They need updating using the consistent framework. Infrastructure estimates will be obtained from NZTA. Operator assets will be obtained with the assistance of the Road Transport Forum NZ (for freight) and regional councils (for PT). Private operator assets estimates will be obtained with the assistance of the Automobile Association NZ.	Estimates of the value of transport assets are available in the STCC. They need updating using the consistent framework. The freight estimates will be obtained with the assistance of KiwiRail and ONTRACK. Public Transport estimates will be obtained through ONTRACK and the relevant councils.

Area of information collection	Key tasks	Modal specific commentary on key tasks		
		Maritime	**Road**	**Rail**
	Section 6.2.2 (c & u) Operating and maintenance costs for infrastructure providers. The infrastructure costs need to be segmented by the users groups which impose the costs on infrastructure, i.e. ▪ Vehicle Type (this is important for calculating RUC, FED etc) ▪ Freight type ▪ Engine size ▪ Fuel Type ▪ Travel time (for road only – this will enable the road industry to evaluate the movement to targeted charging for road user charges)	Segmented by: ▪ International vessels ▪ Domestic vessels ▪ Container vessels ▪ Bulk aggregate vessel	Vehicle type(this is important for calculating RUC, FED etc): ▪ Cars ▪ Light trucks ▪ Medium trucks ▪ Heavy trucks ▪ Buses Fuel Type: ▪ Petrol ▪ Diesel ▪ Electric/Hybrid Engine Size Groups Travel time ▪ Peak ▪ Off Peak Freight type: ▪ Bulk aggregate ▪ Container	Fuel Type: ▪ Diesel ▪ Electric ▪ Steam Freight type: ▪ Bulk aggregate ▪ Container

Area of information collection	Key tasks	Modal specific commentary on key tasks		
		Maritime	**Road**	**Rail**
Operator costs	**Section 6.2.2 (n)** Modal Inter change costs Segmented by: ▪ Freight type ▪ Location ▪ Type of interchange	Freight type: ▪ Bulk aggregate ▪ Container Location ▪ 16 different NZ ports Type of inter change ▪ Between ships ▪ Between ship and port	Freight type: ▪ Bulk aggregate ▪ Container Location ▪ Regional breakdown Type of inter change ▪ Between port and truck ▪ Between railhead and truck ▪ Between trucks ▪ Between truck and end destination of freight	Freight type: ▪ Bulk aggregate ▪ Container Location ▪ Regional breakdown Type of inter change ▪ Between port and train ▪ Between train and railhead ▪ Between trains ▪ Between train and end destination of freight
	Section 6.2.2 (v) Port market entry costs, segmented by region		Not applicable	Not applicable
	Section 6.2.2 (d & x) Operator resource costs in the road sector including vehicle ownership and operating costs in the road transport sector Segmented by: ▪ Vehicle Type	Not applicable	Vehicle type: ▪ Light trucks ▪ Medium trucks ▪ Heavy trucks Buses	Not Applicable

Area of information collection	Key tasks	Modal specific commentary on key tasks		
		Maritime	**Road**	**Rail**
End user costs	**Section 6.2.2 (e)** User resource costs in the road transport industry, including vehicle ownership and operating costs (for private vehicle owners) Segmented by ▪ End user	Not applicable	End user: ▪ School ▪ Work ▪ Elderly	Not Applicable
	Section 6.2.2 (o) End user time costs, including predictability/reliability costs of freight and public transport Segmented by end users of freight and PT: ▪ Freight type (for freight) ▪ Public transport user	Freight type: ▪ Bulk aggregate ▪ Container	Freight type: ▪ Bulk aggregate ▪ Container Public transport user: ▪ School ▪ Work ▪ Elderly	Freight type: ▪ Bulk aggregate ▪ Container Public transport user: ▪ School ▪ Work ▪ Elderly

