ECONOMIC POLICY

THE PRICE IS RIGHT

The road to a better transport system

Patrick Carvalho
Foreword by Nick Leggett

THE NEW ZEALAND INITIATIVE

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About the New Zealand Initiative

The New Zealand Initiative is an independent public policy think tank supported by chief executives of major New Zealand businesses. We believe in evidence-based policy and are committed to developing policies that work for all New Zealanders.

Our mission is to help build a better, stronger New Zealand. We are taking the initiative to promote a prosperous, free and fair society with a competitive, open and dynamic economy. We are developing and contributing bold ideas that will have a profound, positive and long-term impact.

ABOUT THE AUTHOR

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The usual caveats apply.

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Foreword

The road transport industry is pleased to endorse the principles contained in *The Price is Right*.

While the perception is that the things in life we take for granted and use every day – roads being a classic example – are "free", the truth is roads have a significant cost. A growing population, more freight, and sustained economic growth have significantly increased the demand for high capacity and quality roading. Our roading assets have been "sweated" more and are noticeably deteriorating in the eyes of most New Zealanders.

Increased demand of course means increased costs, but in the absence of a pricing mechanism, capital requirements for building, maintenance and use will only continue to increase, without moderating demand.

In the medium term, New Zealand is only going to demand more from its roads as we grow our economy and population. We can't keep "flogging" the same pricing structure if we want to improve networks and quality. Especially when that structure doesn't try to allocate costs based on use.

The road freight transport industry (heavy trucks) carries 90% of New Zealand's freight by tonne. It also contributes $1.5 billion each year through road user charges (RUCs). In other words, trucking operators are already contributing to a cost regime along the lines suggested in this report. The industry is hungry for a road pricing system that transparently demonstrates the use, impact and cost of all road users. We want those who benefit from using the asset to more appropriately pay for it.

To illustrate, if a business needs its goods moved to the market quickly, and has the ability to pay for it, the business can transparently hand over the cost to the customer. We believe our country will become more productive with better equity in our road transport system if the principles identified in this report are adopted.

This work on road pricing is also the means to start a discussion about how and why New Zealand plans and builds infrastructure. Unfortunately, due to our small population size, we have adopted a "just enough" mentality, which sees us build infrastructure to meet today's challenges without thinking about the consequences for tomorrow, or indeed the day after that. This is visible on most state highways, railway lines, and ports, some of which are under considerable strain.

As a nation, we have to "up our game" with infrastructure investment. We need a cross-party, non-ideological infrastructure plan to cover the next 100 years. We need to ask, "What do Kiwis need from great infrastructure?" Such a plan must also be explicit in future-proofing investment scale and decisions, and be truly mode neutral.

We must be able to accurately price road use – and possibly other infrastructure – to both allocate costs and manage demand. Such an approach can be used to moderate private vehicle use, optimise efficient movement of freight, and increase public transport use and more physical travel such as cycling and walking. This will be an important tool in the fight to lower our nation's carbon emissions.

This research is also timely because it's clear from Transport Minister Phil Twyford's statements

that the Government is increasingly viewing road spending as something that needs to be justified by return and revenue.

We hope this report will guide the thinking of politicians and officials as they navigate alternatives – which were previously considered too complex and politically challenging – in a fast-changing and complex transport environment.

Nick Leggett
Chief Executive
Road Transport Forum NZ
Wellington

Executive Summary

New Zealand needs a land transport system that is fit for purpose: a wide range of options that are safe, reliable, environment-friendly and cost-effective. But the current transport environment falls far short. We need to – and we can – do better.

This report shows that in the absence of proper road user pricing, **congestion is becoming the new normal** in our urban centres, costing the economy billions of dollars every year.

Government forecasts also show New Zealand's total vehicle kilometres travelled might increase by as much as 66% by 2040. Without suitable policy action, road congestion is all but certain to intensify.

Minister of Transport Phil Twyford aptly said, "Mobility is the lifeblood of commerce and community." Left untamed, congestion will increasingly clog our productivity growth (i.e. lower wages and higher living costs) and social interactions – not to mention reduced road safety and increased pollutant emissions.

At the heart of the problem – and the solution – is our **transport budget system**.

The average New Zealand driver is not getting the best deal from the way roads are being funded. For one, we are paying for our streets and highways roughly the same way we did 50 years ago, despite technological advances and global best practice.

Advances in fuel efficiency clearly show how unsuitable traditional means of funding land transport through fuel excise duty have become. Fuel tax is a blunt fiscal tool that has survived beyond its time only due to the **administrative convenience** in collecting tax.

The trouble is such an expediency feature does not come for free. Even the Ministry of Transport recognises that "ideally, to ensure fair charging, petrol vehicles would be subject to road user charges as well".

New Zealand's road user charges (RUCs), which apply to diesel-powered vehicles and will soon apply to all electric cars here, are internationally recognised as a successful test case in road funding. RUCs are flexible enough to allow adjustable rates based on the impact of a vehicle on road infrastructure. Importantly, they are based on the exact mileage travelled (as opposed to fuel tax, which is dependent on energy efficiency standards). That said, our current RUC arrangement still **fails to price congestion** costs.

Our transport funding system needs to go further, fully capturing the beneficiary-pays principle. That means charging users in proportion to their road use based on the combination of four elements: distance (mileage), vehicle type and weight (road impact), time (peak and off-peak periods), and location (different roads and lanes might have different fees).

Neither fuel taxes nor RUC currently price the negative externalities of congestion. In other words, our road user funding system needs to incorporate the *time and location* components of road pricing by introducing **congestion charges**.

Instead of Soviet-style rationing of road space by widespread queuing, congestion charges would **harness the power of markets**, encouraging commuters to find trip alternatives such as other travel times, routes and transport modes. In return, government should commit to improving the supply of travel options,

including providing appropriate funding for more and better roads and public transport.

Congestion charges on road usage is not a new concept, with close to a hundred years of academic research backing it and plenty of **international case studies** validating it.

Singapore, which started with a paper-based congestion charge in 1975, will implement a new satellite-based system in 2020. Several other countries – including the United States, Britain, the Czech Republic, Malta, Italy, Sweden, Norway and the United Arab Emirates – have added congestion charges under different technologies and rules. These are useful test cases, providing both success stories as well as lessons.

Politicians from both sides of the aisle in New Zealand have long courted the idea of congestion charges. After all, experts agree road pricing is the single most effective way to deal with congestion while providing incentives to increase the use of public transport.

More recently, the Tax Working Group and the Productivity Commission have separately supported the time-tested, cost-effective congestion charges as an efficient way to modify behaviour and improve environmental quality.

But history shows congestion charging has been New Zealand's perennial "next best idea yet to be implemented".

Apart from the political reluctance to let go of the ease of collecting fuel tax, congestion charging also faces the motoring **public's resistance** to pay for something they consider they have already paid for through petrol excise or road user charges.

Much of the public's negative reaction relates to **misunderstandings and fears** about a new road pricing system. Tellingly, follow-up surveys demonstrate public rejection is significantly reduced *after the implementation* of congestion charges. As congestion reduces, drivers become more receptive of proper pricing road use.

Besides, international experience shows that valid concerns about technology, privacy and socioeconomic equity can be adequately dealt with under the road pricing policy itself.

For long, congestion charging was limited by technology constraints. Not anymore. As **digital costs plummet** and implementation flexibilities rise, we can pick the right technology based on road pricing goals rather than the other way around.

Similarly, there are plenty of **well-tested regulatory tools** to deal with the public's resistance to government access to driver data: de-identified driver information, automatic recurrent deletion of data, no central record of a vehicle's movement.

Lastly, research shows that the distributive socioeconomic impacts of congestion charges are not significant. If anything, international studies show a majority of **road users to be better off**, with lower income groups usually benefiting the most.

In conclusion, **road pricing works**. New Zealand should welcome it as the road to a better transport system. We are well placed to implement a comprehensive, world-class road pricing scheme and reduce the adverse impacts of congestion.

As an island economy with a unitary government, we do not face the regulatory hurdles of other jurisdictions such as in the United States and the European Union.

In addition, emerging technologies, international case studies, and our own experience with distance-based road user charges show that road pricing is **ours for the taking**.

CHAPTER 1

The congestion issue

Summary

Traffic congestion – characterised by slower speeds, longer and unreliable trip times, and increased vehicular queueing – is the new normal across the nation's major urban centres and along sensitive chunks of our highway network. And it is getting worse.

Our vehicle fleet has been growing on the back of a wealthier economy and larger population: from 2.7 million vehicles in 2001 to more than 4.2 million in 2017 to an expected 4.8 million by 2040.

Yes, Kiwis love cars. New Zealand is among the top 10 countries for vehicle ownership per capita. The door-to-door convenience of car use, particularly of sole-occupancy driving, is an undeniable national preference.

But our road network is not equipped to efficiently accommodate congestion at peak times and particular locations. The resulting traffic gridlocks cost the nation billions of dollars in lost productivity and reduced mobility.

The good news is we now have the means to tackle the congestion problem head on.

