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**Committee** Sustainable Transport Committee  
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## **The consideration and evaluation of climate change by the New Zealand Transport Agency in investment and project decisions**

### **1. Purpose**

The purpose of this paper is to describe how the New Zealand Transport Agency (the Agency) takes account of climate change in developing transport projects and in the Agency's investment decisions.

In addition the paper describes how greenhouse gas emissions (GHG) are considered at a regional level in relation to the Regional Land Transport Plan 2015 (RLTP).

### **2. Background**

In New Zealand the sources of air pollution vary seasonally and by location, but major contributors typically include:

- Vehicle emissions
- Wood burning (for home heating)
- Industry
- Natural occurring sources, such as dust, sea salts, and pollens.

Vehicle emissions can be a significant contributor to local air pollution and especially near heavily travelled or congested roadways.

Over the life cycle of a sealed roadway the greatest transport related source of air pollution is exhaust emissions from motor vehicles. These emissions result from the combustion of petrol and diesel fuels.

As New Zealand's vehicle fleet modernises, there has been a reduction in pollution from individual vehicles due to increased fuel efficiency and improved pollution controls. This reduction has been tempered, to some degree, by increases in the number of vehicles and the distance travelled.

The key indicator transport pollutants include:

- Carbon monoxide / Dioxide (CO / CO<sub>2</sub>)
- Nitrogen dioxide (NO<sub>2</sub>)
- Particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) – small particles, less than 10 and 2.5 micrometres, respectively (there are 1000 micrometres in a millimetre).

The focus of this paper is on emissions (primarily Carbon Dioxide or (CO<sub>2</sub>)) relating to climate change effects, how the RLTP emission targets were established as part of the recent development and agreement of the RLTP and the Agency's role in relation to state highways and as a transport investment decision maker in the context of climate change.

## **2.1 Transport policy and legislative context**

The Agency and councils are guided and informed by national policies and legislation with regards to transport and climate change. The primary piece of climate change legislation is the Emissions Trading Scheme (ETS). The ETS covers liquid fossil fuels used in New Zealand including petrol and diesel use. The transport sector has been required to report its emissions since 2010 at a national level through the ETS and whilst the ETS advocates for the need to change the ways we travel and transport freight it is silent on how this might be achieved.

The key statutory guidance on climate change in the transport sector includes the following:

- the Resource Management Act 1991 (RMA)
- the Government Policy Statement on Land transport (GPS) and
- the Land Transport Management Act 2003 (LTMA).

### **2.1.1 The Resource Management Act**

The Resource Management Act (RMA) promotes managing the use, development and protection of natural and physical resources in a way that enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety.

The RMA is most often associated with transport projects in the consenting processes in relation to “avoiding, remedying or mitigating any adverse effects of activities on the environment”.

When building or maintaining the state highway for example, the RMA requires the Agency to avoid, remedy or mitigate adverse environmental effects caused by infrastructure.

In addition RMA section 104E directs those consenting decisions that they “must not have regard to the effects of such a discharge on climate change, except to the extent that the use and development of renewable energy enables

a reduction in the discharge into air of greenhouse gases”. This reinforces the mitigation aspects mentioned above.

### **2.1.2 The Government Policy Statement on Land Transport**

The Government Policy Statement (GPS) sets out the national strategic direction for land transport; this is to improve the performance from the land transport system by focussing on:

- Economic growth and productivity
- Road safety
- Value for money.

Furthermore the GPS establishes “national land transport objectives”. These include:

- a land transport system that addresses current and future demand
- a land transport system that provides appropriate transport choices
- a land transport system that is reliable and resilient
- a land transport system that is a safe system, increasingly free of death and serious injury
- a land transport system that delivers the right infrastructure and services to the right level at the best cost
- a land transport system that mitigates the effects of land transport on the environment.

The final of these objectives is the most relevant to climate change. The GPS seeks to support this objective through:

- Enabling the mitigation of environmental effects - the scale of the land transport investment programme will result in a continued significant investment in mitigating the adverse effects of improvements, concentrating on the most adverse effects.
- Clear reporting on the investment in environmental mitigation - the first step to improving returns from this investment is securing a better understanding of the costs involved. A better understanding of the costs of environmental mitigation is needed to support well informed investment.

