



Ministry of **Transport**
TE MANATŪ WAKA

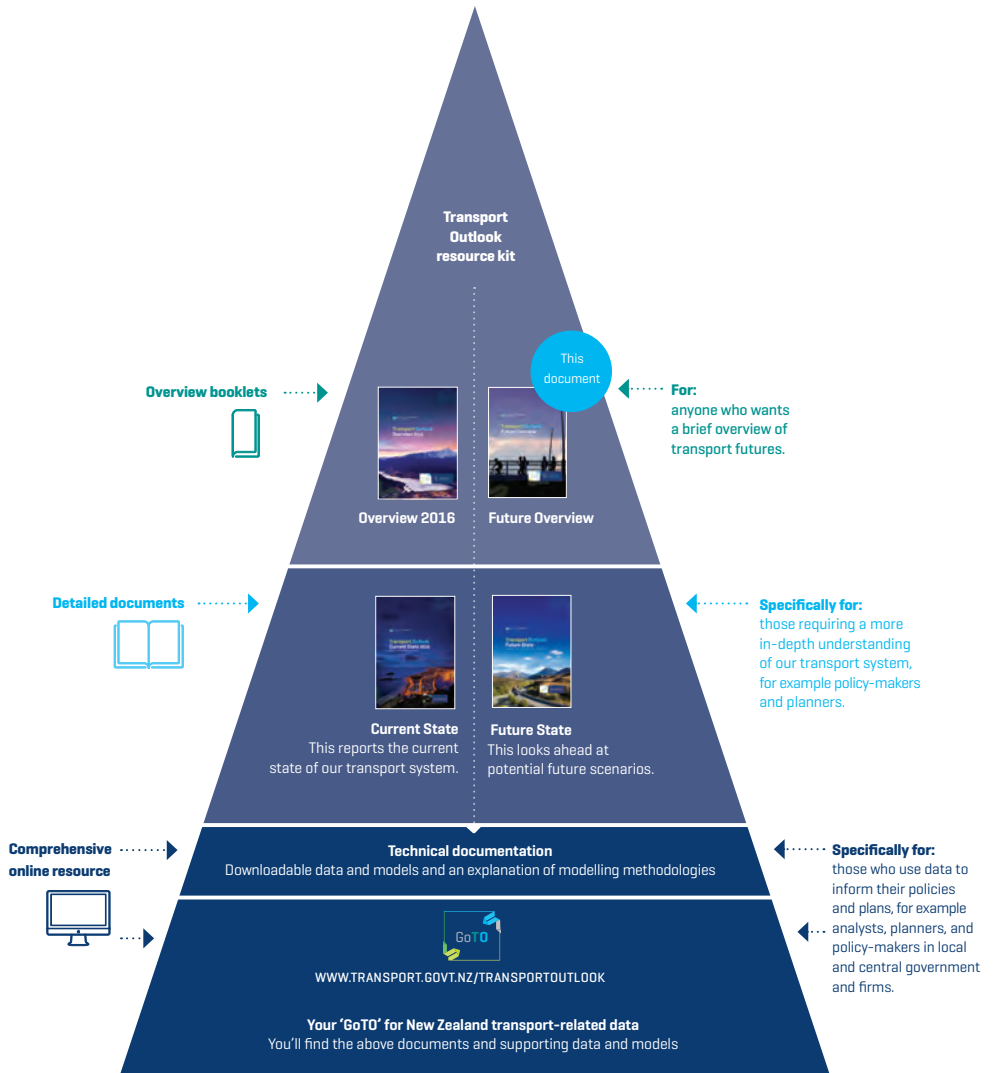
Transport Outlook Future Overview

A summary of transport futures for New Zealand



TRANSPORT.GOV.T.NZ/
TRANSPORTOUTLOOK

Your 'GoTO' for transport-related data
November 2017



Me mātau ki te whetū, i mua i te kōkiri o te haere

Before you set forth on a journey, be sure you know the stars

In the past, we referred to the stars to help show us the way.

Nowadays, we live in a world full of emerging technology – but knowing how to access the right data to help guide us forward is not easy.

This is why we have created this Transport Outlook.

It gathers, collates, and analyses different clusters of transport-related data to help us navigate where we should go.

We call this Transport Outlook our 'GoTO', as it will play an increasingly pivotal role in helping to steer the New Zealand transport sector forward.



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About this report

Transport plays a major role in New Zealand's society and economy. It supports job creation and our social, cultural, and sporting activities, and it's key for our international trade and tourism. That's why it's important to understand what may happen in future in our transport sector.