To cars, with love

The love affair between New Zealand and motor vehicles goes way back. The first cars – quaintly called "horseless carriages" – arrived on our shores at the end of the 19th century.[1] Despite slow beginnings, motor vehicles rapidly replaced horse-drawn carriages in the roaring 1920s to become the dominant means of land transport a few decades later.[2]

Nowadays, motor vehicles are an uncontestable – and increasing – part of Kiwi life. Our fleet numbers have risen by 51% since the turn of the century to 4.2 million vehicles today, of which more than 3.2 million are light passenger cars (78%) and close to 600,000 are light commercials (such as vans and utes under 3,500 kg) (see Table 1).[3] Those figures place New Zealand among the top 10 countries for vehicle ownership per capita, accounting for 792 light vehicles for every 1,000 people in 2017 – and up from 661 light vehicles for every 1,000 people in 2001.[4]

Census data provides further evidence of our growing love for cars. Currently, 92% of New Zealand households own at least one car, with more than one vehicle per household being the new normal (see Figure 1). At 55%, the share of two or more vehicles per household is higher in New Zealand than in the United Kingdom (30%) and Australia (50%).[5]

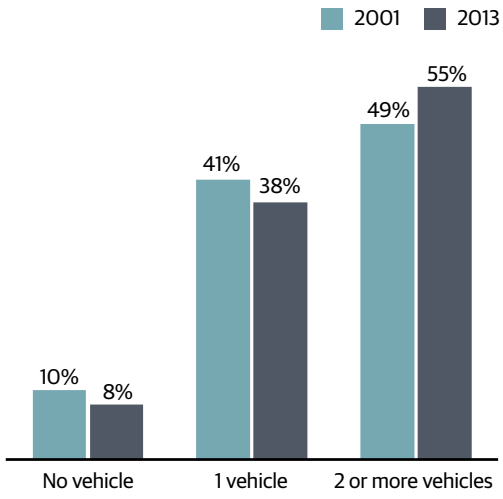
Table 1: New Zealand vehicle fleet, '000s (share of total)

	Light passenger	Light commercial	Motorcycle	Trucks	Buses	Other	Total
2001	2,214 (80.3%)	350 (12.7%)	78 (2.8%)	98 (3.5%)	5 (0.2%)	13 (0.5%)	2,757 (100%)
2017	3,218 (77.5%)	581 (14%)	171 (4.1%)	144 (3.5%)	11 (0.3%)	30 (0.7%)	4,155 (100%)

Source: Ministry of Transport, "Transport Outlook Current State 2016: A Summary of New Zealand's Transport System" (Wellington: New Zealand Government, 2017), 21.

Note: Totals may not add up due to rounding.

Figure 1: Number of vehicles owned by households

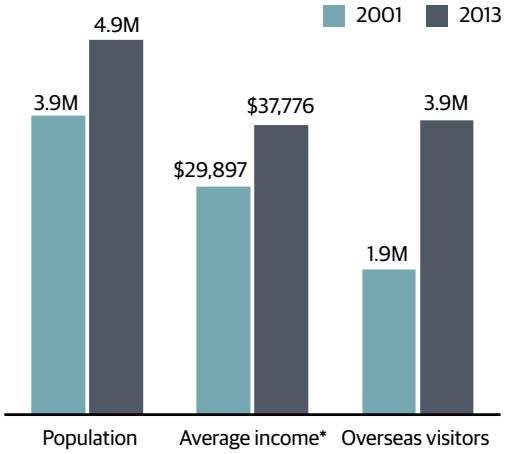


Source: Ministry of Transport, "Transport Outlook Current State 2016: A Summary of New Zealand's Transport System" (Wellington: New Zealand Government, 2017), 7.

Note: Percentage may not total 100% due to rounding.

A larger population and increasing average incomes are driving New Zealand's sustained vehicle growth, and the aggregate demand for greater land movement of goods and people.[6] Rising numbers of overseas visitors too have led to an increased use of cars, camper vans, and tourist coaches on our roads and highways, and more goods transported to tourist hotspots (see Figure 2).

Figure 2: Behind the fleet growth



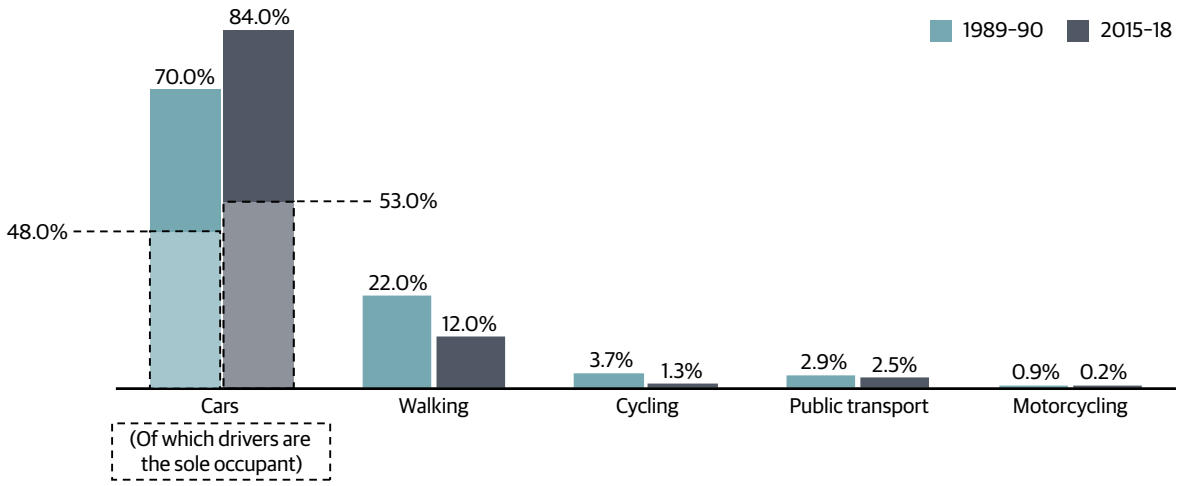
Source: Statistics New Zealand, "Population," Website, www.stats.govt.nz/topics/population; Statistics New Zealand, "International travel: February 2019," Website, www.stats.govt.nz/information-releases/international-travel-february-2019; Ministry of Transport, "Transport Outlook Current State 2016: A Summary of New Zealand's Transport System" (Wellington: New Zealand Government, 2017); World Bank, "GDP per capita (constant 2010 USD)," Website.

Note: *GDP per capita (constant 2010 USD) for 2001 and 2017.

The door-to-door convenience

One of the key reasons New Zealanders love their cars is the door-to-door convenience: the privacy, reliability and swiftness of car trips.

Figure 3: Mode share of household trip legs



Source: Ministry of Transport, "Household Travel Survey," Website.

Note: Percentage may not total 100% due to rounding.

Despite all the valid arguments in favour of other active modes of travel (e.g. walking and cycling) and community gains of public transport, the expediency of private vehicles still seems unbeatable.

If anything, the use of cars as the main choice for household travel has grown over the years.

According to the *New Zealand Household Travel Survey*, private cars were used in 84% of household trips during 2015–18 – around two-thirds of which had single occupants – compared to 70% in the first survey conducted in 1989–90 (see Figure 3).[7] Conversely, the share of all other modes of transport has reduced in the past few decades.

Understanding the purposes of household travel sheds light on our increasing use of cars as the primary mode of transport. Ministry of Transport data shows that most short household trips are work related (24%), closely followed by personal errands (23%) such as shopping and medical appointments, social visits (19%), accompanying/transporting someone (16%), recreation (12%), and education (6%).[8]

Although there is much variation between regions on the use of alternative travel modes – Wellingtonians are three times more likely than the rest of the nation to take public transport to work, and people living in Christchurch are seven times more likely to cycle – the reality is the weather-sheltered, hill-eating convenience of a private car is still a dominant factor in New Zealand society.

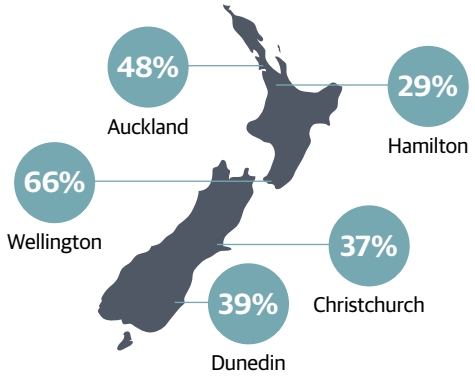
Almost nine out of 10 of those who travel to work go by car (as a driver or a passenger).[9] Even traditional niches of active transport modes are dominated by car use. In the late 1980s, 54% of primary students aged between 5 and 12 walked or cycled to school compared with 31% today, while close to two-thirds now enjoy the ease of car trips.[10]

These statistics reflect the penetration of light vehicles in our daily lives. More and more New Zealanders can now afford cars to go to work, school and other places. The use of public transport as an alternative mode is inversely related to the number of vehicles in the household. While close to two-thirds of households with no vehicle used public buses or trains at least once a year, fewer than a third of the households with two vehicles used public transport in the same period.[11]

Another factor behind New Zealanders' preference for cars is our geography and demographic profile. In a low population density environment with local councils dominant in rural areas, the efficient use of public transport as well as active modes of transport such as walking and cycling are not always feasible or economically viable.

