

Wellington Regional Climate Change Response

Note: a Discussion Document explaining some of the reasoning behind the recommended actions and a linked Technical Background Information document which gives reference sources and supplies some of the technical details underpinning this document, are available online at www.qw.govt.nz/erawq .

September 2009

Mayors' and Chair's foreword

Draft

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1 Purpose

This document has been prepared by a collaborative working group of local authorities in the Wellington region and outlines the region's proposed response to climate change.

2 What are we responding to?

We are now certain that the earth's climate is changing. The Intergovernmental Panel on Climate Change (IPCC) has stated that it is more than 90% likely that this change is being induced by human activities. The National Institute for Water and Atmospheric Research (NIWA) has produced some projections of what the likely climate change effects will be for the various regions in New Zealand and these effects are summarised below.

2.1 Temperature changes

Global temperatures will rise and cause changes in sea level, rainfall, and in the intensity of storms. NIWA's mid-range projections for annual average temperatures in the Wellington region show rises of about 1 degree by 2040 and around 2 degrees by 2090.

2.2 Sea level rise

NIWA climate scientists are currently projecting a sea level rise for the region of about 0.8m to 0.9m by the end of this century, although the possibility of greater rises cannot be ruled out¹. As a result, we are likely to see inundation of low-lying areas and increased coastal erosion. Such sea levels will also cause flood waters to back up, seeking an outlet other than the ocean. Sea level rise beyond 2100 is uncertain, and to a large extent depends on what action is taken to reduce greenhouse gas emissions globally. However it could reach several metres over the next few centuries. A precautionary approach would be to provide for a sea level rise of 1 m by 2100.

The effects of sea level rise will be compounded by the effects of storm surge and wave action. The total effects will have significant impacts on infrastructure such as roads, rail links and other vital community infrastructure, as well as low-lying farming land, water tables along the coasts and fresh water aquifers.

2.3 Rainfall changes

Over the coming century, changes to annual and seasonal rainfall will vary across the region. In very broad terms, the east will probably become up to 8% drier on average, while the north-west will become considerably wetter – up to 15%. Individual rainfall events will become more extreme – possibly up to 40%. These changes will particularly impinge on water supply, flood protection in both rural and urban areas, the viability of agriculture as currently practised in the region, and possibly forestry.

2.4 Storms

Climate models predict more extreme storms as sea temperatures rise, implying higher wind and more rain, although it is presently unclear whether or not storms will become more frequent. In the Wellington region, the risk of extreme rainfalls is likely to increase in general, especially in the Tararuas during northwesterly storms and in the Wellington city area and south Wairarapa during southerly storm events. Resulting erosion and

¹ Note: this is an update to the information contained in the Discussion and Technical Background Information Documents and raises the lower bound of the range of probability.

stress on built structures will have significant implications for land use and for the design and location of infrastructure.

3 What should we do about this?

We can respond to these impacts in two ways: we can try to reduce our greenhouse gas emissions and persuade others to do the same (mitigation); and we can adapt to those impacts which cannot be prevented by mitigation (adaptation). In reality, some of the things we do will have benefits for both mitigation *and* adaptation. They will also have co-benefits in areas other than climate change, such as health, disaster preparedness and recovery, energy security and generally improving community resilience through strengthening networks.

Councils are already engaged every day in programmes and initiatives which will have considerable positive impacts on greenhouse gas emissions levels and will assist their communities to adapt to climate change, whether or not these programmes carry that label, e.g. provision of public transport, asset management planning, flood protection works and so on. However, the imperative of climate change means that additional actions will be required in future.

4 Principles guiding our response

The following set of principles is proposed to guide the region's local authorities in responding to climate change at all levels of action and decision-making.

