Strategic Policy Programme

November 2014

Ministry of Transport
TE MANATŪ WAKA

Ensuring our transport system
helps New Zealand thrive

New Zealand Government

This brochure is presented not as policy, but with a view to inform and stimulate wider debate.

Strategic Policy Programme - Introduction

The Ministry of Transport has a strategic leadership role across the transport system, with responsibility to ensure all modes – land, sea, air and rail – continue to meet New Zealand's needs into the future. Our purpose is to ensure that our transport system helps New Zealand thrive, and we have set ourselves a challenge, to "Create the environment to double the value from transport initiatives".

To achieve this, we need to understand what New Zealand's economy might look like in the future, what kind of transport system New Zealanders will want and need, and how this could be funded. Our transport network, regulatory framework, and funding systems are all components of this, and we need to be prepared for change.

Central and local government invest more than $4 billion annually in the land transport system. This is no small amount, and we must do all we can to make sure that it is invested wisely. Every infrastructure decision has an influence on the future, affecting further demand, supply, behavioural choices and the impacts that these have on society, the environment and our economy. We have been asking ourselves some hard strategic questions, so that we can prepare for the unknowable changes and challenges that are ahead for New Zealand and our transport system.

Strategic questions

We have focused our attention on three strategic areas. We do not offer definitive solutions – each project is about exploring future possibilities and probabilities, and potential effects on the New Zealand transport system. It is vitally important that we consider these tough questions and spark these conversations across the transport sector.

The three questions we looked at were:

- How will New Zealand's economy perform in the future, and what are the implications for transport?
- How could or should our transport system evolve in order to support mobility in the future?
- How could or should we fund our transport system in the future?

Each of these questions has been developed into a formal project, led by a Strategy Director. Project teams were drawn from Ministry staff who engaged closely with a wide range of stakeholders to explore each of these questions.

This document sets out a high level overview of the conclusions of each project, followed by the next steps for the Ministry and how we believe this work can be carried forward to benefit the transport sector and New Zealand as a whole.

A full list of resources and the outputs of each project is located at the end of this document.

Project Overviews

Economic development and transport

How will New Zealand's economy perform in the future, and what are the implications for transport?

Led by Professor Caroline Saunders and Professor Paul Dalziel, Agribusiness and Economics Research Unit, Lincoln University

Transport innovation and investment influence economic growth

Historically, innovations in transport have had significant effects on the levels of economic growth in regions, nations and internationally. In New Zealand, investment in railways opened up new areas of the country for the primary industries. The advent of the refrigerated container and steam shipping provided New Zealand with access to new international markets for our meat and dairy products, and passenger airplanes provided the basis for a thriving tourist industry that now represents 17 percent of New Zealand's export earnings.

Investment in transport drives economic growth through four key routes. It:

- unlocks new sites for development, such as accessing logging opportunities
- provides access to new, better quality, or cheaper resources, as businesses tap into international supply chains to source lower cost inputs for goods manufactured in New Zealand
- allows access to a wider labour market to allow better suited and potentially lower cost labour
- opens up new and larger markets, allowing economies of scale, specialisation and increasing competition
- makes New Zealand a more attractive place for highly skilled and creative people to live and work.

These benefits are largely seen when an economy is developing, as a country puts in place the necessary transport systems to support a modern economy. Once the networks are in place the focus shifts to reducing the costs of doing business along these routes to maintain the relative competitiveness of a place for business.

Transport can have a significant impact on the location of economic activity. The Auckland harbour bridge is a good example of this, as it opened up significant opportunities for economic development and activity north of the Auckland CBD. There are many illustrations of this throughout history, for example, canal location in the United Kingdom affected the location of economic activity and the development of cities around that activity.

Decisions on the location of transport infrastructure can also have a negative effect on some locations. As the use of the highway has increased, we have seen the relative decline of many small towns which were located next to railways which had previously been the source of market opportunities.

We know from a wider look at economic development that businesses seek to increase their access to resources and markets by locating closer together. This effect is driving the development of cities worldwide and is often referred to as "agglomeration".