New Zealand drivers in rural areas are much more likely to travel over longer distances. Data from the Ministry of Transport shows people living in communities with more than 10,000 people clocked an average of 6,190 km per year between 2010 and 2014, whereas those in rural communities travelled 8,620 km.[12] Such different community profiles help explain disparities in public transport use. In 2018, 42% of commuters in urban areas used public transport, compared to under 17% in rural areas.[13]

Figure 4: Use of public transport at least once a year



Source: Ministry of Transport, "Transport Outlook Current State 2016: A Summary of New Zealand's Transport System" (Wellington: New Zealand Government, 2017), 56.

Other local characteristics (e.g. population density, transport corridors and public parking) also explain the variance in public transport use between regions: 66% of Wellingtonians and 48% of Aucklanders used buses and trains at least once a year compared to 29% of Hamiltonians (see Figure 4).[14]

The clogged reality

New Zealand's increasing preference for the door-to-door convenience of private cars (including sole driver occupancy) has increasingly challenged road use capacity – quite often beyond its limits. Traffic congestion now clogs the nation's major urban centres and along sensitive chunks of our highway network.

Traffic bottlenecks are most associated with the Auckland region, New Zealand's largest metropolitan area and housing a third of the nation's population. A 2016 independent study estimated that Auckland's congestion was costing the national economy more than $1.25 billion annually, with road users having to budget 45% additional time to arrive on time.[15]

However, as city dwellers in other urban areas can attest, chronic road congestion is not exclusive to Auckland.

Table 2 depicts the average congestion levels in New Zealand's six largest metropolitan areas based on TomTom's latest database covering 403 cities in 56 countries on six continents.[16] The TomTom Traffic Index is an annual publication measuring congestion levels, defined as an "increase in overall travel times when compared to a free flow situation".[17]

Of course, there are valid criticisms of the TomTom methodology.[18] For one, data is only collected by vehicles that use TomTom devices, which might bias the sample. Furthermore, since the TomTom index is calculated as a *percentage proportion* between free flow and actual travel times, it might disproportionately affect cities with smaller average commutes. Notwithstanding the methodological quarrels, the TomTom index provides evidence of congestion in the surveyed cities.

As expected, Auckland has the nation's highest average congestion at 29%. This means it usually takes 29% extra travel time for "any trip, anywhere in the city, at any time compared to what it would be in local free flow conditions". Morning and evening peak congestion levels are even worse at 61% and 72%, respectively. The TomTom Index ranks Auckland among the top 100 congested worldwide, with drivers idling an extra 18 minutes in the morning and 22 minutes in the evening peaks every day.

Wellington has the second worst congestion in the country, with 27% average extra travel time, followed by Hamilton (22% congestion level), Christchurch (21%), Dunedin (19%), and Tauranga (18%).

Table 2: Average congestion levels across New Zealand's largest urban areas (2018)

City	Congestion level	Morning peak level (extra daily travel time)	Evening peak level (extra daily travel time)
Auckland	29%	61% (+18 min)	72% (+22 min)
Wellington	27%	62% (+19 min)	59% (+18 min)
Hamilton	22%	44% (+13 min)	51% (+15 min)
Christchurch	21%	38% (+11 min)	45% (+14 min)
Dunedin	19%	31% (+9 min)	31% (+9 min)
Tauranga	18%	38% (+11 min)	38% (+11 min)

Source: TomTom, "Traffic Index 2018," Website.

There are many ways to define road congestion: **travel time delay**, used by the TomTom index; **average speed**, which tracks how fast the traffic in a city travels; **peak reliability**, which looks at statistical variability of travel times; and **peak scheduling**, which investigates the extra time road users usually need to budget to arrive on time during rush hour.[19]

Regardless of the definitions, there is widespread agreement about the devastating effect of traffic congestion on the economy and community.[20] Congestion is taking a toll on the mobility of goods, services and people – harming productivity growth, increasing carbon emissions, and sapping social interaction.

As Minister of Transport Phil Twyford writes:

> Mobility is the lifeblood of commerce and community. It is the key to unlocking not only productivity and business growth, but strengthening our social and cultural connections within and between our regions, towns and cities.[21]

It is here to stay

Without corrective policy actions, including the proper costing of road use, congested roads and highways are not going away – and are most likely to increase in the future.

According to Ministry of Transport forecasts, New Zealand will add 700,000 more net vehicles in the coming decades for a record 4.8 million vehicles by 2040.[22]

On the back of a larger fleet and greater demand for movement of goods and people, the road distance travelled will reach new peaks. Under a baseline forecast, total vehicle kilometres travelled is expected to increase from 45.9 billion km in 2017 to 60.7 billion km by 2042 – of which light vehicles will constitute over 92% (see Table 3).[23]

Under an alternative scenario based on higher economic and population growth forecasts – particularly in the Golden Triangle (Auckland-Hamilton-Tauranga) – New Zealand's total vehicle kilometres travelled might even reach 76.2 billion km by 2042 (i.e. 66% higher than in 2017).

That will put further strain on our already congested transport network.

New Zealand needs to deal with its congestion crisis with the best possible range of policy actions: from building more and better roads to improving and expanding public transport alternatives to correctly pricing road use.

For that, it is necessary to understand the reach and limitations of how New Zealand funds, plans and spends resources on land transport.

Table 3: Baseline forecast for vehicle kilometres travelled, billion km (share of total)

	Light passenger	Light commercial	Rideshare & taxis	Trucks	Buses	Motorcycles	Total
2001	32.3 (70.5%)	9.4 (20.4%)	0.4 (0.9%)	3.0 (6.5%)	0.3 (0.7%)	0.4 (0.9%)	45.9 (100%)
2017	31.5 (59.9%)	16.0 (26.3%)	8.7 (14.3%)	3.5 (5.7%)	0.6 (1.0%)	0.5 (0.8%)	60.7 (100%)

Source: Ministry of Transport, "Transport Outlook: Future State" (Wellington: New Zealand Government, 2017).

Note: Totals may not add up due to rounding.

CHAPTER 2

The land transport budget

Summary

Past decades have seen an increasing reliance on local ratepayers to fund local roads, prompting renewed calls for a more prominent role of direct charges, where road users are more accountable for their cost to the system.

As fuel efficiency technology advances, it is becoming clear that New Zealand's traditional means of funding land transport through fuel excise duties need an update, possibly even a revamp. Further, the growing prominence of road user charges for non-petrol vehicles – including electric vehicles as early as 2021 – indicates the future of land transport funding.

A comprehensive road user charging system (road pricing), which includes capturing the costs of congestion, is a more transparent funding structure. An inclusive road pricing scheme has the potential to address the current challenges to land transport funding, including fixing road infrastructure deficits, *while* promoting other transport modes and efficient road use.

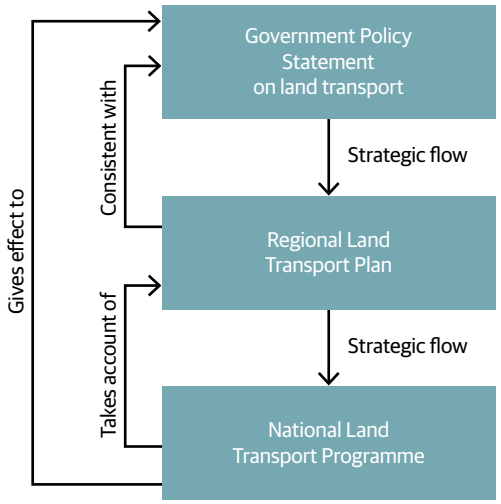
The planning environment

Land transport planning comprises the institutional framework on all decisions pertaining to the funding of and expenditure on roads, public transport, walking and cycling. At the top is the *Land Transport Management Act 2003*, which outlines the legal processes and general principles to guide the planning and funding of the sector (see Figure 5).

Following consultations with the New Zealand Transport Agency (NZTA), the Ministry of Transport, local authorities and the wider public, the government issues a Government Policy Statement (GPS), the strategy guiding land transport decisions for 10 years, reviewed every three years.

Based on the GPS, local councils prepare business cases for local and regional transport projects to be assessed by regional transport committees, whose members are representatives of territorial and regional councils as well as the NZTA.[24]

Figure 5: The land transport planning strategic flow



Source: Ministry of Transport, "Government Policy Statement on Land Transport 2018/19–2027/28" (Wellington: New Zealand Government, 2018).

As required by the *Land Transport Management Act 2003*, regional transport committees then prepare and adopt regional land transport plans consistent with GPS guidelines. The NZTA takes these into account when preparing the

National Land Transport Programme (NLTP), which ultimately gives effect to the GPS, outlining all funding and expenditure in specific land transport activities for the coming years.