- The region's response to climate change will be a collaborative effort led by local authorities.
- Different councils may give effect to shared decisions in different ways, as climate change effects will be felt differently in different parts of the region.
- Up-to-date, agreed, regionally specific scientific information will be shared with local communities and will serve as a basis for our decision-making.
- Wherever appropriate, existing policy and planning structures will be used as vehicles to give effect to our climate change response.
- Decisions will be proactive and will avoid locking future generations into unaffordable or intolerable choices.
- Communities will be involved in finding and prioritising creative solutions to problems.
- Climate change response actions will identify and utilise opportunities to improve the material, cultural and social well-being of our communities.
- Local authorities will act as strong advocates for our communities with central government, and for climate change action with our communities.
- International experience will inform our decision-making on climate change actions.

5 Reduction of emissions

5.1 Regional goals

A set of regional goals has been developed (Table 1) to reduce the greenhouse gas emissions from those sectors which are currently the highest emitters and to offset those emissions which cannot be reduced. These goals are considered to be challenging but achievable. These goals for the region should not be confused with emissions reduction goals individual councils set for their own jurisdictions. Regional emissions will be measured on a regular basis and progress in reaching the goals will be reported.

It must be noted that achieving these reductions will require action at all levels - by central government, local government, business and individuals. Local government alone cannot be held accountable for achievement of these reductions. For example, achieving the electricity sector reductions requires a move to 90% renewable electricity generation; achieving the transport sector reductions requires a transformation of the vehicle fleet to greater efficiency and alternative energy sources. While local government can support these measures through planning processes, central government policies will clearly have an over-riding influence. The aim in setting such goals is to measure the region's progress in reducing its greenhouse gas emissions on a regular basis. The information gained will be used to inform local government policies and planning, support representations to central government, and in education and awareness campaigns with local communities. It is recognised that local government can play a major influencing role with residents in the region through such education. Another important way that local government can contribute to emissions reductions in the long term is through planning processes, in particular integrated planning of transport and urban form.

Table 1 ...Goals for Wellington region emissions reduction and sequestration, assuming a national target of 50% by 2050

Sector	% reduction	
	2020	2050
Transport	20%	50%
Electricity and other energy	30%	70%
Waste	30%	75%
Agriculture	10%	20%
Industry	20%	50%
TOTAL	20%	50%
	% increase	
	2020	2050
Forestry	80%	200%

5.2 Local government mitigation objectives and measures

A set of emissions reduction objectives has been developed for local government (Table 2) and success in achieving them will be reported on a regular basis. Their achievement will contribute to the percentage reduction goals for the region. These objectives have been selected because the sectors they relate to are either fully within local government control or can be influenced by local authority action.

In some cases the impact on emissions will be directly measurable. In other cases, initiatives have been chosen which common sense indicates will have a beneficial effect on emissions, even though it will be too expensive or difficult to quantify their specific effect on total emissions.

There is a further list of initiatives which will be helpful in reducing emissions at Appendix 2. Local authorities in the region may choose to adopt some of these initiatives within their jurisdictions or develop others. They may choose to undertake some initiatives individually or to make them the focus of a collaboration with other local authorities.

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Table 2 Emissions reduction: objectives and measures

Sector	Objective	Measure	Measured by
<p>Transport</p> <p><i>Note: smaller scope for improvement because of high existing use of public transport and active modes in the region.</i></p>	<ul style="list-style-type: none"> All relevant objectives from Regional Land Transport Strategy² – see Appendix 1 Next RLTS review will consider amending RLTS targets to achieve consistency with this Plan. 	<ul style="list-style-type: none"> As per RLTS 	<ul style="list-style-type: none"> Greater Wellington (existing measure) Greater Wellington
<p>Agriculture</p>	<ul style="list-style-type: none"> Nitrous oxide emissions will reduce Sequestration by forestry and biomass will increase Emissions from pastoral farming will reduce 	<ul style="list-style-type: none"> Amount of nitrogen in ground and surface water Amount of marginal land converted to forestry and biomass crops Amount of pastoral land converted to forestry and biomass crops 	<ul style="list-style-type: none"> Greater Wellington (existing measure) Greater Wellington (existing measure) Greater Wellington (existing measure)
<p>Non-transport energy</p>	<ul style="list-style-type: none"> Emissions from household heating incl. hot water will reduce 	<ul style="list-style-type: none"> Number of houses insulated and heated efficiently 	<ul style="list-style-type: none"> EECA (GW partner in existing programme)
<p>Waste</p>	<ul style="list-style-type: none"> Emissions from landfills will reduce 	<ul style="list-style-type: none"> Results in GHG inventories 	<ul style="list-style-type: none"> City and district councils
<p>Forestry</p>	<ul style="list-style-type: none"> Sequestration of CO2 in forests will increase 	<ul style="list-style-type: none"> Area of council-owned lands under active or passive revegetation, or commercial forestry 	<ul style="list-style-type: none"> All councils