This *Transport Outlook: Future Overview* booklet is a summary of the *New Zealand Transport Outlook: Future State* report that provides a base of common information, assumptions, and projections for those involved in transport policy and planning.

The starting point for our projections is 2012/13 as much of our data is taken from the 2013 Census. However, the start and end dates vary depending on the availability of data and the limitations of our models. This document does not represent government policy proposals or plans.

"I encourage you to **contribute** to the discussion on the future of our transport system."

Peter Mersi,
Chief Executive, Ministry of Transport



What might we see in the future?

The future of transport is exciting. Here are a few changes that we may see in the transport sector over the next 25 years.



Increased demand for public transport and walking and cycling facilities as inner-city living becomes more popular and younger New Zealanders become less car-centric



A shift from car ownership to car usership as ride-share and vehicle-share schemes become more popular



Self-driving vehicles a more common sight, providing opportunities for people who don't currently drive, such as the elderly, young, and disabled



Reduced greenhouse gas emissions due to an increase in the number of electric vehicles and more fuel-efficient conventional vehicles



Massive investment in airport and cruise ship facilities with increased tourism and a doubling in the number of domestic air passengers



Huge demand for transport infrastructure as economic and population growth concentrate in the upper North Island while some rural areas struggle to maintain their roading networks ...

... but with new developments in information and communication technologies, potential dispersal of the workforce and transport demand outside the main cities



Negative health effects if the trend continues for New Zealanders to walk and cycle less



Growth in freight tonnage across all modes [road, rail, coastal shipping] with road freight slightly increasing its market share



Larger freight vessels visiting fewer ports, leading to increased competition between ports and investment in port facilities and land transport routes to/from the ports



New freight delivery technologies such as drones, robots, and driverless vans

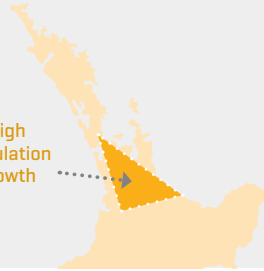


Key insights

Various factors influence our transport system

Our population is growing, but unevenly with most growth in the 'golden triangle' (Auckland, Waikato, Bay of Plenty)

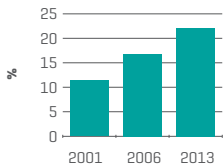
High population growth



Household incomes are increasing and this may mean more travel, mostly by car



% of population aged 65+ in the workforce



Our population is ageing and more older New Zealanders remain active in the workforce



What is ride-sharing?

Sharing a vehicle with other people going in the same direction. The trip might require extra time and distance to pick up and drop off other passengers

Similar to our current airport shuttles

There could be a driver or the vehicle might be self-driving

↓
Travel costs, traffic congestion, and emissions are reduced.



What is vehicle-sharing?

Hiring a vehicle for a short time, for example for a few hours or a few days

Similar to traditional car rental but more suited for shorter periods

Vehicles are often parked around the city, can be booked online or via an app, and are usually unlocked with a code

Self-drive vehicles could pick you up from your doorstep: a real game-changer!

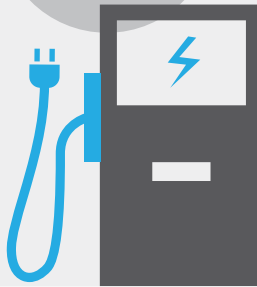


Attitudes toward transport are changing among young people with fewer applying for a driver licence



New technologies such as electric vehicles are emerging

Electric vehicles projected to account for about **40%** of the vehicle fleet by 2040



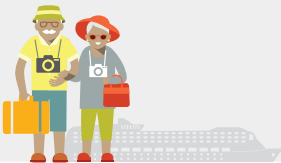
At the same time, other technologies such as online networking and shopping are becoming a substitute for transport



Our trade with the world is growing, which means that our ports and airports are getting busier



More international tourists are visiting New Zealand and New Zealanders are making more overseas trips



More people are living in the inner city, which increases demand for public transport and walking and cycling infrastructure



There's more than one possible future

To project the shape of the future transport system in 2042/43, we looked at current trends and developed a base case

B Base Case

- slow, non-disruptive technological changes
- medium economic and population growth, focused on the Auckland/golden triangle areas
- electric vehicles make up a significant share of the vehicle fleet
- 20% of current private vehicle trips shift to vehicle-sharing