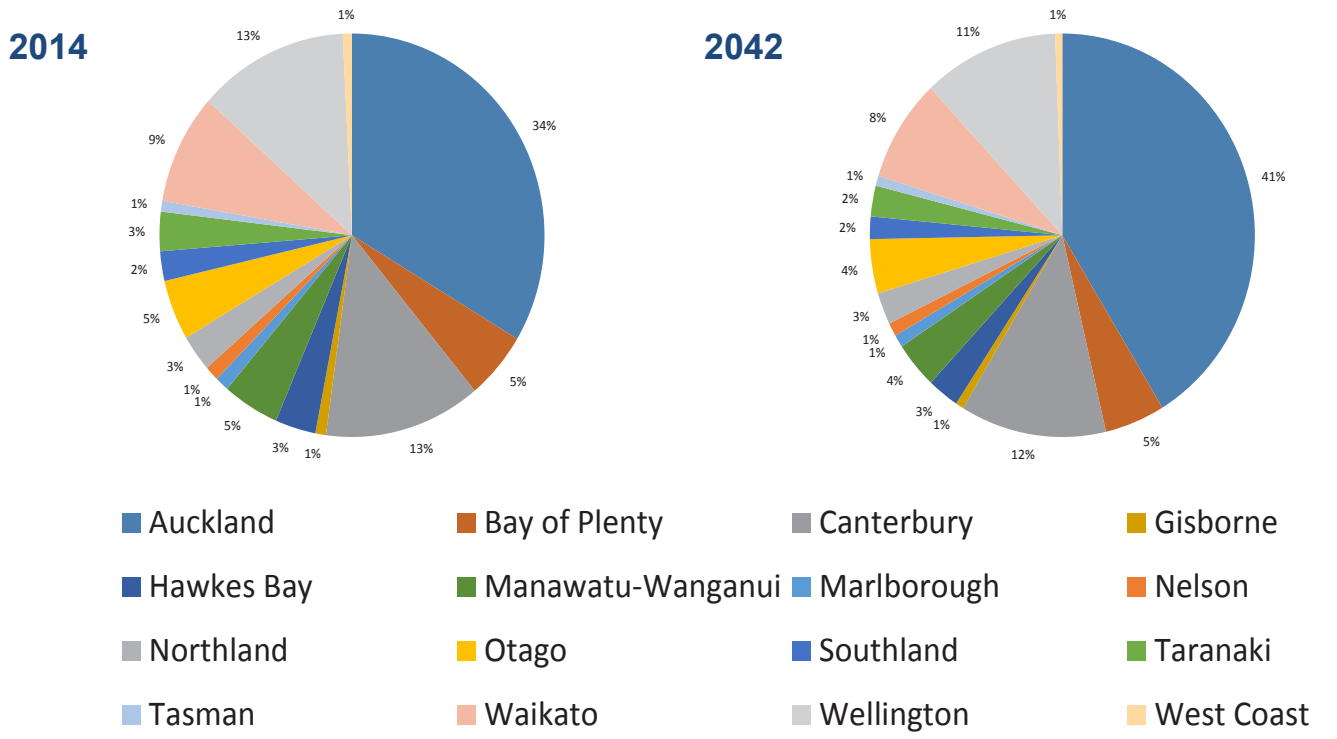
The challenge with agglomeration is that as the attractiveness of a city increases so do the land and housing costs, driving up the costs for the businesses located there. Two countervailing forces are then at play – agglomeration as businesses seek to get as close as possible to labour and markets, tempered by the rising costs of being located in these "prime" areas.

Two factors play key roles in the net result of these two forces on the shape of the cities and regions surrounding those cities – decisions taken on the form of the city, and the level of investment in transport and type of transport infrastructure provided. If little attention is given to making the right investment decisions on design and matching transport, the relative costs of operating in the city increase, reducing the attractiveness of the city for businesses. Investment in transport will help to maintain the attractiveness of a city and good design of the city will minimise the costs of that investment.

Economic development and transport

In the project we modelled the impact of agglomeration and a range of other factors on the location of economic activity in New Zealand. We modelled seven different possible futures and in all but one of them the relative share of economic activity in Auckland increased from 33 percent today, to more than 40 percent. Figure 1 shows this growth using our baseline data, sourced from Statistics NZ (on population growth) and Treasury predictions (on productivity gains). The decisions we take on the future form of Auckland and the transport services to match will either accelerate or moderate this trend.

Figure 1: Projected share of the national economy 2014 and 2042 under the baseline assumptions



It is important to note that agglomeration is not simply a question of absolute scale. Businesses want to locate where they will have a good source of labour, and where buyers will come to look for services. Thus, similar types of businesses will often cluster together, as we have seen in Christchurch and Wellington.