² The RLTS contains an objective, and outcomes, policies and targets that are relevant to climate change. They will constitute the currently agreed shared goals and policies relating to reduction of transport greenhouse gas (GHG) emissions for the region. An annual report on progress with the RLTS is provided and will also serve as a proxy measure of progress on transport-related GHG reductions.

6 Adaptation

Adapting fully to climate change will take many years and possibly centuries. Initiatives to support this adaptation will need to be planned over both short and longer terms. It is not possible in this Plan to propose detailed responses to specific effects because of the uncertainties at this point in the development of the science and in the evolution of climate change.

It is clear that some early actions will greatly assist with planning responses to climate change as the shape and timing of future effects becomes clearer. Three key actions to be undertaken in the short term are outlined below.

6.1 Decision-making framework

The development of an agreed framework for decision-making is highly desirable given the probable scale of some of the initiatives that may be required to address climate change effects. It is likely that a number of local authorities will be addressing similar issues concurrently and that major issues will cross boundaries. Some consistency of approach will be essential for these major issues and could be helpful in dealing with the more minor ones. Where vital infrastructure or services which cross boundaries are concerned, an agreed set of criteria for assessing value and process for making final decisions will be required. The development of such a framework will begin as soon as possible to allow time for negotiation and debate between local authorities and with communities. A potential framework outline is included at Appendix 3.

6.2 Vulnerability assessment

A database of information about the vulnerabilities of the region to climate change effects will be assembled using existing information and filling gaps where necessary. Much of the data for this assessment is already held by councils or other agencies and is readily accessible. This data will inform decisions on priorities for action on adaptation to climate change effects. This information will be shared with the relevant communities through a variety of education initiatives.

6.3 Planning assumptions

A common set of planning assumptions relating to climate change will also assist with resolution of cross-boundary issues and will help ensure a reasonable consistency of approach between local authorities. These assumptions will be developed as soon as possible to guide local planning.

7 Longer term actions

Over the next 10 to 40 years, local authorities will continue to play a key role in assisting their communities to respond to climate change through supporting the transition to a low-carbon economy, identifying and designing adaptive responses to climate change effects and assisting, wherever possible, with the strengthening of community networks.

7.1 Supporting the transition to a low-carbon economy

Ways to contribute to transitioning the region to a low-carbon economy will be actively sought. Local authorities will meet their obligations for waste minimisation and do what they can to:

- Facilitate the electrification of the region's vehicle fleet
- Assist with the development of renewable energy generation through, for example,
 - Use of the Cook Strait tidal resource
 - Possible solar farming, particularly in the Wairarapa
 - Development of wind farms
 - Distributed electricity generation including possible household level generation development (Note: household generation would have major disaster recovery co-benefits)
- Assist with the reduction of agriculture emissions through support and incentives for migration to new farming methods and practices

7.2 Continuing adaptation to climate change effects

The best possible responses to climate change effects will be identified and designed. In this context, this would mean the most appropriate intervention consistent with preserving the agreed value while being the most cost effective over the long term. The evaluation of cost effectiveness will include non-dollar costs and benefits which will be agreed between local authorities. There will be community involvement in developing these evaluation criteria.

7.3 Building community resilience

Fundamental aspects of our society's culture such as property and democratic rights, or economic and physical freedoms could come under threat as our communities absorb the shocks of climate change consequences. The ability of communities to continue to function while dealing with these shocks will be key to creating a tolerable future. Using existing social networks as a platform, local government will help build community resilience through education, support for network-strengthening projects, and ensuring the community is involved in planning and decision-making.