🎯 Staying Close to the Action

- medium economic and population growth
- people prefer to live in the central city and inner suburbs
- regular commuting remains the norm
- ride-sharing, public transport, walking, and cycling are popular
- Auckland and Wellington have demand management road pricing
- 40% of current private vehicle trips shift to vehicle-sharing



Less dispersed population growth

▲ Golden Triangle

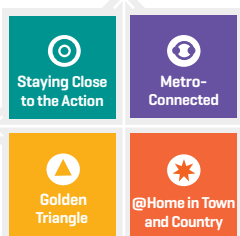
- fast population and economic growth
- many employers locate in Auckland and the broader golden triangle
- sprawling suburbs emerge and suburban lifestyles are popular
- many vehicles are electric
- car ownership falls: 60% of current private vehicle trips shift to vehicle-sharing
- self-driving vehicles are common
- freight tonnage in the golden triangle grows strongly



We also considered four alternative scenarios

Medium economic and population growth

New technology is adopted at a moderate pace



People prefer to connect face to face through the use of transport technologies

People prefer to connect with each other through the use of information and communication technologies

New technology is adopted at a rapid pace

Higher economic and population growth



Metro-Connected

- with improvements in information and communications technologies, employers can distribute their operations across the country
- medium population and economic growth in all large towns and cities
- regular commuting remains the norm, but not necessarily on a daily basis
- 40% of current private vehicle trips shift to vehicle-sharing
- online interaction and shopping are common
- domestic air travel increases as colleagues working remotely occasionally visit head office
- freight tonnage grows across all regions as the population becomes more dispersed



More dispersed population growth



@Home in Town and Country

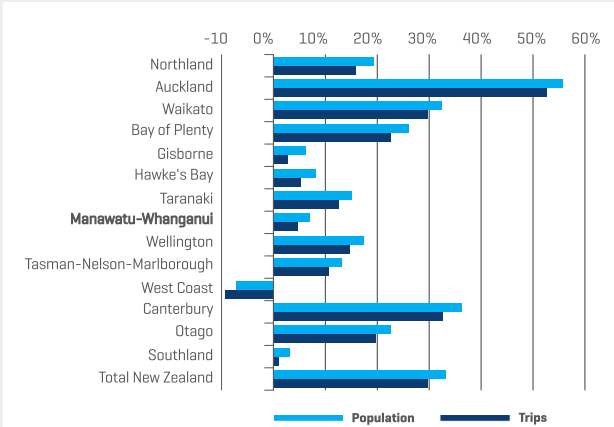
- fast population and economic growth
- many people can work almost anywhere including in small towns and rural areas
- working from home is now the norm
- with self-driving vehicles, many people give up on vehicle ownership
- 80% of current private vehicle trips shift to vehicle-sharing
- people travel less for local trips as they keep in touch with friends, family, and work colleagues through information and communications technologies
- with a more dispersed population, there are more flights to regional centres
- freight tonnage grows across all regions as the population becomes more dispersed



How New Zealanders travel in towns and cities

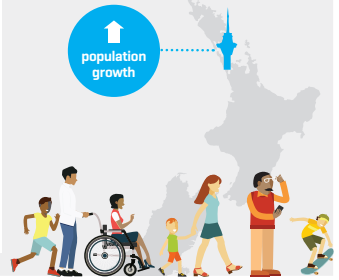
Base Case

B Base Case: projected % change in regional population and number of trips [2012/13 to 2042/43]¹

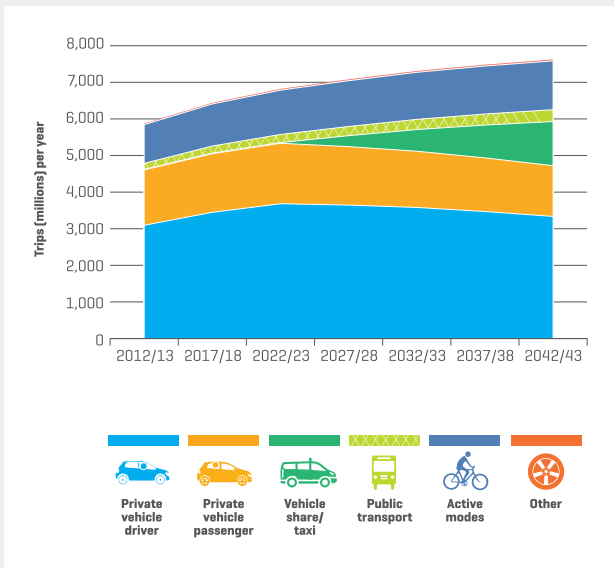


Travel tends to rise as the population increases

Auckland accounts for over half of the increase in total trips across New Zealand due to its share of population growth



B Base Case: projected number of trips by mode²



Despite slightly reduced trips per capita, population growth means a projected increase in trips by all modes: a 30% increase from **5.9 billion trips** in 2012/13 to **7.6 billion trips** in 2042/43.