The GPS focuses on the mitigation of the effects of transport infrastructure, rather than active consideration of climate change as part of decision making processes.

### **2.1.3 The Land Transport Management Act**

The Land Transport Management Act (LTMA) sets out the planning and funding framework that manages central government funding into roading, public transport and traffic safety.

The purpose of the LTMA is to contribute to the aim of achieving an effective, efficient, and safe land transport system in the public interest.

In the context of the environment and climate change the LTMA seeks to provide an integrated approach to land transport funding and management that takes into account the views of affected communities and social and environmental responsibility in land transport funding, planning and management.

The LTMA was significantly amended in 2013. The previous objectives of the LTMA, which included “ensure environmental sustainability” were removed and replaced with a focus on a “safe”, “effective” and “efficient” transport system.

### **3. Regional transport policy framework**

#### **3.1 Regional Land Transport Plan 2015 (RLTP)**

The RLTP is a statutory document that must be prepared every six years as required by the LTMA (as amended in 2013). It is prepared by the Regional Transport Committee (RTC).

The RLTP must contribute to the purpose of the LTMA which seeks ‘an effective, efficient, and safe land transport system in the public interest’. It is also required to be consistent with the GPS.

The RLTP vision is ‘to deliver a safe, effective and efficient land transport network that supports the region’s economic prosperity in a way that is environmentally and socially sustainable.’ As part of achieving this vision, the RLTP seeks to:

- Increase the use of public transport, walking and cycling
- Reduce severe road congestion
- Improve the reliability of the strategic road network
- Improve the resilience of the transport network
- Improve road safety
- Reduce harmful transport emissions
- Increase private vehicle occupancy.

The RLTP strategic approach includes the use of demand management measures to influence how and when people travel, support new technologies, and tools to make the best use of the network. The RLTP also sets out a number of policies that relate to minimising the effect of transport on the environment.

#### **3.2 Development of RLTP emissions targets**

For the year 2025 the RLTP establishes strategic targets for each outcome area including transport generated emissions. These have been developed based upon the ‘expected future’ scenario and a number of different factors.

In relation to the RLTP objective “an efficient and optimised transport system that minimises the impact on the environment” there are two main RLTP outcomes with related RLTP targets and measures these have a 2025 date attached to them. One of these is to “reduced harmful emissions from transport”. The relevant outcome targets are set out in the following table:

‘An efficient and optimised transport system that minimises the impact on the environment’				
Outcome	Measure	Baseline	2025 Target	Comment/Rationale
Reduced harmful emissions from transport	Transport generated emissions (per capita)	2.31 tonnes transport generated CO <sub>2</sub> per capita in 2013  13% reduction in per capita CO <sub>2</sub> emissions from 2005 - 2013	<b>15% reduction</b> in annual per capita CO <sub>2</sub> emissions	Targets are based upon an ‘expected future’ scenario where future growth in vehicle trips is broadly linked to population growth  Government policies are targeted at regulating emissions and providing incentives for people who drive cleaner, more fuel efficient vehicles  Assumes vehicle efficiency improvements of up to 20% over the 10 year period to 2025
	Transport generated emissions (absolute)	1,061 kilotonnes transport generated CO <sub>2</sub> in 2013.  7% reduction in total annual transported-generated CO <sub>2</sub> in Wellington region 2005 - 2013	<b>10% reduction</b> in total annual CO <sub>2</sub> emissions	Policies to encourage more public transport use and seeking a low emission public transport fleet will contribute to these targets  Projections suggest a decrease in transport-generated CO <sub>2</sub> emissions, expressed in both per capita and absolute terms
	Concentrations of harmful transport generated pollutants	5 year rolling average (2009 to 2013) for NO <sub>2</sub> across the regional automatic monitoring stations.  23.5 (µg/m <sup>3</sup> ) at GWRC’s Wellington central monitoring station	<b>A reduction</b> in the average concentration (measured as a 5 year rolling average) of harmful transport-generated emissions (NO <sub>2</sub> + others) at automatic monitoring stations	Harmful pollutant emissions generated by transport are likely to decrease as vehicle standards improve and cleaner engine technologies focus on removing harmful particulates from emissions  GWRC will continually improve its monitoring framework to allow monitoring of the pollutants CO, PM <sub>10</sub> and PM <sub>2.5</sub>