8 Governance

It is important that the region's leaders take a collaborative and complementary approach to climate change. Therefore, a regional climate change forum will convene on a regular basis and at least twice a year. It will be for all councillors in the region and provide an opportunity for these political leaders to discuss progress on achievement of this Plan and to address the implications of new climate change information.

An ongoing officer forum, possibly online, will be set up to support the political forum.

Greater Wellington will coordinate these initiatives.

Appendix 1: Regional Land Transport Strategy objectives, outcomes, policies and targets

1.1 Relevant RLTS Objective

Objective 5. Ensure environmental sustainability

Improve the environmental performance of the transport network, and avoid to the extent reasonable in the circumstances, adverse effects of transport on the environment (in line with the RPS) and communities. This includes, but is not limited to: increased use of passenger transport, cycling and walking; reduced use of private and company cars; increased energy efficiency of the vehicle fleet; reduced greenhouse gas emissions; and a high standard of environmental design of transport infrastructure.

1.2 Relevant RLTS Outcomes

Key outcome:

1.1 Increased peak period passenger transport mode share

Related outcomes:

1.2 Increased off-peak passenger transport use and community connectedness

1.3 Improved passenger transport accessibility for all, including people with disabilities or from low income groups

1.4 Reduced passenger transport journey times compared to travel by private car

1.5 Increased passenger transport reliability

Key outcome:

2.1 Increased mode share for pedestrians and cyclists

Related Outcomes:

2.2 Improved level of service for pedestrians and cyclists

2.3 Increased safety for pedestrians and cyclists

Key outcome:

3.1 Reduced greenhouse gas emissions

Related outcomes:

3.2 Reduced private car mode share

3.3 Reduced fuel consumption

3.4 Increased private vehicle occupancy

Key outcome:

4.1 Reduced severe road congestion

Related outcomes:

4.2 Maintained vehicle travel times between communities and regional destinations

4.3 Improved reliability of the strategic roading network

Key outcome:

5.1 Improved regional road safety

Key outcome:

6.1 Improved land use and transport integration (in line with the WRS and local authority urban development strategies)

Related outcomes:

6.2 Improved integration between transport modes

6.3 Sustainable economic development supported (in line with the WRS)

6.4 Improved transport efficiency

Key outcome:

7.1 Improved regional freight efficiency

Related outcomes:

7.2 Improved inter-regional freight efficiency

1.3 Relevant RLTS outcome targets

Table 3 Relevant RLTS key outcomes

Key outcome	2016 Stretch target
1.1 Increased peak period passenger transport mode share	Passenger transport accounts for at least 25 million peak period trips per annum. (18.3 million in 2005/06)
	Passenger transport accounts for at least 21% of all region wide journey to work trips. (17% in 2006)
2.1 Increased mode share for pedestrians and cyclists	Active modes account for at least 15% of region wide journey to work trips. (13% in 2006)
3.1 Reduced greenhouse gas emissions	Transport generated CO ₂ emissions will remain below 1,065 kilotonnes per annum. (1,118 in 2005/06)
4.1 Reduced severe road congestion	Average congestion on selected roads will remain below 20 seconds delay per km travelled despite traffic growth. (21 seconds in 2006)

5.1 Improved regional road safety	There are no road crash fatalities attributable to roading network deficiencies.
6.1 Improved land use and transport integration (in line with the WRS and local authority urban development strategies)	All large subdivisions and developments include appropriate provision for walking, cycling and public transport.
7.1 Improved regional freight efficiency	Improved road journey times for freight traffic between key destinations.