Alternative scenarios

	Total trips per annum	Public transport trips	Public transport % share of trips	Walking trips	Cycling trips
Baseline [2012/13]	5.9 billion		3%		
B Base Case [2042/43]	7.6 billion	Up 100%	4%	Up 25%	Up 20%
C Staying Close to the Action [2042/43]	7.6 billion	Up 260%	8%	Up 50%	Up 250%
D Metro-Connected [2042/43]	7.5 billion	Up 60%	4%	Up 40%	Up 130%
E Golden Triangle [2042/43]	7.8 billion	Up 60%	3%	Up 30%	Up 75%
F @Home in Town and Country [2042/43]	7.4 billion	Up 40%	3%	Up 25%	Up 80%

What might we see in the future?

Many more electric vehicles




Self-driving vehicles ordered through apps – a shift to ‘mobility as a service’: cheaper travel, no need to own a private vehicle, improved access for people who currently don’t drive




Demand management pricing to ease road congestion



A blurring between ‘private’, ‘shared’, and ‘public’ transport – ‘public transport’ could be any mode that a user can hire, purchase, or share



Point-to-point services, for example direct services to shopping centres, hospitals, large work sites, or from outlying areas to public transport hubs



Air travel

Population growth, rising incomes, lower airfares, more flights, and growth in tourism boost demand for air travel

Projected increase in domestic travel: origin-to-destination departures (2015 to 2043)

B Base Case

92%

Increase led by Queenstown (tourism growth) and Auckland (population growth)



🎯 Staying Close to the Action

92%

Same as Base Case: population size and distribution are the same



🏙 Metro-Connected

108%

More travel as work colleagues interact online across New Zealand but visit HQ every now and then



▲ Golden Triangle

265%

Fast economic and population growth



★ @Home in Town and Country

334%

Fast economic and population growth
More travel as work colleagues interact online across New Zealand but visit HQ every now and then



Origin-to-destination departures

departures from one region to another – could involve a connection

Example
Hokitika
– connection in
Christchurch – Napier
is one departure from
West Coast to
Hawke's Bay



Leg-based departures

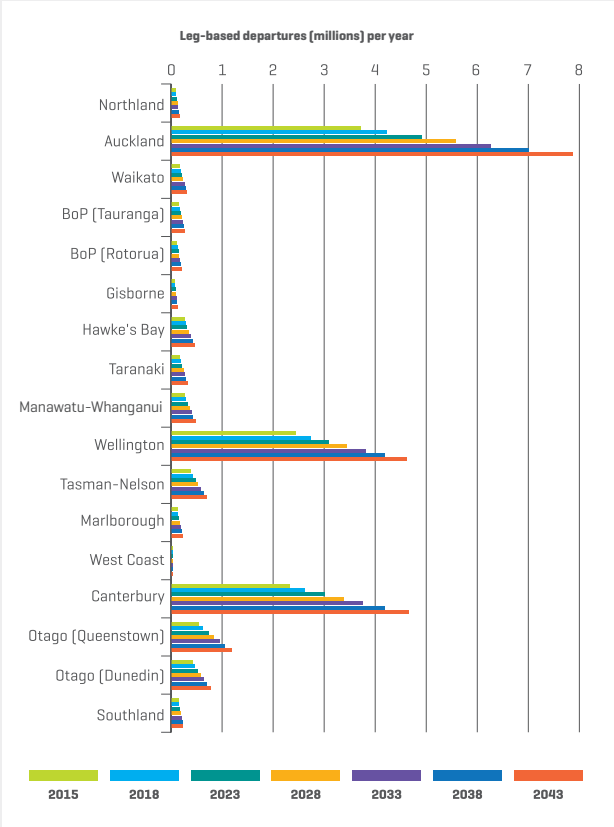
actual departures from an airport, including connecting travel

Example
Hokitika
– connection in
Christchurch – Napier
is two departures: West
Coast to Canterbury,
Canterbury to
Hawke's Bay