Transport investments that connect regions to other markets can have a two way effect. New connections can allow the development of economic activity in a region or they can allow that economic activity to be drawn away from a region. The impact is dependent on the competitiveness of the regions being connected. In regions which are growing, investing in the transport system can reduce costs and increase relative competitiveness. However, in regions which are declining, investment in new transport systems on their own is unlikely to reverse that decline. While local transport investments might help to create jobs in the short term, in the medium term their maintenance costs may become an additional burden for a declining region. To successfully support declining regions transport investments need to be part of a package of measures aimed at creating the local economic ecosystem necessary to support growth.

Given the relationship between economic activity and transport, it is not surprising that there has been a correlation in the patterns between vehicle kilometres travelled and gross domestic product (GDP), nor that commentators have created the 'truckometer' (with vehicle kilometres travelled by heavy trucks used as an early indicator of GDP momentum). However, the relationship seems to be changing – overall levels of light and heavy vehicle kilometres travelled have remained relatively flat for the last eight years, while we have at the same time seen economic growth. A range of factors may have altered this relationship. One is a shift in the shape of the economy as the share of service activity has increased. In addition, alternative ways of access, such as virtual access, may be altering the relationship.

Finally, we need to recognise that transport is an economic activity in its own right, representing more than five percent of New Zealand's economy. As a sector, it is also unusual that government owns and runs much of the infrastructure of the land transport system. Our literature review noted that governments across the world have used investment in transport infrastructure as an economic stabiliser. As an economy has gone into decline governments have increased the amount that they are investing in transport infrastructure as a mechanism to stimulate the economy. The problem with this has been timing. Typically governments announce major programmes of investment as an economy goes into decline. But, by the time the new investments are through the necessary planning phases the economy is again growing so the investment as a consequence ends up creating inflationary pressures when they are least needed.

The key insights from our work were that:

- as a developed nation our focus is on responding to the transport pressures created by economic growth
- the decisions we take on transport investments will affect the location of economic activity in New Zealand
- investment in transport in areas of economic decline will not on their own support growth
- while transport remains important, it is important we look at *access* not just mobility
- as we are in a time of growth we need to ensure we do not add to inflationary pressures through our approach to investment in transport infrastructure.

Future demand

How could or should our transport system evolve in order to support mobility in the future?

Led by Professor Glenn Lyons, University of the West of England, Bristol

New Zealanders drive nearly 30 billion kilometres each year in their cars, vans, utes and SUVs. The road network also carries 70 percent of all of our freight . As a nation we have built and continue to maintain a network of roads to allow us to make these trips.

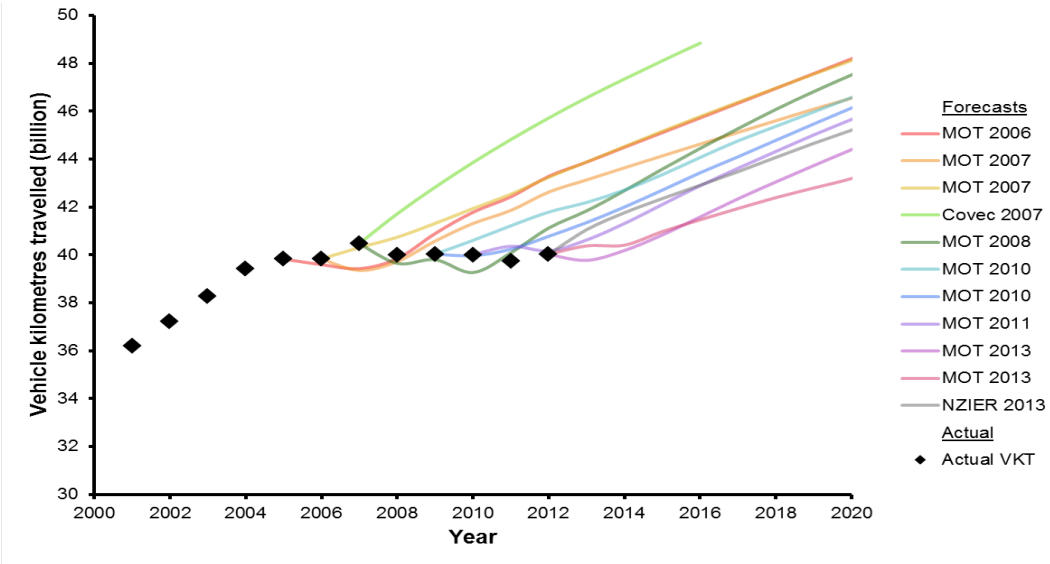
The road network is worth more than $60 billion and costs more than $1 billion a year to maintain. We are planning to invest $10 billion over the next ten years to change the shape of the network to improve its quality and capacity.

