Transport Outlook
Future Overview
A summary of transport futures for New Zealand

Your 'GoTO' for transport-related data
November 2017
Your ‘GoTO’ for New Zealand transport-related data

You’ll find the above documents and supporting data and models

Overview booklets

Comprehensive online resource

Detailed documents

Technical documentation

This document

Transport Outlook resource kit

Overview 2016

Future Overview

Current State

This reports the current state of our transport system.

Future State

This looks ahead at potential future scenarios.

For:

anyone who wants a brief overview of transport futures.

Specifically for:

those requiring a more in-depth understanding of our transport system, for example policy-makers and planners.

Specifically for:

those who use data to inform their policies and plans, for example analysts, planners, and policy-makers in local and central government and firms.

WWW.TRANSPORT.GOV.NZ/TRANSPORTOUTLOOK

Your ‘GoTO’ for New Zealand transport-related data

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Go TO Transport Outlook resource kit
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.
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)

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

% of population aged 65+ in the workforce

<table>
<thead>
<tr>
<th>Year</th>
<th>2001</th>
<th>2006</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
</tr>
</tbody>
</table>

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

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!

Travel costs, traffic congestion, and emissions are reduced.
At the same time, other technologies such as online networking and shopping are becoming a substitute for transport.

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.

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

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

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

New technologies such as electric vehicles are emerging.

Future A5_fa.indd 5
20/11/17 1:38 PM
To project the shape of the future transport system in 2042/43, we looked at current trends and developed a base case.

**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

**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

**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

There’s more than one possible future.
We also considered four alternative scenarios:

**Medium economic and population growth**

- 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

**New technology is adopted at a moderate pace**

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

**Staying Close to the Action**

**Golden Triangle**

**More dispersed population growth**

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

**Metro-Connected**

**More dispersed population growth**

- 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

**@Home in Town and Country**

- New technology is adopted at a rapid pace
- People prefer to connect face to face through the use of transport technologies
How New Zealanders travel in towns and cities

Base Case

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

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.

**Base Case: projected number of trips by mode**

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

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Total trips per annum</th>
<th>Public transport trips</th>
<th>Public transport % share of trips</th>
<th>Walking trips</th>
<th>Cycling trips</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong> (2012/13)</td>
<td>5.9 billion</td>
<td></td>
<td>3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Base Case</strong> (2042/43)</td>
<td>7.6 billion</td>
<td>Up 100%</td>
<td>4%</td>
<td>Up 25%</td>
<td>Up 20%</td>
</tr>
<tr>
<td><strong>Staying Close to the Action</strong> (2042/43)</td>
<td>7.6 billion</td>
<td>Up 260%</td>
<td>8%</td>
<td>Up 50%</td>
<td>Up 250%</td>
</tr>
<tr>
<td><strong>Metro-Connected</strong> (2042/43)</td>
<td>7.5 billion</td>
<td>Up 60%</td>
<td>4%</td>
<td>Up 40%</td>
<td>Up 130%</td>
</tr>
<tr>
<td><strong>Golden Triangle</strong> (2042/43)</td>
<td>7.8 billion</td>
<td>Up 60%</td>
<td>3%</td>
<td>Up 30%</td>
<td>Up 75%</td>
</tr>
<tr>
<td><strong>@Home in Town and Country</strong> (2042/43)</td>
<td>7.4 billion</td>
<td>Up 40%</td>
<td>3%</td>
<td>Up 25%</td>
<td>Up 80%</td>
</tr>
</tbody>
</table>

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)

- **Base Case**: Increase led by Queenstown (tourism growth) and Auckland (population growth)
- **Staying Close to the Action**: Same as Base Case: population size and distribution are the same
- **Metro-Connected**: More travel as work colleagues interact online across New Zealand but visit HQ every now and then
- **Golden Triangle**: Fast economic and population growth
- **@Home in Town and Country**: Fast economic and population growth

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

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.

Total projected increase almost 100%
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

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

**Base Case: projected freight movements**

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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Manufactured goods, retail, other products</th>
<th>Logs</th>
<th>Aggregate</th>
<th>Liquid milk</th>
<th>Limestone, cement, fertiliser</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012/13</td>
<td>217</td>
<td>91.4%</td>
<td></td>
<td></td>
<td></td>
<td>237</td>
</tr>
<tr>
<td>2022/23</td>
<td>277</td>
<td>6.8%</td>
<td></td>
<td></td>
<td></td>
<td>301</td>
</tr>
<tr>
<td>2032/33</td>
<td>315</td>
<td>5.6%</td>
<td></td>
<td></td>
<td></td>
<td>340</td>
</tr>
<tr>
<td>2042/43</td>
<td>340</td>
<td>1.6%</td>
<td></td>
<td></td>
<td></td>
<td>366</td>
</tr>
</tbody>
</table>

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

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

- 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.

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**

We project vehicle km travelled (VKTs) to increase by 50% as our population and economy grow. Travel by commercial light vehicles increases, but may be affected in future by new technologies such as drones and robots.

**Alternative scenarios**

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Billion VKTs in 2042/43</th>
<th>Alternative scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>40</td>
<td>Moderate population and economic growth</td>
</tr>
<tr>
<td>Base Case</td>
<td>61</td>
<td>Population growth focused on inner city Demand management road pricing in Auckland and Wellington</td>
</tr>
<tr>
<td>Staying Close to the Action</td>
<td>54</td>
<td>Population growth focused on inner city Demand management road pricing in Auckland and Wellington</td>
</tr>
<tr>
<td>Metro-Connected</td>
<td>60</td>
<td>Moderate population and economic growth Growth in all large towns and cities</td>
</tr>
<tr>
<td>Golden Triangle</td>
<td>76</td>
<td>Suburban lifestyles popular Fast population and economic growth in golden triangle regions</td>
</tr>
<tr>
<td>@Home in Town and Country</td>
<td>70</td>
<td>Information and communications technologies substitute for many trips Fast population and economic growth dispersed across New Zealand</td>
</tr>
</tbody>
</table>
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 fleet

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

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 vehicles.

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.

Projected vehicle fleet emissions by fuel type:

- Petrol
- Diesel
- Other
- Petrol plug-in
- Diesel plug-in
- Electric
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 fuel-efficient vehicles form a larger part of the vehicle fleet.
More information

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


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.

Your 'GoTO' for transport-related data
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

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