Area of information collection	Key tasks	Modal specific commentary on key tasks		
		Maritime	**Road**	**Rail**
External costs	**Section 6.2.2 (g, h, i, j, l, & z)** External costs (including accidents, bio security, emissions, noise, congestion) Segmented by the users groups which impose the costs on society: ▪ Vehicle Type ▪ Fuel Type ▪ Engine size ▪ Time of travel External costs for each of the transport modes will be estimated in assistance with the environmental, and others, team within the Ministry. The total external costs should also be segmented into the internalised portion and the external portion	Segmented by: ▪ International vessels ▪ Domestic vessels ▪ Container vessels ▪ Bulk aggregate vessel Cost breakdown of total external costs: ▪ Internalised portion of total costs ▪ External portion of total external costs	Vehicle type: ▪ Cars ▪ Light trucks ▪ Medium trucks ▪ Heavy trucks ▪ Buses Fuel Type: ▪ Petrol ▪ Diesel ▪ Electric/Hybrid Engine Size Groups Time of Travel ▪ Peak ▪ Off peak Cost breakdown of total external costs: ▪ Internalised portion of total costs ▪ External portion of total external costs	Fuel Type: ▪ Diesel ▪ Electric ▪ Steam Cost breakdown of total external costs: ▪ Internalised portion of total costs ▪ External portion of total external costs

Area of information collection	Key tasks	Modal specific commentary on key tasks		
		Maritime	**Road**	**Rail**
Case Studies	**Case study #1 – Urban public transport** Urban public transport on Wellington and Auckland for specific routes which the transport modes compete. Information will be segmented by: ▪ End user ▪ Fuel Type		Segmented by: End user: ▪ School ▪ Work ▪ Elderly Vehicle Type ▪ Petrol ▪ Diesel ▪ Electric/Hybrid	Segmented by: End user: ▪ School ▪ Work ▪ Elderly
	Case study #2 – Short distance freight Set a case studies covering freight movements which are less than 100km between start and end destination. Case studies will have the same start and end point of freight. Information will be segmented by: ▪ Freight Type ▪ Vehicle Type ▪ Time of travel	Freight type: ▪ Bulk aggregate ▪ Container Time of travel ▪ Seasonal fluctuations	Vehicle type: ▪ Light trucks ▪ Medium trucks ▪ Heavy trucks Freight type: ▪ Bulk aggregate ▪ Container Time of travel ▪ Seasonal fluctuations ▪ Fluctuations within time of day (peak vs. off-peak)	Freight type: ▪ Bulk aggregate ▪ Container Time of travel ▪ Seasonal fluctuations

Area of information collection	Key tasks	Modal specific commentary on key tasks		
		Maritime	**Road**	**Rail**
	Case study #3 – Long distance freight Set a case studies covering freight movements which are less than 100km between start and end destination. Case studies will have the same start and end point of freight. This case study will be completed in the 'golden triangle' between Auckland, Tauranga and Hamilton that provides most of New Zealand's GDP. Information will be segmented by: ▪ Freight Type ▪ Vehicle Type ▪ Time of travel	Freight type: ▪ Bulk aggregate ▪ Container Time of travel ▪ Seasonal fluctuations	Vehicle type: ▪ Light trucks ▪ Medium trucks ▪ Heavy trucks Freight type: ▪ Bulk aggregate ▪ Container Time of travel ▪ Seasonal fluctuations ▪ Fluctuations within time of day (peak vs. off-peak)	Freight type: ▪ Bulk aggregate ▪ Container Time of travel ▪ Seasonal fluctuations

Area of information collection	Key tasks	Modal specific commentary on key tasks		
		Maritime	**Road**	**Rail**
	Congestion case study – Case study #1 will also include an analysis of congestion Case studies will be carried out on congested routes in Auckland, Wellington, and Christchurch to determine the marginal costs of congestion for the road sector. Congestion is insignificant in the other transport modes. For road congestion the following segmentation is needed: End user: ▪ School ▪ Work commute ▪ Commercial Vehicle type ▪ Cars ▪ Light trucks ▪ Medium trucks ▪ Heavy trucks ▪ Buses Time of day ▪ Peak ▪ Off peak)		End user ▪ School ▪ Work commute ▪ Commercial Vehicle type ▪ Cars ▪ Light trucks ▪ Medium trucks ▪ Heavy trucks ▪ Buses Time of day (peak vs. off peak)	