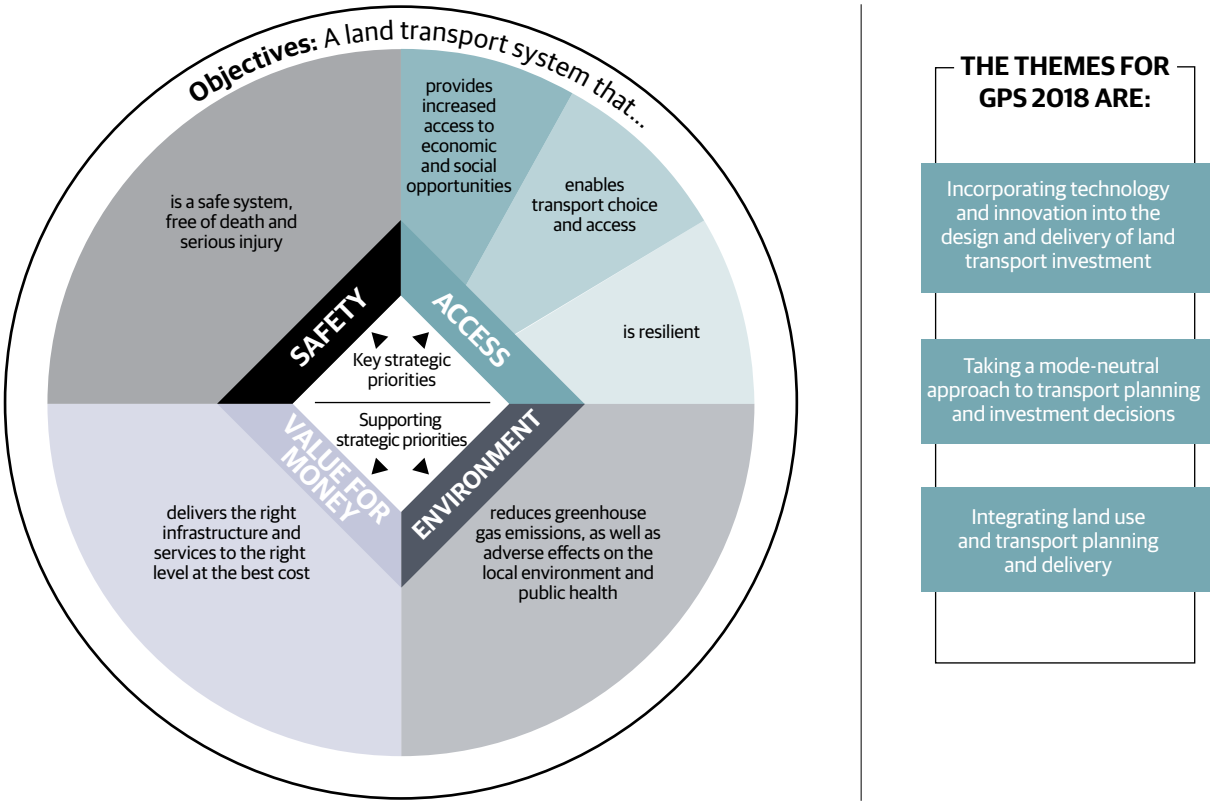
GPS 2018 is the fifth edition, setting the expectations for land transport investments between the 2018/19 and 2027/28 fiscal years.[25] It brought three key changes. First, it placed a distinct focus on safety and access as key strategic priorities (see Figure 6). Second, it elevated the environmental impact of land transport. Third, it included themes to "assist understanding of how to effectively deliver on priorities".[26] Most notably, GPS 2018 introduced a focus on mode neutrality.

A mode-neutral approach can be defined as:

> … considering all transport options for moving people and freight, including multi-modal options, when identifying the best value-for-money transport solutions to deliver transport outcomes. Investment appraisal and evaluation of those options should identify all costs and benefits without any bias towards particular modes.[27]

Transport planning and investment using a mode-neutral approach emphasises less on road investments and gives other transport modes such as public transport "greater funding priority due to past underinvestment".[28] While grounded on valid arguments, mode neutrality has its own

Figure 6: GPS 2018 strategic direction and themes



Source: Ministry of Transport, "Government Policy Statement on Land Transport 2018/19–2027/28" (Wellington: New Zealand Government, 2018).

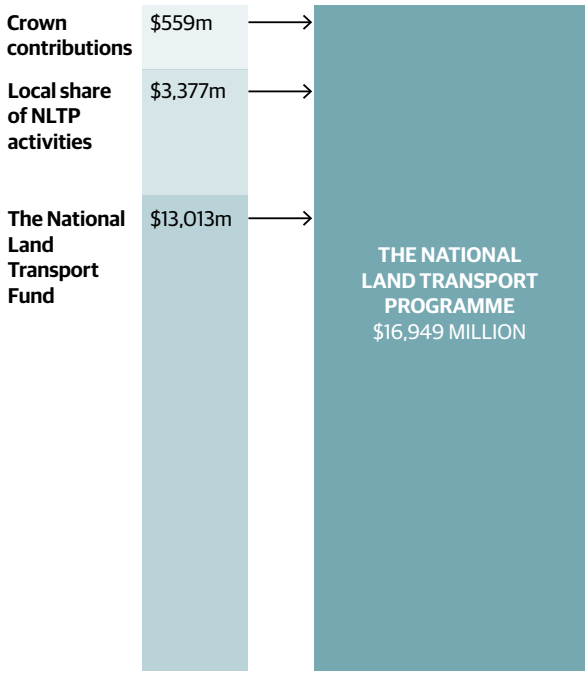
substantial challenges, particularly for the already constrained fiscal position of local governments and a growing gap in road infrastructure needs.

Nevertheless, NLTP 2018–21 includes considerable changes to both revenue sources and expenditure destinations.

Show me the money

The current NLTP expects $16,949 million of funding for fiscal years 2018/19 to 2020/21 to come from three sources: Crown contributions ($559 million), local government ($3,377 million), and the National Land Transport Fund ($13,013 million) – see Figure 7.[29]

Figure 7: National Land Transport Programme funding sources (2018–21)



Source: New Zealand Transport Agency, "National Land Transport Programme 2018–21" (Wellington: New Zealand Government 2018).

Crown contributions comprise direct appropriations, loans and subsidies from central government. For 2018–21, almost half the Crown contributions ($225 million) will come from the Kaikoura Earthquake Recovery Fund to reinstate State Highway 1, which was damaged in the 2016 earthquake. Further, $94 million will go the Accelerated State Highway Regional Programme.

Another sizeable Crown contribution ($109 million) will come from the Housing Infrastructure Fund Loan to fund roading projects in high growth urban areas of Auckland, Hamilton, Tauranga and Queenstown.

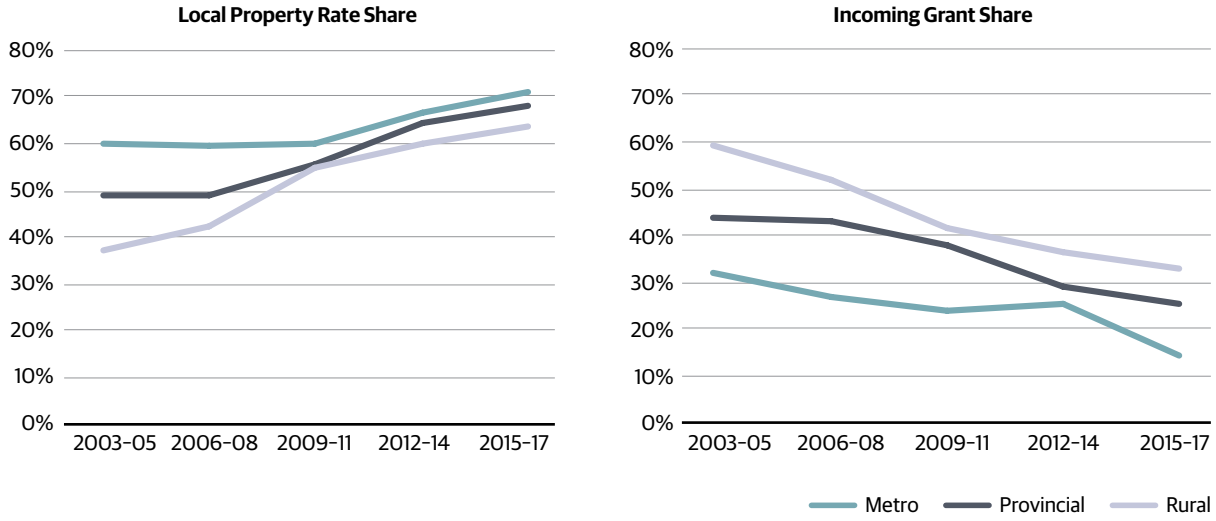
The local government share to the NLTP relates to the collection of local resident rates and user charges to co-fund land transport infrastructure and services, most notably local roads. NLTP plans to invest $1.3 billion in local road improvements in 2018–21 – half the amount will come from local authority contributions to the land transport programme.

Since 2003, when the first NLTP was adopted, local ratepayers have been increasingly footing the local road funding bill, particularly in rural areas (population below 20,000 residents) and provincial areas (population between 20,000 and 90,000 residents). Figure 8 shows the average shares of local road investments that are mostly funded by local property rates and incoming grants (e.g. NLTF and Crown contributions), grouping local authorities by their respective population size.

Ratepayers in rural councils, for instance, went from a median average funding of 37% total operating income on local roads in 2003–05 to 64% in 2015–17, whereas incoming grants have diminished from 59% to 33% more recently. Similar reductions in local funding were seen in larger councils, including in metropolitan areas (population above 90,000 residents).