Table 4 Relevant RLTS related outcomes

Related outcome	2016 Target
1.2 Increased off-peak passenger transport use and community connectedness	Passenger transport accounts for at least 25 million off peak period trips per annum. (16.7 million trips in 2005/06)
1.3 Improved passenger transport accessibility for all, including disabled people or from low income groups	80% of passenger transport services are guaranteed to be wheelchair accessible. (11.8% in 2005/06) Most of the region's residents live within 400 metres (5 minutes walk) of a bus stop or train station with a service frequency of at least 30 minutes. Passenger transport services in the highest deprivation areas are more affordable.
1.4 Reduced passenger transport journey times compared to travel by private car	Peak period PT journey times are equal to or better than a similar journey undertaken by a private car for key selected corridors.
1.5 Increased passenger transport reliability	Nearly all bus and train services run on time.
2.2 Improved level of service for pedestrians and cyclists	All of the strategic cycle network provides an acceptable level of service. Nearly all urban road frontages are served by a footpath.
2.3 Increased safety for pedestrians and cyclists	Fewer than 100 pedestrians injured in the region per annum. (150 injured in 2005) Fewer than 75 cyclists injured in the region per annum. (112 injured in 2005)
3.2 Reduced private car mode share	Private vehicles account for no more than 62% of region wide journey to work trips. (68% in 2006)
3.3 Reduced fuel consumption	No more than 442 mega litres of petrol and diesel per annum will be used for transport purposes. (464 mega litres in 2005)
3.4 Increased private vehicle occupancy	Vehicles entering the Wellington CBD during the 2 hour AM peak contain on average at least 1.5 people per vehicle. (1.37 people in 2006)
4.2 Maintained vehicle travel times between communities and regional destinations	No decrease in average vehicle journey "speeds" shown in travel time surveys for selected key routes. (55km/h in 2006)
4.3 Improved reliability of the strategic roading network	Key routes are very rarely affected by closure.

6.2 Improved integration between transport modes	The majority of passenger transport services covered by integrated ticketing.
6.3 Sustainable economic development supported (in line with the WRS)	Reduced vehicle kilometres travelled per GDP.
6.4 Improved transport efficiency	Reduced passenger transport expenditure per passenger. Reduced roading expenditure per GDP.
7.2 Improved inter-regional freight efficiency	All infrastructure constraints to rail freight movements are removed.

The RLTS also states that “In addition to the targets shown above, many more indicators will measure progress towards achieving the strategy outcomes. In the order of 100 indicators will be reported on annually through the Annual Monitoring Report.”

1.4 Relevant RLTS policies

Network management

- Ensure best use is made of network management techniques³ to optimise the performance of the transport network.
- Ensure the role of the urban passenger rail network is maintained as the key long to medium distance and high volume service.
- Increase rail capacity and coverage in line with current and future demand, and complement rail services with bus services.
- Ensure a high level of service for passenger rail with regard to rolling stock and rail infrastructure reliability.
- Support enhanced accessibility to rail services including, where appropriate, new stations and extending electrification of commuter rail lines (in particular north of Paraparaumu and Upper Hutt).
- Support the ongoing development of new and existing park and ride facilities.
- Ensure the continuous review and improvement of bus services.
- Support the use of bus priority measures in congested areas.
- Support trolley buses in Wellington City and their ongoing upgrade.
- Support continuous development of the cycling network and integration with other modes.
- Support continuous development of the pedestrian network and integration with other modes.

Travel demand management

- Ensure the availability of reliable information on the transport system and the choices available.
- Support reduced reliance on private⁴ motor vehicles, particularly single occupancy vehicle use (excluding motorcycles) and use for short trips.
- Support the increased use of passenger transport.
- Support the uptake of cycling and pedestrian travel, particularly for short trips.
- Encourage appropriately located land development and ensure integration with transport infrastructure.
- Encourage the development of travel plans.

³ For example, Advanced Traffic Management Systems, Advanced Traveller Information Systems, High Occupancy Vehicle lanes.

⁴ In this context private motor vehicles includes company cars not being used for commercial purposes.

- Advocate for government policy to enable road pricing⁵.
- Support start-up funding for viable 'alternative to road' initiatives.
- Support beneficial rail freight initiatives where net benefits exceed those of road freight.

Safety

- Support improved safety (perceived and real) of pedestrians from risks posed by traffic, the physical environment and crime.
- Support improved safety of cyclists from risks posed by traffic and other hazards.
- Support improved safety and personal security (perceived and real) of passenger transport users.