Area of information collection	Key tasks	Modal specific commentary on key tasks		
		Maritime	**Road**	**Rail**
Revenue/Funding	**Section 6.2.2 (k, t, & bb)** The level of government funding in each industry (through direct funding and subsidisation)	Total level for the maritime industry	Total level for the road industry	Total level for the rail industry
	Section 6.2.2 (m) Annual level of investment in transport infrastructure in each mode.	Total level for the maritime industry	Total level for the road industry	Total level for the rail industry
Other information	**Section 6.2.2 (aa)** Importance of international vessels for price setting in the maritime sector	The level of total revenue from international vessels, segmented by: ▪ Maritime New Zealand Revenue ▪ Customs Revenue ▪ Ministry of Fisheries (bio security) revenue	Not applicable	Not applicable
	Section 6.2.2 (dd) Intermodal peak pricing relationships, with respect to inter island capacity, seasonal capacity relative to peak, and line and rolling stock capacity.			
	Section 6.2.2 (cc) Land transport funding outside the NLTP			
	Section 6.2.2 (o) Demand elasticity relationship between transport demand and fuel prices in public transport and freight.			

11 Appendix 4: Australian costs and charges research and publications

Competitive neutrality between road and rail, WP40
Australian Bureau of Transport Economics (1999)

This study was undertaken to identify the implications for road and rail prices of introducing GST and other tax changes. A further scenario considered what additional changes to charges would be necessary to achieve competitive neutrality between the modes in terms of both paying their full social costs including externalities.

The report noted that ideally, taxes and charges would be compared at the operational level for all possible routes where the two modes compete. This is clearly impracticable, and it was necessary to construct an idealised, representative route for each mode for the analysis in this Working Paper: an 'average' road freight haul of 1125 kilometres, and an 'average' rail freight route of 1200 kilometres (weighted average distances on 7 major intercity corridors). Routes of these lengths provide a sensible basis for comparison because they are most likely to see competition between road and rail.

The study found that the net effect of the changes (principally full infrastructure charging for road and charging for externalities) would be to raise rail FCL (Full Container Load) rates by 4 per cent, road FCL rates by 12 per cent and LCL (less than container load) rates by 6 per cent relative to the situation that would otherwise exist following introduction of the GST and other proposed changes.

Land transport infrastructure pricing, WP57
Australian Bureau of Transport and Regional Economics (2004)

The Bureau of Transport and Economics (BTRE) undertook a comparative analysis of current land transport pricing regimes in response to a request from the Australian Logistics Council. The report contains little actual costs and charges information. It is more of a discussion paper highlighting the differences between road and rail infrastructure pricing frameworks. The report notes that there are many differences and also important similarities between existing road and rail freight infrastructure pricing arrangements and summarises these in a table. Both road and rail infrastructure charges have principally a cost-recovery objective, albeit administered by statutory authorities in the case of road and by commercialised entities in the case of rail.

The Future of Freight
Port Jackson Partners (2005)

This study commissioned by the Australasian Railway Association (ARA) estimated the full economic costs of road and rail freight on all main Australian interstate corridors. Because ARA was the client for the study the consultants had unusually good access to detailed rail cost data, the study found that rail transport was more economic than road on all corridors. The results were unambiguous for long distance east-west corridors but dependent on some arguable assumptions on north-south corridors along Australia's east coast.