#### 4. Regional trends in CO<sub>2</sub> emissions

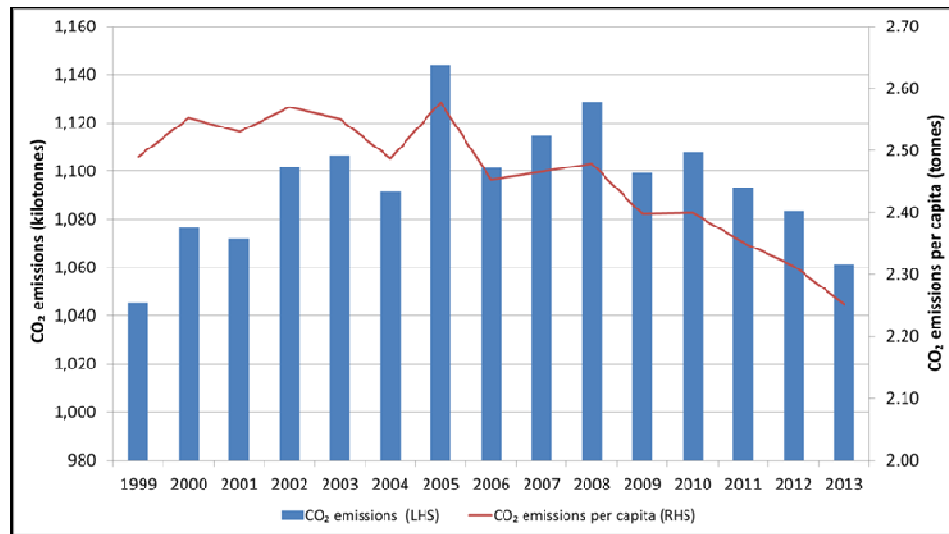
Tracking and forecasting emissions from both public and private vehicles can be complex given CO<sub>2</sub> emissions are influenced by several factors:

- vehicle kilometres travelled
- travel times, as a reflection of traffic congestion and vehicle travel speeds being less efficient regarding emissions
- fleet composition – including HCVs, cars, all in a range of models and sizes
- vehicle fuel efficiency – related to fleet age as newer cars are generally more fuel efficient than older cars
- the evolution and increasing popularity of hybrid and electrically powered vehicles.

CO<sub>2</sub> accounts for the bulk of transport-generated emissions and is therefore a suitable proxy for total transport generated GHG emissions. Furthermore, the time series data relating to transport generated CO<sub>2</sub> emissions are easily accessible and presents good historic trend information.

Across New Zealand, 16% of total annual GHG emissions were attributed to the transport sector in 2014.

Regional transport-related CO<sub>2</sub> emissions rose between 1999 and 2005 before declining between 2005 and 2013. In 2013, regional transport-related CO<sub>2</sub> emissions were at their lowest level since 1999. These trends are described in the figure below.



Between 2001 and 2013 transport-generated CO<sub>2</sub> emissions within the region declined in per capita terms by around 12%. It is thought that this is due to the combined effect of a reduction in fuel consumption due to vehicle fleet fuel efficiency improvements, and a reduction in vehicle kilometres travelled (VKT) per capita over the same period.

In absolute terms, transport-generated CO<sub>2</sub> emissions increased by around 10% between 1999 and 2005, before falling by 8% between 2005 and 2013, to a level in 2013 that was 2% higher than in 1999.

The Wellington Transport Strategy Model (WTSM) suggests public transport accounted for approximately 3% of total annual regional transport related greenhouse gas emissions in 2011, whilst freight trips accounted for around 10%. The majority of emissions (87%) were generated by the private motor vehicle.