Projected leg-based domestic departures Base Case

B Base Case: projected leg-based departures by region of airport³



Under the Base Case, leg-based departures are projected to roughly double between 2015 and 2043

Queenstown airport is projected to experience the largest growth of about **120%**

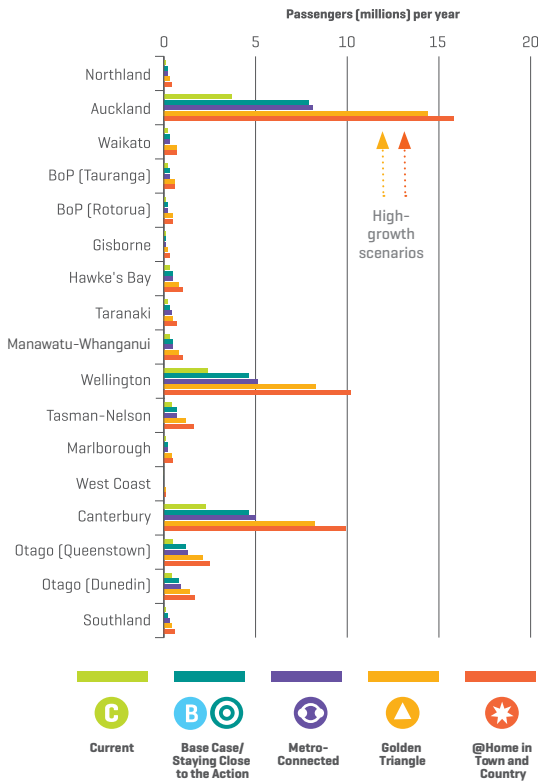
Auckland airport is projected to experience the second largest growth of about **110%**

Passenger numbers for Auckland, Wellington, and Christchurch airports are high because of their local populations and also because passengers on regional flights pass through these 'hub' airports



Alternative scenarios

Projected leg-based domestic departures by region of airport [2043]

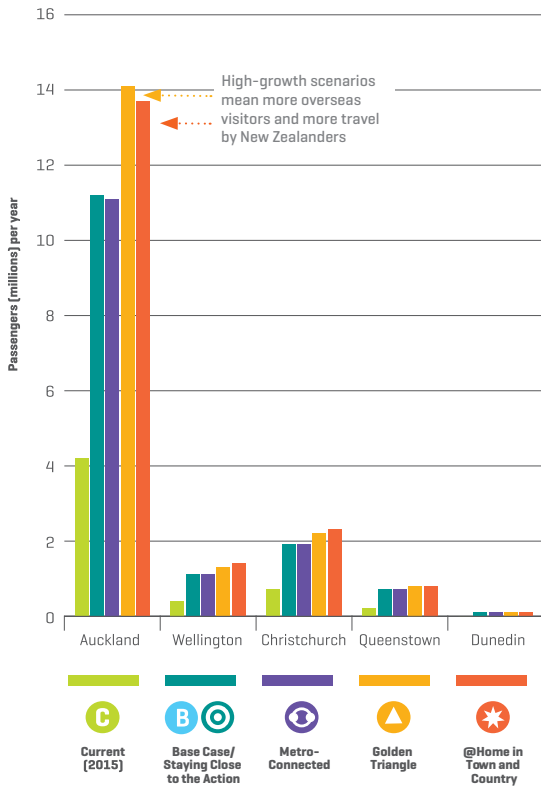


At a national level, the population, GDP, and tourism assumptions for the three moderate growth scenarios (Base Case, Staying Close to the Action, and Metro-Connected) are identical and their results at a national level are also identical. Similarly, the two high-growth scenarios (Golden Triangle and @Home in Town and Country) also give identical results at the national level.



Projected leg-based international departures

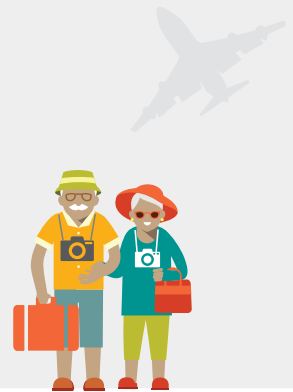
Projected leg-based passenger departures on international flights (2043)



Departures through all five international airports more than double as New Zealand residents take more trips and more international visitors enter and leave the country