This would be relatively straightforward if we knew how demand would change. The challenge we face, however, is there have recently been changes to the patterns of demand for personal travel.

From 1980 to 2004 we saw annual increase in demand in the order of three percent per year. This highlighted the importance of tackling congestion and improving safety and gave us assurance revenue would grow to cover the costs of a growing network. From 2005 to 2013 total demand only grew by 0.25 percent per year.

We now face an uncertain future. We cannot be certain demand will return to pre-2005 levels of growth nor can we be certain it will remain flat. This means we can no longer rely on traditional forecasting models alone to help us to decide how to invest. Figure 2 illustrates how our traditional forecasting models have consistently overestimated demand.

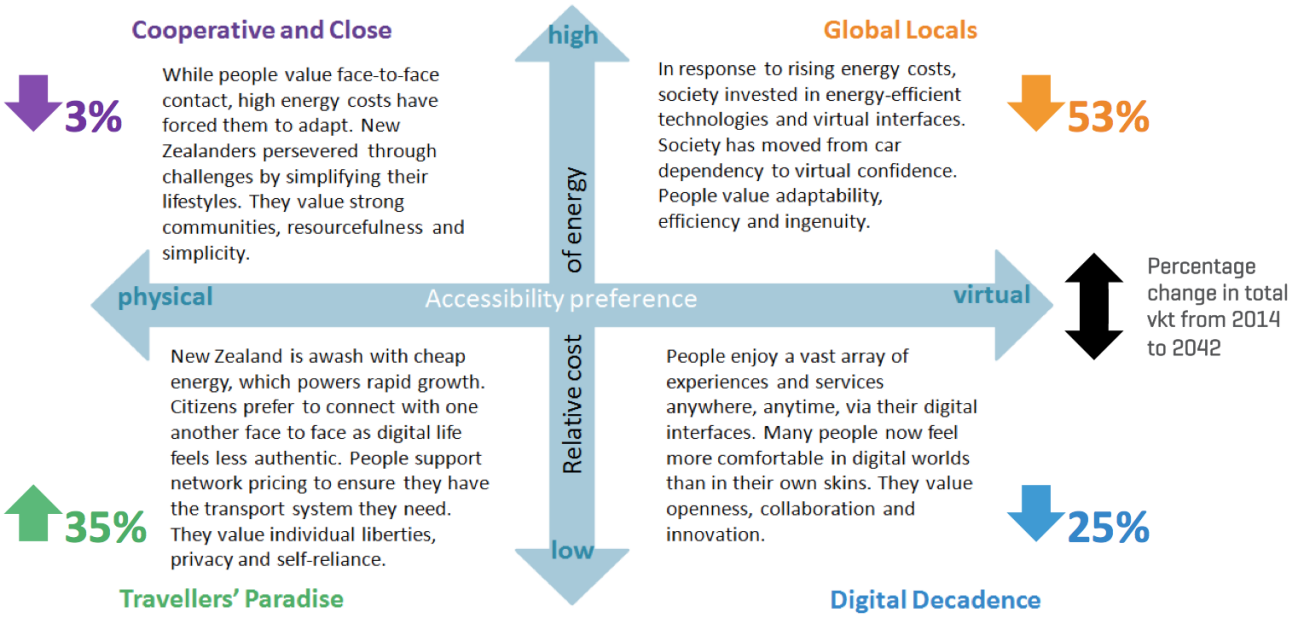
Figure 2: Historic New Zealand light vehicle traffic forecasts vs actual growth



The aim of this project was to explore the uncertainty around demand for personal travel; car travel in particular which represents 77 percent of the total kilometres travelled on our roads. We did this by developing four future scenarios which explored the possible impact on travel of our use of digital technology and also the impact of energy costs on future travel demand.

These scenarios are shown in Figure 3. We also modelled the likely change in passenger vehicle kilometres travelled for each of these scenarios.