This underlying trend has led to calls – including from the Productivity Commission draft report on local government funding and financing inquiry – for greater funding from user charges as an alternative to the heavy reliance of local road funding on property rates.[30]

Figure 8: Average funding shares in local road operating income

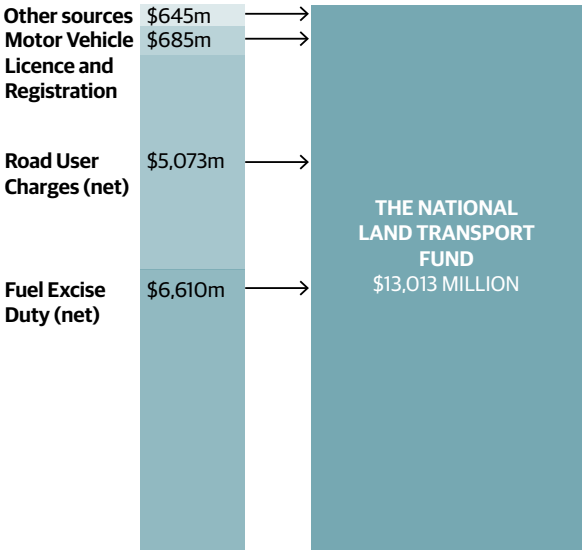


Source: Author's calculations based on Statistics New Zealand data.

Note: Percentages refer to the median funding shares of total operating income on local roads by local councils grouped according to their population size, as defined by Local Government New Zealand's guidelines: rural (population below 20,000 residents), provincial (population between 20,000 and 90,000 residents), and metropolitan (population above 90,000 residents). Incoming grants refer to "current grants, subsidies, and donations income" from other public entities such as Crown appropriations and the NLTF.

GPS 2018 also includes nods to a more user-pays system and for "demand management… to be part of the solution to the [congestion] problems in high growth areas – particularly in Auckland".[31]

Figure 9: The National Land Transport Fund (2018–21)



Source: New Zealand Transport Agency, "National Land Transport Programme 2018–21 (Wellington: New Zealand Government, 2018).

After accounting for Crown contributions and local authority shares, the bulk of NLTP funding (i.e. around 80%) comes from the National Land Transport Fund (NLTF), comprising revenues from fuel excise duties, road user charges, motor vehicle licence and registration, and other sources such as the rent and sale of state highway property and cash movements from previous balances.

Historically, fuel excise duties have been at the forefront of New Zealand's fiscal strategy, still accounting for close to half the total NLTF receipts. For 2018–21, fuel excise duties on petrol vehicles will supply $6,610 million of net funding to NLTF investments, followed by $5,073 million from road user charges on diesel-powered vehicles, and $685 million from motor vehicle licence and registration fees (see Figure 9).

But the dependence on fuel excise duties as a transport funding tool is not cost free, and it is expected to wane in the coming years (see Box 1). Road user charges (RUCs) have consistently

Box 1: The specious convenience of fuel taxes

If you drive to work, go shopping, or drop off your kids at school, you are not alone. Nearly 80% of household trips in New Zealand are by car, with four out of five cars fuelled by petrol.[32]

Petrol taxes have been an integral part of government fiscal strategy, mainly because of their relative convenience: low administrative costs, high compliance rates, and seamless payments.

As it turns out, petrol excise duties are not without costs.

Under our fuel tax regime, a driver pays the same petrol duties regardless of when and where the car is used – thus adding to the congestion in already overcrowded roads.

Moreover, studies show fuel taxes can be regressive, which means low-income families tend to bear a disproportionate share of road funding costs.[33] In New Zealand, for example, data from the Household Expenditure survey shows how fuel taxes – which are ultimately a consumption tax – disproportionally affect lower income families.[34]

To further understand the regressive nature of petrol taxes, it is key to look at the relationship between fuel economy and road usage.

The rationale for petrol taxes lies in the user-pays principle. In this sense, the fuel excise duty is a proxy for road usage: the longer the distance travelled, the higher is the tax due.

Petrol tax receipts are, however, proportionate to fuel consumption patterns. This is in contrast to New Zealand's road user fees on diesel-powered vehicles, which charge drivers based on the exact mileage travelled.

The problem is that different petrol vehicles have different fuel economy features, with newer cars increasingly more efficient than older (and cheaper) versions.[35] Research by the Ministry of Transport confirms that fuel taxes are "likely to become more inequitable as the efficiency of vehicles improves".[36]

Fuel efficiency can have an immense impact on a driver's petrol tax liability. Based on government guidelines, average petrol consumption can go from 2.9 litres per 100 km (highly efficient vehicles) up to 19.6 litres per 100 km.[37]

Even the Ministry of Transport recognises that "ideally, to ensure fair charging, petrol vehicles would be subject to road user charges as well".[38] However, the convenience of petrol taxes gets in the way.

But it should not be the case.

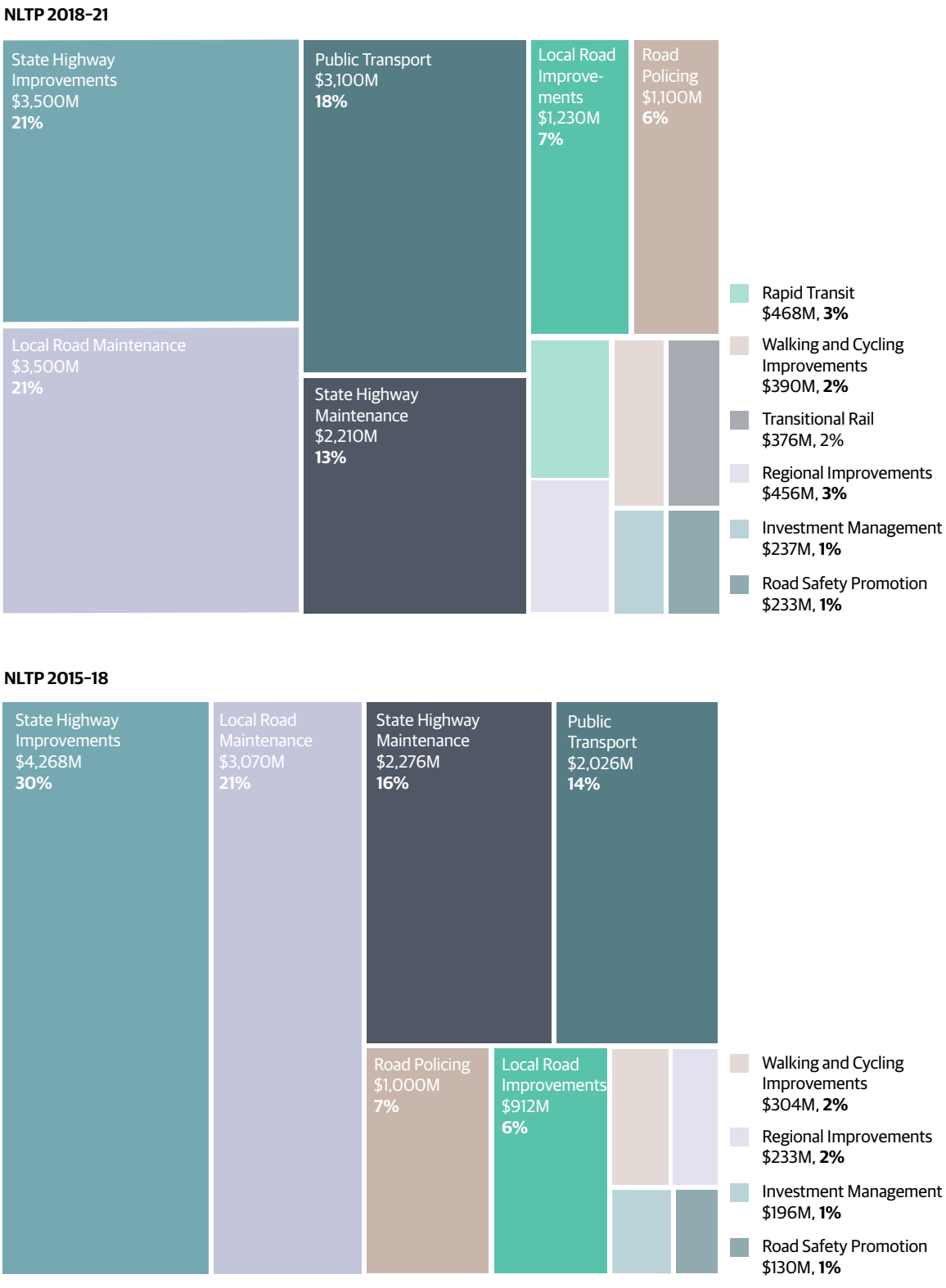
increased their contribution to the NLTF. RUC receipts went from about half the fuel excise receipts in the 1990s to almost on par in recent years – and are likely to contribute even more as electric vehicle exemptions on road user charges are expected to expire in 2021.[39]

And the money goes to

GPS 2018 – and the corresponding NLTP 2018–21 – lists expenditure targets for 12 planned activities. Two of those activities are new, namely transitional rail and rapid transit, showing the programme's emphasis on mass transport modes. Further, the allocation shares of planned activities in the current NLTP programme vis-à-vis previous editions indicates the move away from state highway investments towards public transport (see Figure 10).