In the future it is likely that the downward impact on fuel consumption from vehicle fleet efficiency improvements, including improvements to the bus fleet, will outweigh the impact of population growth (generating additional vehicle trips) and any per capita increase in private car and freight VKT that might occur, resulting in a steady reduction in per capita CO<sub>2</sub> emissions and a similar reduction in absolute annual transport generated CO<sub>2</sub> emissions.

The rate of reduction, however, will depend on several factors including growth in car VKT, modal shift from car to public transport and external factors such as the price of fuel.

## **5. The Agency's decision making framework**

### **5.1 Introduction**

The Agency has a number of different functions in relation to transport and the environment:

- Building, maintaining and operating the state highway network and
- Makes investment decisions regarding land transport projects and activities
- Regulates and controls access to the transport network (vehicle emission specifications and standards).

The Agency is guided by the legislative requirements of the GPS, LTMA and RMA when considering transport planning and investment decisions.

The Agency's Highways and Network Operations group manages nearly 11,000 kilometres of state highways. This involves planning, construction, operation and maintenance activities across New Zealand and the management of the related air quality effects.

### **5.2 Highways and Network Operations Policy framework**

In response to the legislative framework and government policy the Agency has developed a series of environmental focused policies in order to address the environmental aspects of state highways. This includes the way that it assesses the environmental impact of projects and how it mitigates any adverse effects.

These policies include:

- Environmental and Social Responsibility Policy
- State Highway Environmental Plan, and
- Environmental and Social Responsibility Standard.

The Agency's Environmental and Social Responsibility Policy responds to the LTMA and states that the Agency will promote an accessible and safe transport system that contributes positively to New Zealand's economic, social and environmental welfare and are committed to acting in an environmentally and socially responsible manner. **Refer attachment 1**

The Agency gives effect to the Environmental and Social Responsibility Policy through its State Highway Environmental Plan. This plan sets out the strategic environmental and social vision for managing key areas, including the following air quality objectives:

- Understand the contribution of vehicle traffic to air quality.
- Ensure new state highway projects do not directly cause national environmental standards for ambient air quality to be exceeded.
- Contribute to reducing emissions where the state highway network is a significant source of exceedances of national ambient air quality.

The State Highway Environmental Plan defines objectives and methods to help ensure that the highways and network operations group meets the requirements of the Environmental and Social Responsibility Policy.

The Environmental and Social Responsibility Policy and the Standard provides tools, references and resources to ensure that environmental and social matters are considered appropriately throughout the lifecycle of state highway projects.



The State Highway Environmental Plan accounts for climate change through climate change adaptation and mitigation and sets out three objectives:

- Manage increased hazards of climate change impacts on state highway infrastructure.



- Collect and analyse information on GHG emissions and the impact of climate change on the functioning of the state highway to support decision-making.
- Mitigate activities associated with the construction, operation and maintenance of state highways to effect a net reduction of GHG from transport.

These objectives very much support the approach of mitigating the impacts of climate change on state highway and mitigating the “construction, operation and maintenance of state highways” effects on the climate.

### **5.3 Highways and Network Operations project assessment**

The Agency when considering the environment, and more specifically climate change adaptation and mitigation, will assess the project in terms of how project design options positively or negatively impact on the climate and also how climate change will affect the options and the design themselves.

This analysis is summarised for projects within an “assessment of environmental effects” report. Note that a report of this type is a RMA requirement for any applicant seeking resource consent, so the creation of this type of report isn’t a NZTA specific policy.

In broader project assessment “multi criteria assessment techniques” are used to compare project outcomes (both positive and negative) in order to determine the preferred option. Here the environmental aspects (of which climate change is a subset) are analysed in relation to the broader suite of outcomes.

Such analysis is often workshop based with knowledge experts used in the various analysis areas. These workshops also develop the criteria, scoring and weighting for the multi criteria assessment.