Figure 3: Summaries of the four scenarios to 2042, with percentage change in passenger demand



The goal was not to create predictions of the future, nor was it to create a view on what our preferences were for the future transport system. Our goal was to produce a range of plausible futures. This would allow us to improve the likelihood that the investment decisions we make today will be right for the future.

This project is a complement to the Ministry's project exploring Future Freight Demand which forecast freight demand would grow by 58 percent between now and 2042.

The conclusions of our work were that:

When we think about creating a thriving New Zealand we should recognise we are trying to improve access not just mobility. There are three different ways we can achieve this: with good transport systems; with good spatial planning; or by improving digital access. We need to integrate our thinking across these three areas to achieve the optimal outcome.

To reduce the uncertainty we face we should seek to better understand the factors affecting the changing patterns of demand and refresh our demand models accordingly. We should look both at social trends and also speed in development, take-up and impact of new technologies.

To ensure resilience of the access system we develop for New Zealand we should seek to build in flexibility where we can. This will allow us to respond more quickly to changing patterns of demand and reduce the likelihood that we will make investments which will become unnecessary.

We need to recognise that the investment decisions we make will shape patterns of demand and not just respond to them. We should move away from the approach of seeking to simply predict future demand and then provide for it. We should instead debate the sort of access we want and decide how to invest to support the future.

Future funding

How could or should we fund our transport system in the future?

Led by Dr Doug Wilson, University of Auckland

The land transport system has a book value of approximately $60 billion. Central government invests $3.4 billion each year in the land transport system through the National Land Transport Fund (NLTF). To this, local government contributes another $1.4 billion each year. This includes money to cover the costs of regulating the system, maintaining the asset base, improving the level of service and adding to that asset base.

We have a clear process to agree the overall scale and focus of that investment in the Government Position Statement on Land Transport (the GPS), which the Government produces every three years. The NZ Transport Agency runs and manages the state highway system and works closely with the regions to agree how to invest the money allocated for local networks to achieve the Government's goals for the land transport system. Local authorities contribute roughly half of the costs of the investment in local roads.

The revenue to cover the costs for investment in land transport is primarily raised through taxes on users of motorised vehicles and through local rates. Central government makes additional contributions from general tax.

This is an elegant system that subtly balances a wide range of interests. It has also proved to be an effective system under which New Zealand has seen a significant reduction in road fatalities, a significant increase in capacity on the network, and a significant increase in public transport use.

However, this is a relatively new system. Our initial experience is at a point where the performance of the system can be reviewed and improved.

Recognising this fact, and reflecting the importance of seeking continuous improvement in delivering public services, this project set out to explore the following key questions:

- What is the right framework to decide the right overall level of investment?
- What is the right approach to decide how much to invest in each category, for example local roads versus state highways, new infrastructure versus maintenance?
- What should land transport revenues cover and by what mechanism?
- What are the pros and cons of different approaches to collection of revenues?

How should we set the overall amount to invest in the land transport system?

Each GPS sets a 10 year forward forecast for the quantum of investment under the NLTF. This is used as the starting point for the assessment of future investment needs. The forward path is tested by a range of measures including a comparison of New Zealand's level of investment relative to other OECD countries and the baseline increases with expected GDP growth and forecasts for inflation.

This set of tests allows us to consider the affordability of the forward programme of investment. This is a good base model, but it does not include an assessment of whether this is the right level of investment to achieve our economic and social goals, our needs.

So there is a risk with the current approach that we might under or over invest in the land transport system. The pressures to over invest include a forward path in the GPS which assumes an inflationary increase in out years, and the timing of the GPS which is set immediately before an election creating pressure on the incumbent Government to make investments over and above the current forward path. This creates pressure to follow a cycle of accumulating growth of expenditure on transport.

The risks of underinvestment arise because of increasing expectations about service levels and population growth (mainly in metropolitan areas). These pressures to the system may not be met simply with inflation based increases, especially as construction cost pressures move faster than inflation. The project explored different options to test the overall level of investment in land transport, to help improve our framework to decide the right level of investment to achieve our goals.