For instance, NLTP 2018–21 plans to spend $3,500 million on State Highway Improvements (i.e. 21% of total NLTP expenditure), which is a decrease in both nominal and percentage terms compared with the previous NLTP. In NLTP 2015–18, incurred investments in State Highway Improvements totalled $4,268 million, or 30% of total spending.[40]

Figure 10: Budget allocation among planned activities, in current million dollars and percentage shares



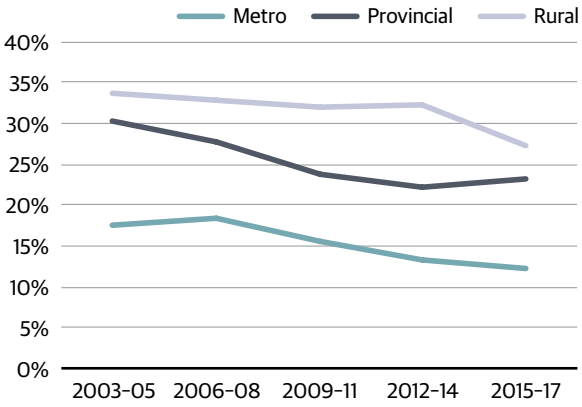
Source: New Zealand Transport Agency, "National Land Transport Programme 2018–21" (Wellington: New Zealand Government, 2018).

Note: The planned activity measures in NLTP 2018–21 represent target values, whereas the ones in NLTP 2015–18 are actual expenditures. Totals may not add up due to rounding.

Similar movements appeared in the State Highway Maintenance category. NLTP 2018–21 allocated $2,210 million (or 13% of total projected spending) towards this planned activity, compared with $2,276 million (or 16% of total incurred spending) under NLTP 2015–18 for the same activity.[41]

On the other hand, public transport expenditure substantially increased from $2,026 million (or 14% of total spending) under NLTP 2015–18 to $3,100 million (or 18% of the total) under NLTP 2018–21. In nominal terms, the dollar increase represents a 53% rise.[42]

Figure 11: Average shares of road expenditure in the local budget



Source: Author's calculations based on Statistics New Zealand data.

Note: Average funding refers to the median allocation shares of total operating expenditure on local roads as a percentage of total operating expenditure across all budget activities, by local councils grouped according to their population size, as defined by Local Government New Zealand's guidelines: rural (population below 20,000 residents), provincial (population between 20,000 and 90,000 residents), and metropolitan (population above 90,000 residents).

GPS strategic priorities moving away from roading investments add to the long-term decline of investment by local councils. Pressed to increasingly foot the bill through property rates, local authorities have been withdrawing expenditure allocation to local roads as a share of total budget (see Figure 11). As a result, the quantity and quality of road infrastructure in New Zealand suffer, as attested by statistics on traffic congestion and road accidents.[43]

Changes in planned activity priorities are not unusual, as the GPS is ultimately a political document that reflects the legitimate values of an incumbent government – and by extension, voters' contemporary preferences.

However, most of the NLTP funding comes from fuel excise duties and road user charges – representing more than two-thirds of total expected funding in 2018–21. This creates valid arguments for higher spending on roads and highways, given the user-pays nature of these funding sources and the quality of services offered.

A more transparent road pricing system can contribute to a better transport funding system by addressing roading investment challenges without compromising the current mode-neutral vision in the national land transport sector.

If the price is right, road use can be optimally determined within the land transport system itself.

CHAPTER 3

Pricing our roads for the 21st century

Summary

Road pricing is a beneficiary-pays system where users are charged in proportion to their use of road infrastructure based on the combination of four elements: distance (mileage travelled), vehicle type and weight (road impact), time (peak and off-peak periods), and location (different fees for different roads and lanes).

Government levies based on distance and weight are a common form of road pricing. The longer the mileage travelled and the larger the vehicle, the higher is the impact on the wear and tear of roads – and the higher are road tax dues. In New Zealand, distance-based road pricing has been partially captured since the 1970s by a fuel tax per litre on all petrol-powered cars (as a proxy for mileage travelled) and by a mileage-based, weight/axle-variant road user charge on vehicles running on diesel.

When applied together, the time and location elements refer to congestion charges and are increasingly being used in transport systems across the world.[44] These charges are usually levied when users drive on overcrowded roads, such as during peak times in the city centre.

The principal aim of congestion charges is to induce an orderly use of roads. Unlike Soviet-style rationing of road space by widespread queuing, congestion charges harness the power of markets to adjust the demand for road use.

In a world first, Singapore introduced congestion pricing in 1975 and an electronic system using overhead gantries throughout its busiest districts in 1997. Now, it is preparing to implement a satellite-based system in 2020. Several other countries – including the United States, Britain, the Czech Republic, Malta, Italy, Sweden, Norway and United Arab Emirates – have followed suit, adding congestion charges under different technologies and rules.

New Zealand is well placed to implement a comprehensive, world-class road pricing scheme. As an island economy with a unitary government, we do not face the regulatory hurdles in other jurisdictions such as in the United States and the European Union. In addition, emerging technologies, international case studies, and our own experience with distance-based road user charges show that road pricing is ours for the taking.

The science of pricing road use

The idea behind charging drivers in proportion to their road use is not new. In 1776, Adam Smith wrote:

> When the carriages which pass over a highway or a bridge, and the lighters which sail upon a navigable canal, pay toll in proportion to their weight or their tonnage, they pay for the maintenance of those public works exactly in proportion to the wear and tear which they occasion of them. It seems scarce possible to invent a more equitable way of maintaining such works.[45]

Such a beneficiary-pays structure is at the core of road pricing. The rationale is that allocating direct costs to users leads to an efficient – and arguably fair – use of resources.

For centuries, user-pays systems have been integral to government funding of road infrastructure. Yet, modern economic theory

has extended road pricing beyond the physical *wear and tear* of infrastructure to cover the indirect cost of congestion.

As vehicle usage increased beyond road capacity at *specific times and locations*, traffic congestion has become a common feature. Too many drivers on congested roads today not only contribute to the wear and tear of infrastructure but also impose additional costs on society by delaying the movement of goods and people. Empirical studies also show that congestion increases pollution emissions, the likelihood of car crashes, and noise levels.[46]

To deal with the problem, governments could raise road use charges and force drivers to internalise the social costs of contributing to congestion. The higher the user fee on a congested road, the lower will be the number of drivers willing to pay for driving on it at a specific time, therefore reducing congestion levels. In this sense, congestion pricing is a corrective charge – or a Pigouvian tax, named after English economist Arthur Pigou[47] – to achieve socially efficient road use. Faced with higher congestion charges, drivers could opt to commute via alternative modes (e.g. public transport or cycling), choose other transport routes, or combine multiple trips into a single one.

However, it was through the seminal work of Nobel-laureate William Vickrey in 1963 that road pricing gained its modern scientific treatment.[48] Vickrey noted that congestion charges could be used to prevent traffic gridlocks *without necessarily reducing car usage*: "You're not reducing traffic flow, you're increasing it, because traffic is spread more evenly over time."[49]

Vickrey's revolutionary idea was to use dynamic (i.e. time-varying) charges to induce drivers to adjust their departure times so that road capacity is not reached – and traffic bottlenecks are prevented.

For instance, let us assume a certain city centre can accommodate an even flow of 1,000 vehicles per hour without congestion delays, meaning up to 3,000 vehicles could pass through in a three-hour period as long as no more than 1,000 cars do it any single hour. If 1,200 cars drive to the city centre in the first hour, it will cause a gridlock that reduces the traffic flow to, say, 400 cars per hour for the next two hours. Dynamic congestion charges can therefore allow more cars to pass through the roads as opposed to unrestricted road access.

The benefits

Road pricing usually has three potential roles.[50] First, it charges drivers for the roads they use. In this sense, road pricing is not a tax but a cost fee such as distance-based road charges or fixed road tolls to pay for a particular road infrastructure.

Second, road pricing targets congestion by harnessing market forces to efficiently use roads by rationing car travel demand (Pigouvian tax) and/or by managing an orderly traffic flow (Vickrey's dynamic charges).

Third, governments can implement road pricing to alleviate other forms of transport funding (i.e. revenue neutral), fund other transport modes (e.g. public transport, cycleways), or even fund unrelated activities (i.e. as a general form of tax revenue).

Regardless of the purpose, governments should always be aware that road charge payers expect to benefit from their payments. Otherwise, there is a high potential of public backlash, delegitimising road pricing. Clear communication and proper use of policy targets and tools are an integral aspect of any successful road pricing scheme.

Well implemented road pricing schemes offer several documented benefits.[51] Apart from

reducing congestion and ensuring a steady revenue to maintain current road infrastructure and other related expenditures, it also provides valuable information on consumer travel demand on where to build new roads and highways. In addition, it guarantees a level playing field among competing transport modes (e.g. cars versus public transport) as well as competing road financial structures (e.g. tolled versus non-tolled roads).