This is probably the closest that any study in Australia has got to the New Zealand STCC study and it may be interesting to compare the cost estimates derived in the two studies. This study undertakes separate detailed analysis of above track and below track operating and capital costs and externalities for both road and rail on each inter-capital corridor. However, its focus is on costs with the assumption being that charges should then be set to match costs.

Freight and mode share forecasts – A review of the Future of Freight Maunsell Australia (2006)

This report is a critique of the Future of Freight study summarised above. It was undertaken for the National Transport Commission.

The review considered that the Port Jackson Partners (PJP) report had adopted forecasts for inter-capital non bulk freight growth and rail mode share that are higher than forecasts by BTRE and others. This makes rail freight unit costs appear lower and the economic benefits of rail appear greater than would be the case with the lower forecasts.

The estimates of rail costs in the PJP report were also considered low in terms of a number of other factors and it was considered that higher rail costs could reasonably be assumed. The possible magnitude of the difference that might reasonably be adopted has been quantified for some aspects. Collectively these amount to enough to question the PJP report's conclusion that total economic costs of rail are necessarily lower than road in the north-south corridors. It is considered that service quality differences door-to-door between road and rail are much more important than price in determining changes in mode share. In the east-west corridor there is a more clear-cut case that economic costs of rail are lower than road and this is reflected in the higher mode share that rail captures already.

Road and rail freight infrastructure pricing, Inquiry Report No 41 Productivity Commission (2006)

In 2005 the Australian Government requested the Productivity Commission to conduct an inquiry to assist the Council of Australian Governments to implement efficient pricing of road and rail freight infrastructure through consistent and competitively neutral pricing regimes, in a manner that optimises efficiency and productivity in the freight transport task and maximises net benefits to the community.

The review estimated the full financial costs of providing and maintaining freight transport infrastructure on major road and rail networks. It also sought to assess the full economic and social costs of providing and maintaining road and rail freight infrastructure including environmental and safety impacts of the different transport modes.

The Productivity Commission did not find a compelling case that heavy vehicles competing with rail freight on major north–south corridors are relatively subsidised. Corridor-specific data that are available are consistent with logic in suggesting that the unit costs of use of these 'built-for-purpose' routes are lower than average network costs and, for many heavy vehicles, are likely to be below

current charges. For rail, significant government financial contributions allow access charges to be set below the long-run economic costs of providing freight services on major corridors.

The flipside of this, though, is that the cost of heavy trucks using many rural local roads and lightly-used arterials is likely to be well above the network average charge. But many regional rail networks which compete with road for some bulk tasks (the haulage of grain, for example) are themselves subsidised, making it difficult to assess the relative distortion.

Further, while trucks generate larger external impacts than rail, policy-relevant externalities are low on the major corridors. The highest externality costs of road freight transport occur in urban areas. However, these are largely common to rail freight journeys as well, given the need in many cases for truck pickup and delivery.

Interestingly, the Productivity Commission notes that while some have argued that more comprehensive work should be done to accurately measure cost recovery in each mode in order to be definitive about any relative price distortions, in the Commission's view, this would not be a particularly fruitful exercise. A greater pay-off would come from progressing road pricing reform, which would also have the advantage of addressing any lingering concerns about competitive neutrality.

The Productivity Commission noted that:

- Only a small proportion of the land freight task is contestable between road and rail.
- For many freight tasks, road and rail freight are more complements than substitutes.
- Road freight has an inherent advantage over rail in that the burden of fixed and common network costs can be largely shared with passenger transport (the dominant user).
- Because road charges under PAYGO are designed to recover capital spending as it is incurred, users bear the opportunity cost of capital, and there is no subsidy to road freight in aggregate over time.
- All government spending on road construction and maintenance is included in the spending base from which heavy vehicle charges are determined (according to the Australian National Transport Commission cost allocation template), whereas government contributions to rail generally are not recovered.
- An efficient level of freight externalities will rarely be zero, given community benefits from freight transport and the costs of effecting abatement.