The project considered different approaches to setting a funding band. An effective approach would be based on both *affordability* and *need*. We concluded that we could seek improvements to current practice by:

- improving our access to relevant data, in particular on *need*, such as:
  - asset conditions and whole of life costs
  - demand forecasts and system use and performance
  - road and road service user willingness to pay.
- improving our ability to analyse data, such as:
  - using network outcomes to define measures that inform the setting of service level expectations
  - using asset and demand data and benefit-cost calculations to identify investment and disinvestment options
  - using OECD, GDP, and other aggregate data to establish benchmarks for the total level.
- constructing a framework to ensure systematic and repeatable integration of the improvements in data and analytical method.

What should land transport revenues cover?

Money collected from motorists is ring fenced (hypothecated) for use on land transport and related activities. While the different laws that enable these revenues to be raised place no limits on what the funds can then be used for, hypothecating them to the road system creates an implicit social contract between motorists and freight operators on the one hand and the state's investors on the other.

This combination of a dedicated pool of funds and flexibility around how they are invested is a good approach. It ensures that investment in the system is not subject to the uncertainty of having to bid for money from a central pot each year or each term of government. At the same time it allows funding to be moved around to meet the highest priority needs of the network as a whole, putting every dollar to work as it comes in.

Under the Land Transport Management Act 2003, the range of legitimate things to fund extends beyond just those activities that generate the majority of the revenue for the system. Nevertheless the project concluded that the general principles inferred from this 'social contract' for use of revenue hypothecated from road users are:

- most of the revenue should be spent on roads: operating and maintaining them, and capital investment (rebuilding and/or upgrading existing roads and building new ones)
- the revenue should cover related services whose costs are caused by road use, such as the road enforcement aspect of police costs, safety programs, and NZ Transport Agency overhead costs
- the revenue should contribute to services that result in lower road congestion than would otherwise occur, to the benefit of road users (public transport and bike lanes)
- the revenue should not be used for activities unrelated to road use.

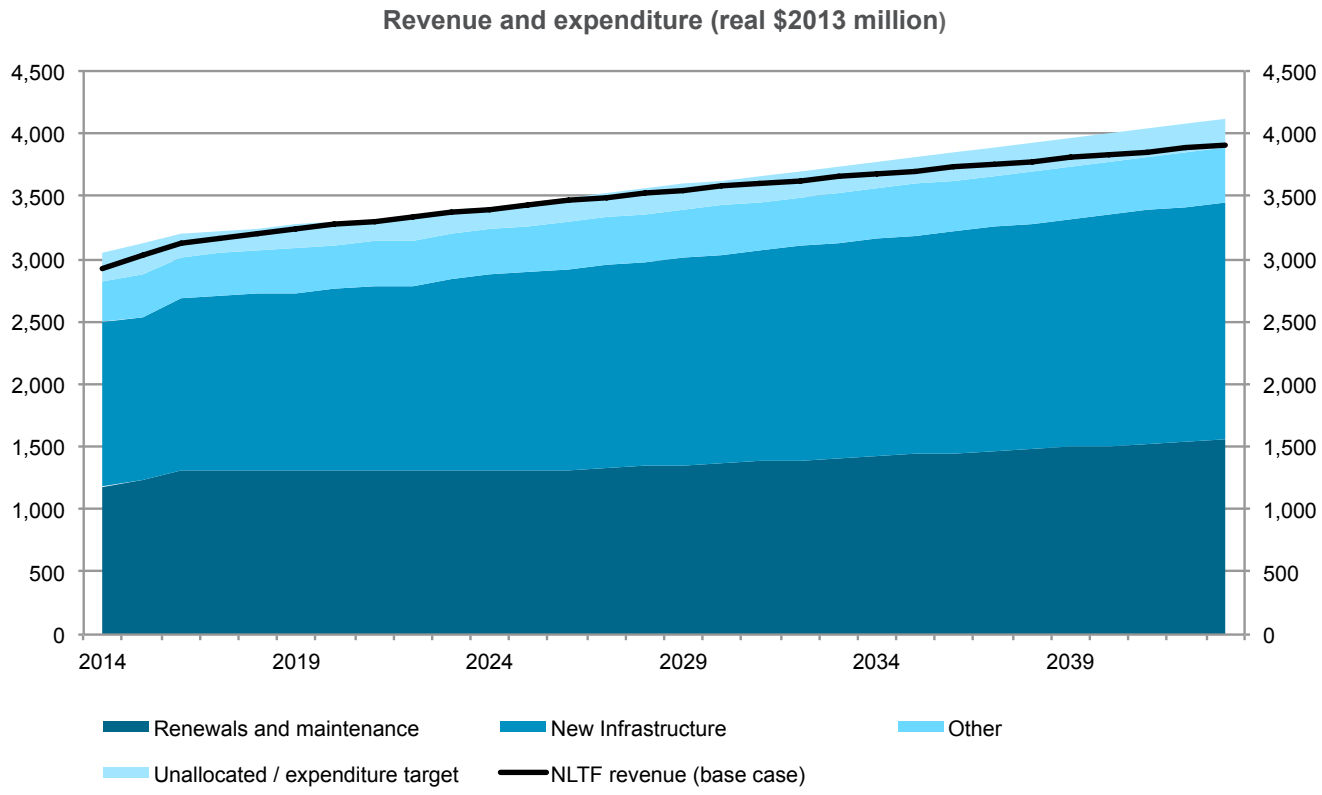
How should we raise revenue for the land transport system?