Further, by tackling congestion, road pricing also enables shorter, safer and more reliable household and commercial trips, which increase productivity and labour market access as well as decrease fuel consumption and related pollution emissions.

The international experience

Using distance-based user charges and direct tolls to fund roads, highways and bridges is now a common reality in jurisdictions across the globe. In 2015, approximately 50 countries – including New Zealand – had at least one significant electronic toll collection (ETC) or road user charging (RUC) scheme; by 2025, it is expected to rise to more than 60 countries.[52] If we include fuel taxes as a proxy for distance-based road pricing, then all OECD countries except Mexico have some form of excise duty embedded in the final price of petrol.[53]

On the other hand, the time-and-location elements of road charges, i.e. congestion pricing, is not still not universal. But its implementation has been on the rise in several metropolitan areas across the world, particularly in the past 15 years as technological advancements have significantly reduced the implementation costs of congestion pricing.

Starting with a paper-based scheme in Singapore in 1975, congestion charges are now levied in jurisdictions such as Oslo (since 1990), Orange County, California (1995), Houston, Texas (1998); Durham (2002), London (2003), Taipei (2006), Stockholm (2007), Virginia (2012), Milan (2012), Dubai (2013), Gothenburg (2013), and New York (expected to go into effect in 2021).[54]

Congestion charging schemes come in many shapes and forms, which shows the flexibility of road pricing in addressing the particular challenges in each jurisdiction. A common thread, though, is imposing direct user charges to reduce traffic congestion.

The main conceptual types of congestion pricing are:[55]

- **Variably priced lanes:** Variable tolls on different lanes within the same motorway, such as High-Occupancy Vehicle (HOV) lanes, only allowing vehicles with a minimum number of passengers; High-Occupancy Toll (HOT) lanes, which exempt HOVs from toll charges; and Express Toll lanes, with no exemptions based on the number of passengers. This congestion pricing scheme is particularly common in the United States, with more than a thousand HOV/HOT/Express Toll lanes across the country.
- **Corridor-based:** Variable congestion charges on an entire roadway (or roadways) such as in Singapore and Dubai.
- **Area-based:** Variable or fixed charges at specific times of the day for driving within a certain boundary, such as the congestion pricing schemes in London and New York.
- **Cordon-based:** Similar to area-based congestion pricing but charges only apply if one is crossing the boundaries of a ringed area (e.g. Stockholm and Gothenburg).
- **Network-based:** All roads are potentially subject to charges, such as in the upcoming satellite-base system in Singapore starting in 2020.[56]

Public (mis)perception

If congestion increasingly affects the movement of people and goods in metropolitan areas, if no one likes to be stuck in traffic, and if robust evidence shows road pricing is the single-most viable and sustainable approach to reduce congestion, then congestion pricing should have widespread public support – except it does not.[57]

Public opinion surveys conducted *before implementing* congestion pricing in the United States show that about 70% of respondents opposed the idea.[58] In New Zealand, similar surveys show that fewer than a third of the public openly support congestion charges.[59]

However, follow-up surveys show significantly reduced public rejection *after implementing* congestion charges.[60] In the United States, road pricing rejection is about 30% after the system is fully operational.[61] In New Zealand, once road pricing is explained well, a majority are open to the government introducing network-wide road charges in the future.[62]

A similar change of heart happened in Stockholm: Before implementation in 2006, public support for congestion pricing was below 40%; by 2011, it was nearly 70%, and above 50% even among people who pay the most fees.[63]

The differences between surveys *before* and *after* implementing congestion pricing indicate that public opposition is driven by misunderstandings and fears about the new system.

To address the public's concerns, political leadership must clearly communicate the gains from road pricing. In particular, New Zealand drivers must understand they already pay for distance-based road pricing through either petrol taxes or road user charges. They also pay for congestion through lost hours idling in traffic.

In New Zealand, hypothecation of land transport revenues has been the rule since 2008.[64] It would thus be wise to go for a revenue neutral strategy: Every net dollar raised through congestion charges should be offset by, say, a dollar less through property rate collection or lower fuel taxes.

Second, public authorities should commit to improving the supply of travel options, including appropriate funding for more and better roads and public transport.

Without the safeguards, a road pricing regime could risk becoming a money-making machine, penalising drivers with no alternative but pay for something they used to have for free – and still have the congestion.

Road pricing is ultimately a user-pays system, so drivers are entitled to expect a direct relationship between what they pay for and what they get in return. Otherwise, public fears of congestion pricing being "just another great big tax on everything" would be warranted.[65]

Also, valid concerns about the right technology pick, data privacy matters, and equity effects of congestion charges on different households must be addressed – as discussed in the following chapter.

CHAPTER 4

Addressing valid concerns

Summary

Road pricing is an effective way to fund road infrastructure and manage congestion – the alternative being car queuing and blunt revenue tools (e.g. fuel taxes as a proxy for distance travelled). But implementing a road user charge system based on distance, time and location raises valid concerns about technology (how would data be collected and at what financial cost), privacy (what type of data would be harnessed and who would have access to it), and social equity (distributional costs on road users).

For long, road pricing rules were limited by technological constraints. Not anymore. There are already many – and counting – competing digital tools to implement road pricing (e.g. dedicated short-range communications; automatic number plate recognition; satellite-based global navigation systems; in-vehicle telematics; and mobile communication networks).[66] As digital cost plummets and implementation flexibility rises, the right technology should be picked based on road pricing goals rather than the other way around.[67]

Advances in road pricing technology are generating copious amounts of data, so motorists' concerns about their privacy are warranted. Fortunately, we can tailor the regulations to curb big-brother's unreasonable surveillance by establishing the proportionality to purpose and need of the data collected, as well as reassuring the ownership and control rights of private and commercial data.

Lastly, social equity concerns are a key element in public apprehension about implementing congestion pricing – even though research shows the distributive impacts of such road user charges are small, and no more regressive than fuel taxes.[68] Public authorities should commit to a revenue neutral principle on congestion charge receipts, while improving public transport alternatives.

Technology

"With little ingenuity, it is possible to devise methods of charging for the use of the city streets that are capable of adjusting the charge in close conformity with variations in costs and traffic conditions", wrote Vickrey, the father of road pricing theory, in 1963.[69] Little did he know it would take more than 50 years for technology to catch up with his vision.

That time has come. Recent innovations in information and communications technology (ICT) systems are now widely available to revamp how cities manage and fund land transport. Further, improvements in automatic number plate recognition (ANPR) and global navigation system by satellite (GNSS) mean a new era of road pricing is underway. For example, the cost of a reliable, secure and private GNSS device has fallen from around $1,000 in 2005 to less than $100 now.[70]

In addition, reduced smartphone prices and applications means drivers now have better access to real-time information to make decisions on their best use of road transport. Ridesharing companies already collect at a minimal cost information on distance, time and location to calculate routes and the cost of trips.

Such technological breakthroughs are vital for the next generation of road pricing schemes, allowing data-driven, flexible pricing adjustments

to maximise optimal traffic flow at the lowest cost.

New Zealand is already a leading force in the electronic road user charge revolution, including exporting the technology to other countries. In 2014, Auckland-based company EROAD successfully helped implement the first GPS cellular based electronic weight-mile tax solution in North America.[71]

New Zealand's Electronic Road User Charges (eRUC) – a distance-based road pricing digital system for diesel-powered vehicles – was launched in 2010 and already accounts for more than half the total road user charge receipts.[72] Under eRUC, small, novel and affordable gadgets attached to a vehicle use GPS technology and the mobile network to process information, while seamlessly collecting road pricing payments.

Adding the collection of information on time and location for congestion charges to the eRUC scheme is not a major technological challenge. As long as the government focuses on setting the data requirement standards, as it currently does, private companies would compete in different ways to provide the service, letting drivers pick the best price-service bundle that fits their needs.[73] Moreover, expanding eRUC to all vehicles (and replacing fuel excise duties) would create economies of scale for further cost-saving innovations.

As a positive spill-over of emerging tracking technologies, massive amounts of road use data have the potential to give birth to novel applications, such as automatic payments for on-street parking, customised car insurance policies, and traffic planning enhancements.[74] New Zealand could be a hub of new markets on transport technology services. But for that to happen, privacy concerns need to be adequately addressed.

Privacy

Questions surrounding the motorist's right to privacy about the data collected are a legitimate concern. Such data might already be caught by private companies through mobile phone apps for commercial purposes, but the public might be more reluctant to *mandatorily* share this information with state authorities.

In any case, these fears and concerns are not insurmountable in practice.

In America, electronic tolling agencies ensure data privacy by linking the vehicle's on-board unit transponder and the driver's personal information to a generic internal account number. For further protection, none of the de-identified information collected is disclosed to other organisations; and motorists can choose to pay anonymously via pre-paid accounts.[75]

In Germany, the GPS-based Toll Collect GmbH user charge system for motorway trucks protects data by only allowing queries to generate a bill, with no central record of the vehicle's movements. Once the bill is paid, all usage data is deleted. Likewise, Toll Collect GmbH's roadside enforcement cameras only check whether the vehicle's registration has any outstanding bills or police warrants; if not, the data is immediately erased.[76]

In New Zealand, the government has restricted data access to motorists' total distance travelled under eRUC to calculate the road user charges due. All telematic and location data are securely kept between the eRUC provider and users according to private contracts.[77]

Should New Zealand upgrade its eRUC regime to a network-wide road pricing scheme (i.e. covering the road use of all drivers based on distance, time and location), further consideration of the treatment of motorists' data is warranted. Given the pervasiveness of

road pricing data, we need to have a national conversation about the extent and security of government access to traffic data, particularly regarding law enforcement and safety.