The Productivity Commission also undertook modelling of the implications of increasing road charges, concluding that while it does not appear that higher road charges are justified solely to promote competitive neutrality on major corridors, economic modelling conducted by the Commission suggests that aggregate modal shares would not alter much even if heavy vehicle charges were to increase significantly. Moreover, the small gain in rail's market share

comes at the expense of a decline in the size of the market itself, so that rail output actually falls. (However, this does not mean that there would be no efficiency gains from increasing heavy vehicle charges where this is needed for cost recovery.)

The results reflect not only the small share of road user charges in total road freight costs, but also the reality that rail is not a good substitute for road for many types of non-bulk freight. The fact that prices for rail freight on the major inter-capital corridors have decreased relative to road at the same time as road's market share has increased, adds some weight to this.

AusLink corridor strategies
Australia's Department of Infrastructure, Transport, Regional Development and Local Government website[37]

During 2005 and 2006 the Australian Government together with relevant State Governments undertook a series of investigations to develop corridor strategies for 24 main national transport corridors. The strategies aimed to identify current and future freight and passenger transport demands in each corridor, which mode(s) could meet this demand most efficiently, and whether there were existing or emerging infrastructure deficiencies due to the demand growth projections. These studies took the existing charges as given in determining the future demand and mode shares.

2007 Heavy vehicle charges determination - Regulatory impact statement
Australian National Transport Commission (2007)

After the Productivity Commission broadly endorsed the NTC's cost allocation methodology, the Australian Transport Council (ATC) directed the NTC to begin work on a new heavy vehicle charges determination, to replace the current Second Determination.

In April 2007, the Council of Australian Governments (COAG) outlined a road pricing reform plan, and endorsed the ATC directive for a 2007 Heavy Vehicle Charges Determination as part of the first phase of this plan. This reflected findings from the Productivity Commission Inquiry that:

- heavy vehicle charges were set to under-recover costs: this Determination shows that in 2007/08 heavy vehicles will under-recover expenditure by $168m if charges are not changed.
- vehicles are subsidised if they do not recover their attributable costs: this Determination finds B-doubles under-recover their attributable costs by just over $11,000 per vehicle per year.

Addressing issues of cost recovery through the Determination is the first step in a broader COAG reform program which seeks to improve the efficiency and productivity of the road network through heavy vehicle price reform. This is expected to include consideration of externality costs, incremental pricing for

[37] Source: http://www.auslink.gov.au/whatis/network/corridors/index.aspx

higher productivity vehicles and mass-distance charging of all heavy vehicles in the medium term.

The NTC Heavy vehicle charges determination regulatory statement includes detailed road use and expenditure data from throughout Australia that is used in the cost allocation process to determine the new charges. In a change from previous determinations the costs that are allocated are based on an average of expenditure over seven years instead of the previous three year average.

Review of policy relevant externalities,
Maunsell Australia (2008)

This report prepared for the NTC and COAG investigated whether direct pricing is likely to be an optimal mechanism for internalising heavy vehicle externalities. It concluded that there are few cases where this is likely to be the case.

12 Appendix 5: Bibliography

Australian Bureau of Transport Economics (1999), "Competitive Neutrality between Road and Rail", Working Paper Number 40.

Australian Bureau of Transport and Regional Economics (2004), "Land Transport infrastructure pricing", Working paper number 57.

Australian National Transport Commission (2007), "2007 Heavy Vehicle Charges Determination Regulatory Impact Statement Volume I", Retrieved from http://www.ntc.gov.au/filemedia/Reports/2007HVChargesDetRISVol1Dec2007.pdf on 3 September 2008.

Australian Productivity Commission (2006), Road and Rail freight infrastructure pricing, Inquiry report number 41, December 2006.

Booz Allan Hamilton (2005), "Surface Transport Costs and Costs and Charges", prepared for Ministry of Transport.

Booz Allen Hamilton (2007), "Impacts of Fuel Price Changes on New Zealand Transport", prepared for Land Transport New Zealand.