For example multi criteria analysis might consider project options and alternatives in terms of:

- transport outcomes
- social and community outcomes
- environmental outcomes
- resilience outcomes
- economics outcomes
- constructability outcomes
- costs outcomes.

Multi criteria analysis will not only develop a preferred option but can also raise specific aspects and issues that need resolution in the design and consenting processes. These aspects will be mitigated during the later stages of developing the project design details and through to construction. For example this might include:

- careful selection of materials in the design phase to reduce overall emissions (e.g. LED lights rather than Sodium street lighting)

- the application of integrated planning and travel demand management principles which aim to decrease single-occupancy vehicle use and reduce congestion
- manage increased hazards of climate change impacts on state highway infrastructure.

## **5.4 The Agency funding and investment decisions**

The Agency acts as the manager and decision maker regarding the National Land Transport Fund for New Zealand. In order to undertake this role the Agency has developed an investment assessment framework in order to assess and prioritise land transport programmes, projects and other activities.

The framework, and its priorities, is used by the Agency in developing the National Land Transport Programme and to make subsequent investment decisions.

The GPS establishes the government investment strategy by defining the results desired from National Land Transport Fund investment. The Investment Assessment Framework is thus a mechanism to give effect to the GPS.

The Investment Assessment Framework uses three factors (strategic fit, effectiveness, and benefit-cost appraisal) to determine how well proposed activities meet the government's investment strategy as defined in the GPS.

These three categories can be defined as:

- strategic fit of the problem, issue or opportunity identified through the business case and alignment with the GPS results.
- effectiveness of the proposed solution, consistency with business case, and how well it delivers on the results identified in the strategic fit assessment.
- benefit and cost appraisal of the proposed solution, assessing the whole of life benefits and costs (based on Economic Evaluation Manual procedures).

Decisions on investment are thus made in relation to each proposal's three letter profile with the three categories having possible ratings of high, medium or low.

Proposals are initially assessed by each project owner with supporting evidence supplied to justify the initial three letter profile. The Agency then confirms or amends the draft three letter profile in relation to the Investment Assessment Framework.

### **5.4.1 Benefit – Cost appraisal**

Climate change (in the form of vehicle emissions reductions) is one of a number of aspects considered in establishing a benefit–cost appraisal. Some of these can include:

- safety crash cost savings
- travel time cost savings
- vehicle Operating Costs savings

- vehicle emissions reductions
- property costs
- construction/implementation (including preconstruction)
- maintenance
- renewal
- operating
- external impact mitigation.

Climate change, in the form of vehicle emissions reductions, is accounted for in the context of the benefit–cost appraisal (as more efficient travel, less congestion etc) but is only one element in a much wider suite of costs and benefits.

## **6. Comments**

The RLTP sets out a clear regional policy on reducing the impacts of travel and transport on the environment. The RLTP also establishes targets in relation to this and uses environmental impacts as one aspect of how major projects are prioritised.

The Highways and Network Operations group of the Agency has developed a series of environmental focused policies in order to address the environmental aspects of operating, building and maintaining state highway.

At a project level the Highways and Network Operations group consider climate change within the decision making process in relation to choosing a preferred option. In this situation the consideration of climate change is part of a larger multi criteria analysis process in which a range of factors are considered.

The Agency’s policy also guides the consideration of the effects on the environment of constructing new projects and maintaining and operating the state highway network. This largely focuses upon adaptation and mitigation of these activities in relation to climate change under the framework of the RMA.

The Agency also has a role in making investment decisions through its Investment Assessment Framework. The framework does consider climate change in the benefit/cost appraisal part of the project assessment process. However, climate change is a small part of benefit/cost appraisal and climate change considerations are not a key driver of the overall investment decision making process.

## **7. Communication**

No further communication is required.

## **8. The decision-making process and significance**

No decision is being sought in this report.

## **8.1 Engagement**

Engagement on this matter is unnecessary.

## **9. Recommendations**

*That the Committee:*

- 1. Receives the report.*
- 2. Notes the content of the report.*

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**Attachment 1: NZTA Environmental and social responsibility policy summary**