Environment and public health

- Support the reduction of greenhouse gas emissions arising from the operation of the regional transport network.
- Support government investigations into alternative fuel options and eco-efficient vehicles.
- Ensure the transport network is developed in a way that minimises the use of non-renewable resources.
- Support the use of transport modes that are not dependent on fossil fuels, including active transport modes.

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⁵ Road pricing is where drivers pay the true cost of using roads. This includes the social, economic, and environmental costs such as accidents, pollution and time delays, which are currently borne by the community or economy.

Planning and integration

- Support the growth and land use aspirations of the Wellington Regional Strategy and the Regional Policy Statement, particularly in relation to compact regional form, supporting a strong Wellington City CBD and regional centres, and densification around passenger transport nodes.
- Support land use principles that minimise dependence on the private car.
- Ensure the current and future regional transport network is identified and protected in territorial authority planning documents.
- Support better integration of transport and land use planning by identifying roading hierarchies and advocating for appropriate access controls in district plans.

Implementation policies

- To prepare and review implementation plans for pedestrians, cycling, road safety, travel demand management, passenger transport and freight, in accordance with the regional framework provided by this strategy, that identify the needs and proposed actions specific to each mode.
- To prepare a Regional Rail Plan that identifies the needs and proposed actions for development of the rail network over the next 30 years.

Programme prioritisation and funding policies

- Ensure the following applies to the allocation of Crown “C” funds:
 - (ii) The highest priority for the use of C funds for assisting local share will be passenger rail improvement projects.

1.5 Relevant RLTS implementation plan targets

In addition to all of the above, 2016 strategy targets have been set for travel demand management:

- All large subdivisions and developments include appropriate provision for walking, cycling and public transport.
- Passenger transport accounts for at least 21% of all region wide journey to work trips. (17% in 2006)
- Active modes account for at least 15% of region wide journey to work trips. (13% in 2006)
- Private vehicles account for no more than 62% of region wide journey to work trips. (68% in 2006)
- Vehicles entering the Wellington CBD during the 2 hour AM peak contain on average at least 1.5 people per vehicle. (1.37 people in 2006)
- Transport generated CO₂ emissions remain below 1,065 kilotonnes per annum. (1,118 in 2005/06)
- No more than 442 mega litres of petrol and diesel per annum will be used for transport purposes. (464 mega litres in 2005)
- Average congestion on selected roads will remain below 20 seconds delay per km travelled despite traffic growth. (21 seconds in 2006)

Appendix 2: Emissions reductions actions

2.1 The tables

Suggested initiatives are grouped according to the activity area of councils: leading, planning, pricing, regulating and funding.

Optimum timeframes for implementation are suggested. The terms “short, medium and long term” should be read in the context of this Plan’s 2050 time horizon. Short term should be read to mean 0-5 years, medium term 6 – 15 years, and long term will apply to any implementation beyond 2025.

Glossary of acronyms

RC/TA	Regional council/territorial authority
WRS	Wellington Regional Strategy
RPS	Regional Policy Statement
SOVs	Single occupancy vehicles
HOV	High occupancy vehicle
PT	Public transport
RLTS	Regional Land Transport Strategy
TDM	Travel demand management
HERS	Home energy rating system
SMEs	Small to medium enterprises
PV	Photovoltaic
LTCCP	Long Term Council Community Plan

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2.2 Transport

Many of the policies and programmes which will be necessary to reduce greenhouse gas emissions from transport lie within the control of central government. In particular, the largest reductions in transport emissions are expected to come from improvements to vehicle fleet efficiency, and changes to alternative fuels such as electric vehicles. Areas where the region's councils could support central government's efforts or fill gaps are in

- planning of road and rail infrastructure,
- provision of public transport,
- urban form and land use planning to manage travel demand and increase the active mode share.

Local government also has a supporting role to play through consents and planning/provision for migration of the fleet to more renewable energy sources.