Directorate-General for Research Sustainable Systems (2005), "ExternE – Externalities of Energy: Methodology 2005 Update". A research project for the European Commission

Fisher, Kjellstrom, Kingham, Hales and Stresthra (2007), "Health and Air Pollution in New Zealand", prepared for Health Research Council of New Zealand, Ministry of Transport and Ministry for the Environment.

Helen Clarke (2008), "Rail buy back marks new sustainable era for transport", 5 May 2008, retrieved from http://www.beehive.govt.nz/release/rail+buy+back+marks+new+sustainable+era+transport on 5 June 2008.

IER Germany (2006), "HEATCO – Developing Harmonised European Approaches for Transport Costing and Project Assessment", 2006

Infometrics (2005), "A Commentary on: Surface Transport Costs and Charges", report to New Zealand Automobile Association

Land Transport New Zealand (2006), "Economic Evaluation Manual"

Land Transport New Zealand (2007a), "Road User Charges (RUC) facts", retrieved from http://www.ltsa.govt.nz/commercial/ruc.html on 20 June 2008.

Land Transport New Zealand (2007b), "Excise Duty: Who can get refunds, and how". Retrieved from http://www.landtransport.govt.nz/factsheets/14.html on 20 June 2008

Maibach, Schreyer, Sutter, van Essen, Boon, Smokers, Schroten, Doll, Pawlowska, Bak (2008). “Handbook on estimation of external costs in the transport sector”, CE Delft Solutions for Environment, Economy and Technology, The Netherlands

Maritime New Zealand (2006), “National Marine Oil Spill Contingency Plan”, Issue 1 April 2006

Maritime New Zealand (2007), “Annual Report 2006/07”

Maritime New Zealand (2008) Factsheets, “Ship Registration Act 1992; A Guide to Ship Registration”, retrieved from: http://www.maritimenz.govt.nz/publications/ship_registration/AGuideToShipRegistration.pdf, on 19 June 2008.

Maunsell Australia (2006), “Freight and mode share forecasts – A review of the future of freight”, report prepared for the Australian National Transport Commission.

Maunsell Australia (2008), “Review of policy relevant externalities”, prepared for the Australian National Transport Commission and the Council of Australian Governments.

McKenzie Podmore Limited (2005), “Surface Transport Costs and Charges, A discussion for RTFNZ of a Ministry of Transport (MoT) Policy Background report”, September 2005.

Ministry of Transport (2005), “National Rail Strategy to 2015”

Ministry of Transport (2006), Review of Maritime New Zealand, conducted by PricewaterhouseCoopers and Thompson Clarke, January 2006

Ministry of Transport (2008a), “Seachange; Transforming Coastal Shipping in New Zealand”, May 2008.

Ministry of Transport (2008b), “The New Zealand Transport Strategy 2008”.

Ministry of Transport (2008c), “Government Policy Statement on Land Transport Funding 2009/10 – 2018/19”, August 2008.

Ministry of Transport (2008d), “Statement of Intent 2008 – 2011”.

New Zealand Institute for the Study of Competition and Regulation Inc (1999), “The Privatisation of New Zealand Rail, Part 1, Assessment of History, Markets and Data”, Report to The Treasury.

ONTRACK (2007), 2007 Annual Report

Port Jackson Partners (2005), “The Future of Freight”, study commissioned by the Australian Railway Association.

Ports of Auckland (2007), “Annual Financial Statements”

Rockpoint Corporate Finance Limited (2008), New Zealand Port Sector Report 2008, “Rock the Boat”, June 2008.

Schreyer, Schneider, Maibach, Rottengatter, Doll, Schmedding (2004), “External Costs of Transport, Update Study”, Infras/IWW, October 2004

Transport Canada (2008), “Estimates of the full costs of transport in Canada”.

Victoria Transport Policy Institute of Canada, “Transportation Cost and Benefit Analysis”, December 2006.