Auckland’s three-quarter share of international departures remains constant

Transit passengers are excluded



Most airports will need to invest in their facilities for passengers and planes

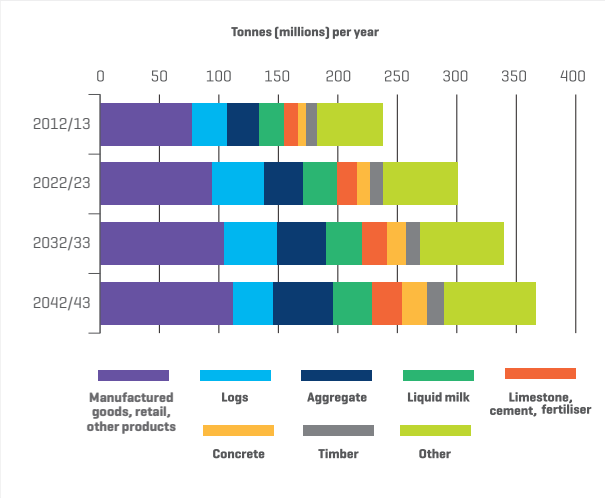
Land transport routes to/from airports will also need to be improved



Freight

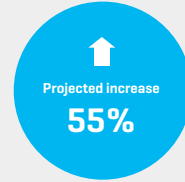
Base Case

B Base Case: projected freight movements⁴




Freight tonnage is projected to increase by about **55%**, from **237 million tonnes** to **366 million tonnes**


Manufactured goods/retail/other products contribute most to growth



B Base Case: projected freight by mode [million tonnes and % share]

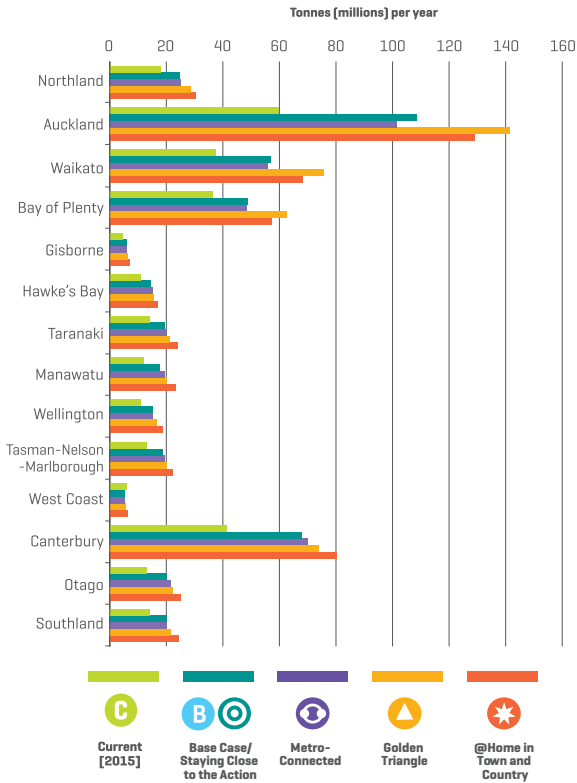
	2012/13	% share 2012/13	2022/23	2032/33	2042/43	% share 2042/43
Road	217	91.4%	277	315	340	92.8%
Rail	16	6.8%	19	20	21	5.6%
Coastal shipping	4	1.8%	5	5	6	1.6%
Total	237		301	340	366	

 Coastal shipping affected by projected slow growth in petroleum shipments from Marsden Point

 Rail tonnage affected by projected reductions in coal and slow growth in log volumes

Alternative scenarios

Projected freight tonnage [2042/43]



Auckland has the largest tonnage – because of the size of its population and its port, and also because it has many national distribution facilities

Canterbury has large freight volumes as the main population and distribution centre for the South Island.

Sum of freight that moves within a region and the freight into and out of a region

Metro-Connected

freight more dispersed across large towns and cities



Golden Triangle

higher freight volumes in Auckland, Waikato, Bay of Plenty



@Home in Town and Country

freight more dispersed across all regions



99% of merchandise imports and exports by volume pass through our sea ports. In future international shipping companies might send larger freight vessels to fewer New Zealand ports. This might mean:

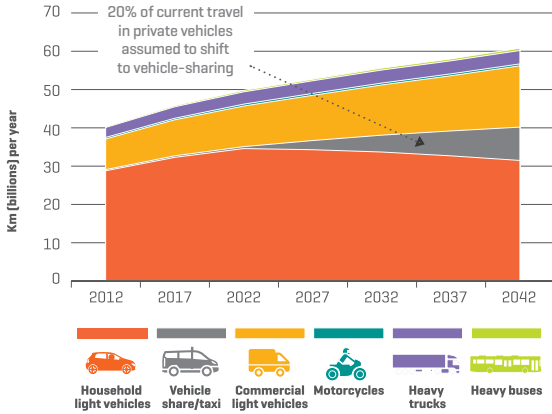
- increased competition between ports and investment (including potential over-investment) in port infrastructure
- pressure on road and rail networks to and from the ports as larger vessels load and unload
- freight moved longer distances by land to get to a port, not necessarily the closest



Vehicle distance travelled

Base Case

B Base Case: projected vehicle kilometres travelled by vehicle type



We project vehicle km travelled [VKTs] to increase by 50%

Travel by commercial light vehicles increases as our population and economy grow ...

... but may be affected in future by new technologies such as drones and robots

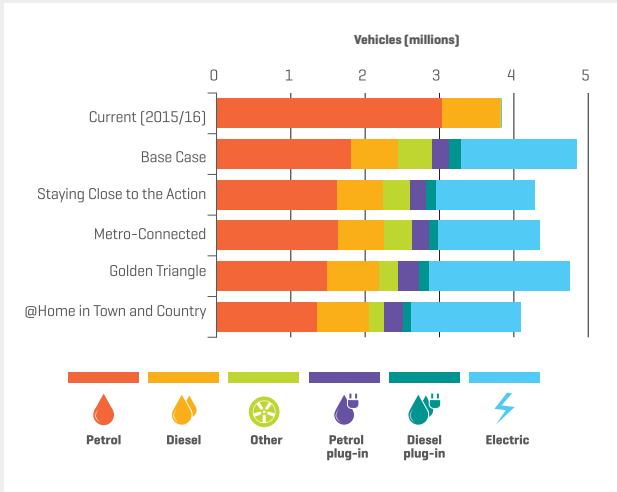
Alternative scenarios

	Billion VKTs in 2042/43	Alternative scenarios
Baseline [2012/13]	40	
B Base Case [2042/43]	61	Moderate population and economic growth
C Staying Close to the Action [2042/43]	54	Population growth focused on inner city Demand management road pricing in Auckland and Wellington
D Metro-Connected [2042/43]	60	Moderate population and economic growth Growth in all large towns and cities
A Golden Triangle [2042/43]	76	Suburban lifestyles popular Fast population and economic growth in golden triangle regions
E @Home in Town and Country [2042/43]	70	Information and communications technologies substitute for many trips Fast population and economic growth dispersed across New Zealand

Vehicle fleet

Alternative scenarios

Projected vehicle fleet in 2039/40

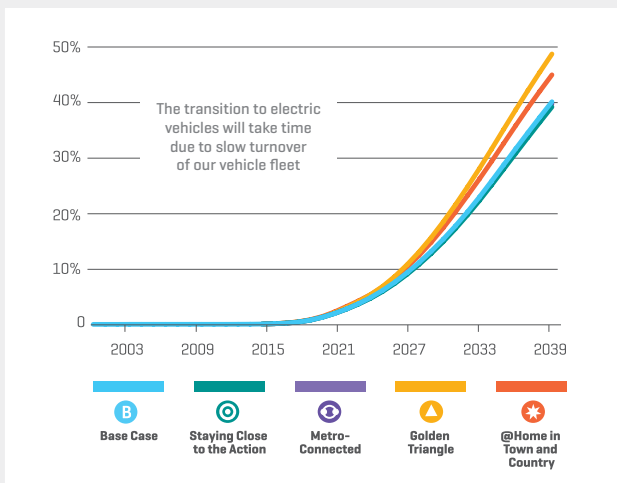


The vehicle fleet is still projected to grow in all scenarios

Others = conventional hybrids and a small number of LPG and CNG vehicles



Projected electric vehicles as % of vehicle fleet²



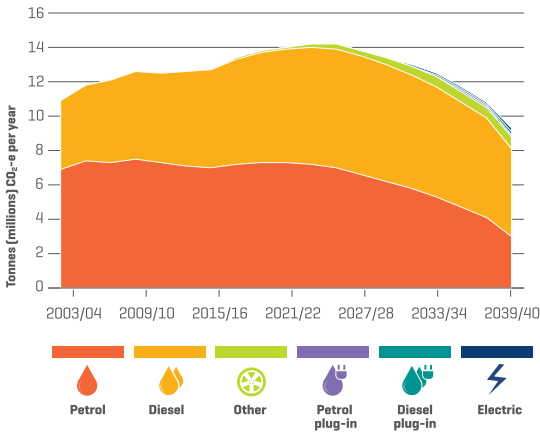
New electric vehicles are projected to reach cost of ownership parity (vehicle cost, fuel, road user charges, repairs, and insurance) with conventional vehicles in the mid 2020s