2.2.1 Transport Assumptions

If central government, local government and individuals all take action on climate change, emissions in the transport sector could be reduced by 20% by 2025 and by 50% by 2050. It is assumed that to achieve this level of reduction:

1. Central government transport strategies will include significant emissions reductions targets.
2. Central government policies will be formulated and funded to deliver on these targets.
3. NZ will continue to be an early adopter of new technologies
4. Electric cars will become widely available by 2015 and widely affordable by 2025
5. International trends for uptake of active modes once infrastructure is provided are confirmed in the Wellington region.
6. Urban form and transport network routes influence each other.

Table 5 Suggested transport emissions reduction initiatives

Objective	Suggested initiatives to achieve target	Led by	Assisted by	Time frame	Co-benefits
To migrate the regional vehicle fleet to low carbon emission vehicles	Leadership				
	Facilitating/funding research, feasibility studies.	RC/TA		Short to medium term	
	Promoting migration of council fleets to cleaner energy vehicles.	RC/TA		Short term	
	Planning				<ul style="list-style-type: none"> Economic benefit through job creation, possible IP export if fleet migrated early
	Integrating at an early stage the planning for necessary infrastructure through regional implementation plan	RC	TA	Short to medium term	
	Including facilitation policies and strategies in WRS, RPS	RC	TA	Short to medium term	
	Pricing				
	Establishing incentives for lower-carbon vehicles, e.g. differentials in parking or other charges	RC/TA		Medium term	
Regulatory processes					
Fast-tracking of consenting processes.	TA		Medium term		
Funding					

To reduce kilometres travelled by SOVs.	Funding infrastructure including charging facilities	RC/TA		Short to medium term	
	Leadership				
	Facilitating/funding research, feasibility studies.	RC/TA		Short term	
	Promoting migration of council fleets to cleaner energy vehicles.	RC/TA		Short term	
	Planning				
	Integrating at an early stage the planning for necessary infrastructure through regional implementation plan	RC/TA		Short to medium term	<ul style="list-style-type: none"> Improved community resilience through creation of new relationship networks
	Including facilitation policies and strategies in WRS, RPS	RC	TA	Short term	<ul style="list-style-type: none"> Significant health benefits from increased active mode share
	Pricing				
Establishing incentives for lower-carbon vehicles, e.g. differentials in parking or other charges	TA	RC	Short term and ongoing	<ul style="list-style-type: none"> Downstream economic benefits from improved community health 	
Regulatory processes					
Fast-tracking of consenting processes.	TA	RC	Short to medium term		
Funding					
Funding infrastructure including charging	TA	RC	Short term and		

	facilities		ongoing
To increase the use of public transport	Leadership		
	Continuing strong promotion of PT	RC	Short term and ongoing
	Planning		
	Early planning for rapid increase in bus/HOV lanes	TA	Short term and ongoing
	Pricing		
	Using fare levels as incentives to increase uptake of PT option	RC through contracts	Short term and ongoing
	Funding		
	Increasing number of bus/HOV lanes	TA	Short term and ongoing
To increase active transport mode share	Improving PT as per RLTS – park and ride, integrated ticketing, timetable alignment	RC	Short term
	Expanding PT networks, increasing service levels	RC	Short term and ongoing
	Leadership		
	Encouraging active mode uptake amongst council staff (incentives)	RC/TA	Short term and ongoing
	Strongly promoting co-benefits of active modes	RC/TA	Short term and ongoing
	Continuing travel planning activities with		Short term and

schools and businesses

RC

ongoing

- Significant health benefits to community

Planning

Integrating planning at an early stage for necessary infrastructure

RC/TA

TA

Short to medium term

- Economic benefits from improved health – lower health costs, greater productivity

Reviewing existing cycle/walkways and planning safety improvements

RC/TA

Short to medium term

Including safe cycle and/or walking lanes as part of all roading developments/ refurbishments wherever feasible

RC/TA

Short term and ongoing

Developing options for new cycle/walkway networks with a view to inclusion in RLTS

RC

Short term

Regulatory processes

Developing subdivision rules requiring provision for safe active modes

TA

Short term

Funding

Implementing improvement programme for existing cycle/walkways

RC/TA

TA

Short term and ongoing

Developing new cycling and/or walking routes with emphasis on safety

RC/TA

Short term and ongoing

Including active mode routes in new road developments and refurbishments of existing,