The project considered whether the current revenue tools would provide a sustainable source of revenue for investment in land transport given improvements in vehicle efficiency and forecasts for demand and levels of investment. Figure 4 compares forecast NLTF revenue to expenditure over the next 35 years.

The main conclusions were:

- central government's existing revenue tools are able to cope with foreseeable changes for about the next 10-15 years
- we need indicators to monitor these changes.

Figure 4 - NLTF Revenue compared to expenditure under current forecasts



However, revenue sustainability is just one objective. Revenue systems can support other objectives, for example, by helping to reveal users' willingness-to-pay for infrastructure we might improve the efficiency of investment. Revenue tools that charge people for where and when they used infrastructure, such as universal network charging, would reveal more about user demand for infrastructure than existing tools do.

In the project we identified a list of six criteria for revenue tools:

- revenue sustainability
- collection costs
- economic efficiency
- distributional equity
- accountability
- environmental sustainability.

The project assessed a variety of revenue tools against these criteria. We used this assessment to identify which tools could best meet different sets of objectives decision makers could have for the transport revenue system.

Overall, the main conclusions reached were:

- the fact that we can raise more revenue does not mean we should
- we have a window of opportunity to think carefully, not just about the next generation of central government revenue tools, but also the needs of local government and the role that pricing tools can play in bringing about the transport outcomes New Zealand wants.

What to do next?

The main findings of the project suggest a number of avenues for further work by the Ministry. Each of these speaks to an aspect of core business and core capability. Consequently, the issue is not whether to pursue these, but when and at what pace. The Ministry will be tackling this as it develops its work programme for 2015 and beyond.

What have we learned?

Throughout this programme of work we have sought to understand the trends, influences and changes in society that will impact on the New Zealand transport system. Through our infrastructure investment, funding regime and the regulatory framework we are continually making choices that affect the future of the system. These choices are based on our beliefs about the future, and the more we know, the better our choices will be.

We are well placed

New Zealand has a good transport system that is largely meeting demand. Our current system provides New Zealanders with good levels of accessibility and contributes towards conditions for good economic growth. Our funding system works, hypothecation (ring fencing transport funding) allows certainty for planning, and we have good and effective revenue tools for our current conditions. We can expect that these will continue to perform well for the short to medium term.

Transport infrastructure lasts far longer than the short to medium term, and we need to ensure we are providing a system that is flexible and responsive to support changes in user demand, means of access and funding channels. Our work shows that most of the land transport network is currently sufficient.

... but there are challenges ahead

While we have seen a flattening of demand, the location of that demand is changing, increasing pressure on cities without increasing the revenue base to support changes to the shape of the network.

Although demand has been flattening, we must consider the effect of demand returning to a growth pattern. This would create new pressures for the transport system.

The cost of maintaining the system continues to rise at a rate which is faster than the economy is growing. This adds to the importance of making sure new investments in infrastructure can be strongly justified.

Historically we have seen vehicle kilometres travelled increase in line with GDP, providing a clear basis for investment where there is constrained capacity on our roads. This relationship is no longer as clear. It may be that virtual access is replacing physical access in some areas.

Wider benefits for regions are a good justification for investments to be made in transport infrastructure in the regions. However, our work has found that without other investments in the region, transport investments alone are unlikely to drive regional economic growth.