A nationwide network of charging stations for electric vehicles will be required

Vehicle emissions

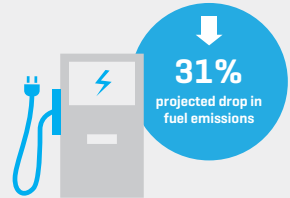
Base Case

B Base Case: projected vehicle fleet emissions by fuel type⁵



Emissions are projected to fall by **31%** from 2015/16 to 2039/40, despite an increase in the size of the vehicle fleet and distance travelled

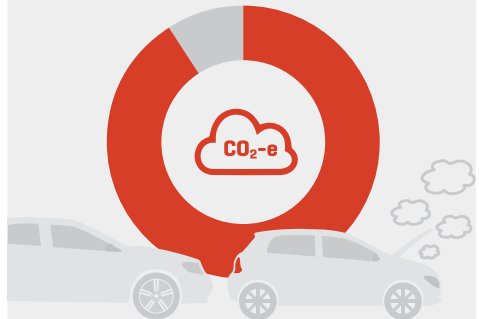
This is because of more electric vehicles in the vehicle fleet and, for non-electric vehicles, improved vehicle fuel efficiency



Transport is New Zealand's third largest greenhouse gas (GHG)-emitting sector and contributes about **18%** of New Zealand's gross greenhouse gas emissions

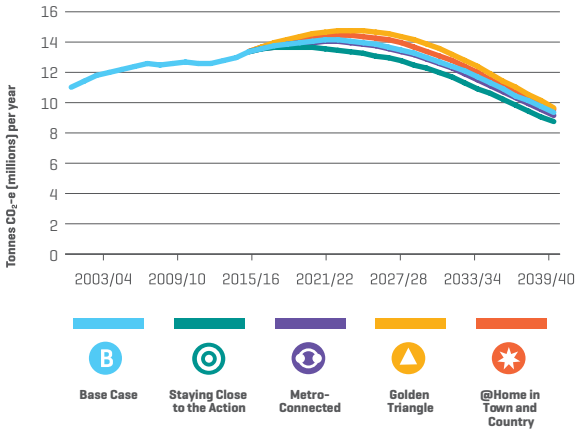


90% of New Zealand's domestic transport GHG emissions come from road transport, mostly from light passenger vehicles⁶

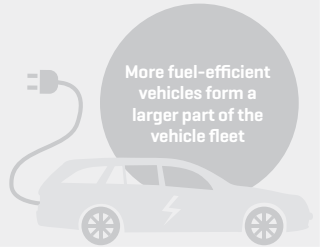


Alternative scenarios

Projected vehicle emissions by scenario



In all scenarios emissions are projected to rise initially, as electric vehicle registrations and improvements in fuel efficiency remain low in relation to growth in VKTs, and then to fall



More information

In this *Transport Outlook: Future Overview* document we provide a quick view of our transport system.



The information in this document comes mainly from the New Zealand *Transport Outlook: Future State* report available at www.transport.govt.nz/transportoutlook.

For further information, contact transportoutlook@transport.govt.nz

Refer also to the New Zealand Transport Agency's Long Term Strategic View (nzta.govt.nz/planning-and-investment/long-term-strategic-view/) for a view of issues and opportunities in the transport system.



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Sources

- 1 Stats NZ for population projections
- 2 Historical numbers based on Ministry of Transport analysis of the Motor Vehicle Register [New Zealand Transport Agency]
- 3 Current airport passenger numbers are sourced from airport websites and publications, or Ministry estimates for smaller airports
- 4 National Freight Demand Study for 2012/13 volumes (www.transport.govt.nz/research/nationalfreightdemandsstudy/)
- 5 Historical numbers based on Ministry of Transport analysis of data from the Ministry for the Environment (www.mfe.govt.nz/node/23304/) and Ministry of Business, Innovation and Employment (www.mbie.govt.nz/info-services/sectors-industries/energy/energy-data-modelling/statistics/oil)
- 6 www.mfe.govt.nz/climate-change/state-of-our-atmosphere-and-climate/new-zealands-greenhouse-gas-inventory

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