New Zealanders are relatively comfortable trusting government with their data. A prime example is Statistics New Zealand's Integrated Data Infrastructure database, which combines sensitive data on the life events (such as education, income, benefits, migration, justice, and health) of all citizens and residents in the country.[78] But road pricing should not give carte blanche to the government to collect widespread data on road use.

For instance, New Zealanders might agree to the government accessing their personal road use data to investigate car accidents, including catching hit-and-run offenders. Yet, not many would like the state to automatically prevent road speeding – as the European Union is set to do from 2022.[79]

In accordance with New Zealand's privacy laws, road pricing legislation should reinforce basic freedom from unreasonable surveillance. This would establish the proportionality to purpose and need of the data collected, as well as reassure the ownership and control rights of private and commercial data.[80]

Surveys conducted by the New Zealand Privacy Commissioner and the New Zealand Automobile Association confirm that New Zealanders are indeed concerned about individual privacy and protecting personal information under an electronic road pricing scheme.[81]

In particular, respondents said their concerns about sharing road use information included "reason the information is required", "type of personal information", "how securely the information is stored", and "strict controls on who can access the data and how it is used".[82]

Summing up, privacy concerns are justified but can be adequately accommodated by technology and a measured approach imposing limits on road data surveillance and use.

Social equity

The social impact and fairness of road pricing also contribute towards public wariness of congestion pricing. For one, there are several multifaceted definitions of what is fair.[83] The distributional costs and benefits of road pricing can be gauged through many standpoints such as the ability to pay user charges (vertical equity), the extent of road use (market equity), geographical location of road users (horizontal equity), and the impact on the mobility of vulnerable socioeconomic groups (social equity).[84] These valid perceptions on fairness do not always point in the same direction, and subjective discretion plays a decisive role in final assessments.

This is not to say that broad agreements on a *fair* road pricing design cannot be reached – particularly when contrasted against the current equity environment based on congestion-invariant, potentially regressive fuel taxes and limited resources for transport alternatives. As Transport Minister Phil Twyford notes, "A failure to provide public transport is likely to have a far more regressive impact than charging for congestion on the roads."[85]

Pivotal to most road pricing schemes are those who value time (businesses and high-income drivers) and will bear most new user charges to benefit from less congested roads.[86] This might seem to support pricing out low-income households and making them worse off under the new policy. But this is not necessarily the case.

First, low-income households are more likely than affluent ones to use public transport, and need not be directly affected by new road user charges.

Second, while priced-out low-income drivers could be forced to use a less preferred travel mode, travel less, or depart at less convenient times, they would benefit from faster, more reliable public transport commutes.

Third, low-income motorists might still benefit from a congestion-free drive on occasions when they place a high value on their time, such as being late for work, missing a doctor's appointment, or facing late pick up fees at childcare.

Fourth, society as a whole, including low-income families, will benefit from higher productivity (and therefore higher wages) from more efficient road use and mobility.

The economics literature says the overall distributive impacts of road pricing are small – and no more regressive than fuel taxes.[87] International case studies show the majority of road users are better off, with lower income groups benefiting the most.[88] Related studies found broad support across all income groups for congestion charges after implementation.[89]

But distributional effects of road pricing are complex and context dependent on factors such as geographical dispersion, car dependency, availability of transport alternatives, flexibility of policy design, and use of road charge revenues.[90] There is no one-size-fits-all road pricing solution. At times, road pricing can even impose financial hardship on at-risk groups (e.g. single parents with dependent children, people with disabilities, and households with difficult access to public transport).

In general, the blunter the road pricing scheme, the harder it will be to address unintended effects on social equity. Time-varying, network-wide road-user charges are likely to have the lowest distributional impact. They would capitalise on the ability of users to adapt their behaviour at the least cost option – a feature not available under our current distance-based, time-invariant fuel tax road pricing regime.[91]

For instance, different time-and-location charges are sufficient to lessen the adverse effects on low-income earners who work night shifts or have limited alternatives to car use.[92] In regional areas like Auckland, where bottleneck congestions are pervasive, dynamic congestion charges would help better spread the traffic without penalising the flow.

Concluding remarks

This report shows that congestion is the new normal in major urban centres across the nation. Slower speeds, longer and unreliable trip times, and increased vehicular queueing are obstructing the lifeblood of our commerce and community. That means lower productivity growth (i.e. lower wages and higher living costs), weakened social interactions, worse safety standards, and increased pollutant emissions.

Behind this clogged reality is our national preference for cars as the favoured means of transport – particularly when the current transport funding system does not fully capture the social cost of congestion.

With more than 4 million vehicles on our roads, New Zealand is among the top 10 countries for vehicle ownership per capita. Nine out of 10 New Zealand households own at least one car, with the majority of families having two or more vehicles.

Our love for cars is set to keep increasing on the back of a stronger economy, larger population and increased inbound tourism. Baseline forecasts project vehicle mileage travelled will jump by a third in the next two decades.

What we need is a better road management strategy, starting with revisiting our land transport budget process.

On the expenditure side, we need to promote all transport modes, and attend to the quantity and quality of our roads. We may not be able to build ourselves out of congestion, but we can invest more and better in roads.[93]

Our state highways are a case in point. About 98% of the network comprises single-carriageway roads (one lane in each direction), rendering our "highways" a misnomer.[94] Further, 95% of our open roads do not have the safety standards to support current speed limits.[95]

On the funding side, we need to emphasise the beneficiary-pays principle, correctly pricing the costs of road use – including the costs of adding another car on a congested road.

New Zealand is already a leading player in road user charges, correctly pricing the use of diesel vehicles on mileage travelled. But we need to go further.

First, we need to move away from fuel excise duty, which is a poor proxy for distance-based pricing and a blunt fiscal tool to deal with tax equity issues. Arguments that petrol taxes address environmental concerns should be treated outside the transport budget through a strengthened emissions trading scheme and a regulatory framework.

Second, neither fuel excise duties nor road user charges currently price the negative externalities of congestion. Hence, we encourage New Zealanders to welcome a comprehensive road pricing scheme based on distance (mileage travelled), vehicle type and weight (road maintenance effects), time (peak and off-peak periods), and location (different roads and lanes might have different fees).

Such a road pricing system has the potential to increase the accountability of funding and expenditure of the land transport system, while imposing a measured and cost-effective use of roads.

Apart from resourcing a steady and aligned flow of funds to maintain current road infrastructure and other targeted expenditures, road pricing

provides valuable information on consumer travel demand on where to build new roads and highways. It also guarantees a level playing field among competing transport modes (e.g. cars versus public transport) as well as competing road financial structures (e.g. tolled versus non-tolled roads).

Further, by tackling congestion, road pricing also enables shorter, safer and more reliable household and commercial trips, which increase productivity and labour market access as well as decrease fuel consumption and related emissions.

International experience already provides several road pricing best-practices (and a number of implementation mistakes to avoid). With the improved and cheaper technology, concerns about operation costs and privacy are no longer impediments.

Likewise, the more flexible transport funding becomes, the more feasible it becomes to address social equity concerns.

Evidence for all these benefits is the unmistakable surge in public support for road pricing after its implementation.

Road pricing works. And New Zealand should welcome it as the road to a better travel experience.

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New Zealand needs a land transport system that is fit for purpose. That means a wide range of transport options that are safe, reliable, environment-friendly and cost-effective. The current transport environment fails to hit that mark. We need to, and we can, do better.

This report shows how a road pricing system – where road users pay charges based on distance, time, location, and vehicle type and weight – can promote transport funding transparency and accountability, while addressing the increasing traffic congestion woes in New Zealand.

This study also addresses valid concerns on road pricing about emerging technology, user data privacy, and equitable socioeconomic impact.

The case for road pricing is not new, with close to a hundred years of academic research backing it and plenty of international case studies validating it.

Among transport experts, there is widespread agreement that charging drivers with higher road user rates at peak times in congested routes is the single-most effective way to deal with traffic bottlenecks while providing additional incentives to increase public transport use.

Instead of Soviet-style rationing of road space by widespread queuing, such congestion charges would harness the power of markets, encouraging commuters to find trip alternatives such as other travel times, routes and transport modes. In return, government should commit to improve the supply of travel options – including appropriate funding for more and better roads.

Road pricing enhances the mobility of commerce and community. That means higher productivity growth (i.e. higher wages and lower living costs); faster, safer and more reliable road trips; greater labour market access and efficient urban land usage; appropriate economic incentives for public transport and active travel modes; and lower carbon emissions.

The report concludes by highlighting New Zealand's well-placed position to implement a comprehensive, world-class road pricing scheme.

A brave new world awaits us – but only if we transport ourselves in the right direction.

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