Fairness in funding is a matter that will come into the spotlight. The current land transport funding regime remains an effective way of raising revenue. But increases in petrol excise duty (at some point in the future) to compensate for increased vehicle efficiency will mean an increasing disparity of contribution between those with efficient and those with non-efficient vehicles.

We can (and should) choose our future

The Ministry must continue to focus on these potential future challenges. The future is not something that will 'just happen' to us. We shape our future through the choices we make. In view of this, we should recognise and embrace our role in shaping the future of New Zealand. We need to have a robust debate about what we as a nation want from our transport system. This debate around the future of the transport system needs to be held in collaboration with central and local government, and the major players in the transport sector.

We need better data and modelling capabilities

In order to inform a discussion on the future transport system for New Zealand, we need better information on the current system and its users. We also need to be able to test the effectiveness of changes to the system before making new investments.

The Ministry must grow its capacity to process and use information. Solid data and trend analysis is key to being able to provide good guidance to the government and we must continue to improve our skills in this area.

As a start to this, in these strategy projects, we have developed new models for demand, economics and revenue that will support the debate. These need to be taken forward and continually improved so that we can more effectively forecast changes, and also assess the implications of planned interventions.

The debate should start with our economy and social access

As we think about our future we have recognised that we need to consider access, not just mobility. Accessibility doesn't necessarily require a physical transport solution – it can be achieved through a mix of good transport, good urban design and good use of technology. This can be viewed as a jigsaw puzzle, of which the Ministry of Transport only holds one piece. We need to engage more with those responsible for holding the other pieces in order to debate and decide the new requirements for accessibility, in addition to providing a long-term vision for our preferred future.

Achieving our preferred future

A sector and government-wide vision of our preferred future will enable us to set clear goals and targets. These goals will underpin future investment decisions and work programmes across the transport sector.

Our aim, throughout these projects, has been to better understand the influences that shape the future and the tools required to meet future challenges, so that we can continue our role in ensuring that the transport system helps New Zealand to thrive, and that we create the environment to double the value from transport initiatives. There is more work to be done but we are well on our way.

Next steps

Through these projects, we have produced a raft of materials which help us to understand economic growth and its relationship to transport, and how to deal with uncertainties around future demand for transport. We will be making this information available for others to use as a resource to consider the implications for local transport systems.

We will also engage with other government departments and local government to take forward the debate on accessibility and future needs for New Zealand.

The suite of tools that we have produced will also inform the development of GPS 2018 as we explore the possibilities for developing a national transport model and engage the transport sector in discussing the options for future investment in transport.

Our aim from the outset of this programme of work has been to enhance strategic thinking across the Ministry and transport sector. This is an ongoing commitment and each project has led to a new suite of questions and areas that warrant further investigation. We invite you to join in this quest.

Acknowledgements

The Ministry would like to express its thanks to its strategy directors, who led these projects: Professor Caroline Saunders, Professor Paul Dalziel, Professor Glenn Lyons and Dr Doug Wilson. We are very grateful for the time, effort and care that they put into delivering these projects.

The Ministry would also like to thank the more than 100 contributors to this work from across central and local government, stakeholder groups and academia. Their contributions have significantly assisted us to form our views, and we appreciate the level of interest, input and advice we have received. We look forward to working with these stakeholders as we further explore the future of transport in New Zealand.

Papers and tools *(tools are shown in italics)*

Economic Development and Transport

Economic Development and Transport Summary report
Economic development: A review of the key themes in the international literature
Future options for the New Zealand economy: Model, data and futures
Transport implications of future options for the New Zealand economy: An opening discussion
Contribution to transport of economic development: An international literature review

Future Demand

Future Demand Summary report
Future Demand Final report
Future Demand Scoping paper
The motor car and the construction of a new world
Grow, peak or plateau: The outlook for car travel
Peak car: Does it exist and is it evident in New Zealand?
Insights into the scenario planning methodology
New Zealand transport and society: Scenarios to 2042
New Zealand transport and society: Trends and projections
Future Demand: A youth perspective
Transport's digital age transition
Future Demand Model overview and user guide
Future Demand Interactive model (spreadsheet)

Future Funding

Future Funding Summary report
Scoping approaches to set an investment band for land transport
Review of international transport planning and funding frameworks
Uses of hypothecated revenue
Revenue tools for transport
Assessment of revenue tools
Optimal funding
The sustainability of current transport revenue tools model and report
Summary of stakeholder engagement and findings

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