RC/TA

Short term and ongoing

	and in subdivisions		
To manage travel demand	Leadership		
	Continuing travel planning activities with schools and businesses	RC/TA	Short term and ongoing
	Facilitating where possible the rapid deployment of high-speed broadband networks (see Wellington Regional Strategy)	RC/TA	Short term and ongoing
	Advocating for flexible employment approaches including work-from-home and “office-free days” scheme	RC/TA	Short term and ongoing
	Planning		
	Integrating planning for urban form and transport	RC/TA	Short term and ongoing
	Strengthening TDM measures in RLTS, District and Regional Plans etc	RC/TA	Short term
	Regulatory processes		
	Developing policies and rules for land use and developments which support TDM and increased use of rail by industry and services	RC/TA	Short term

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2.3 Non-Transport Energy (including electricity)

2.3.1 Non-transport Energy Assumptions

1. 90% of national electricity supply comes from renewable sources by 2025.
2. Carbon capture and storage is used to reduce emissions from the remaining 10% of electricity sources by 2050
3. Tidal power resource in Cook Strait can be brought on stream by 2025 (including resolution of any environmental and technical barriers).
4. Both tidal and wind energy resources in the region are fully exploited by 2050.
5. Photovoltaic technology advances make this energy source affordable and widely accessible by 2020.
6. Power companies' rates for buying back energy produced at household level (feed-in tariffs) are equal to or better than their sales tariffs by 2015.
7. Grow Wellington's Centre of Excellence for Sustainable Energy will considerably assist the region's migration to cleaner energy sources.

Table 6 Suggested non-transport energy emissions reduction initiatives

Objective	Suggested initiatives to achieve target	Led by	Assisted by	Time frame	Co-benefits
To manage the demand for energy from households (see also goals for efficient homes and businesses)	Leadership				
	Lobbying central government for low energy use standards for appliances	RC/TA		Short term	
	Promoting co-benefits of energy efficiency measures to households – insulation, energy efficient devices and appliances, solar hot water, household-level micro-	RC/TA	EECA	Short term and ongoing	<ul style="list-style-type: none"> • Improves resilience of system • Financial benefits

	generation, as appropriate.					to businesses, households
	Modelling desired outcomes with council buildings and housing stock.	RC/TA			Short term and ongoing	
To generate sufficient energy within the region from renewable sources to cover the region's energy usage	Leadership					
	Facilitating and advocating strongly for rapid development of Cook Strait tidal current energy resources	RC/TA	Electricity generators		Short to medium term	<ul style="list-style-type: none"> Major benefits for security of supply
	Supporting investigation of opportunities for bio-fuel crops in Wairarapa	RC/TA			Medium term	<ul style="list-style-type: none"> Significant economic benefits in job creation, potential IP export
	Working closely with energy supply companies to promote uptake of household-level generation	RC/TA			Medium term	
	Developing effective group to lobby central government on development of regional renewable energy resources	RC/TA			Short term and ongoing	
	Regulatory processes					
	Strengthening district and regional plans, RPS, WRS, to facilitate rapid renewable energy resource development	RC/TA			Short term	
	Funding					
	Establishing joint venture or consortium to ensure full and rapid exploitation of Cook Strait tidal current energy	RC (TA?)			Medium to long term	

To heat the region's homes cleanly and efficiently

Leadership

Facilitating specific research for this region

RC/TA

Short to medium term

Promoting co-benefits of energy efficiency measures to households – insulation, energy efficient devices and appliances, solar hot water, household-level micro-generation, as appropriate.

RC/TA

Short term and ongoing

Modelling desired outcomes with own buildings and housing stock.

RC/TA

Short term and ongoing

Developing effective group to lobby central government on HERS development

RC/TA

Short term and ongoing

Planning

Developing coordinated regional programme for insulation of homes, accessing government funds or filling the gap.

RC/TA

Short to medium term

Regulatory processes

Developing subdivision rules requiring provision for distributed generation, including at household level.

TA

Short term

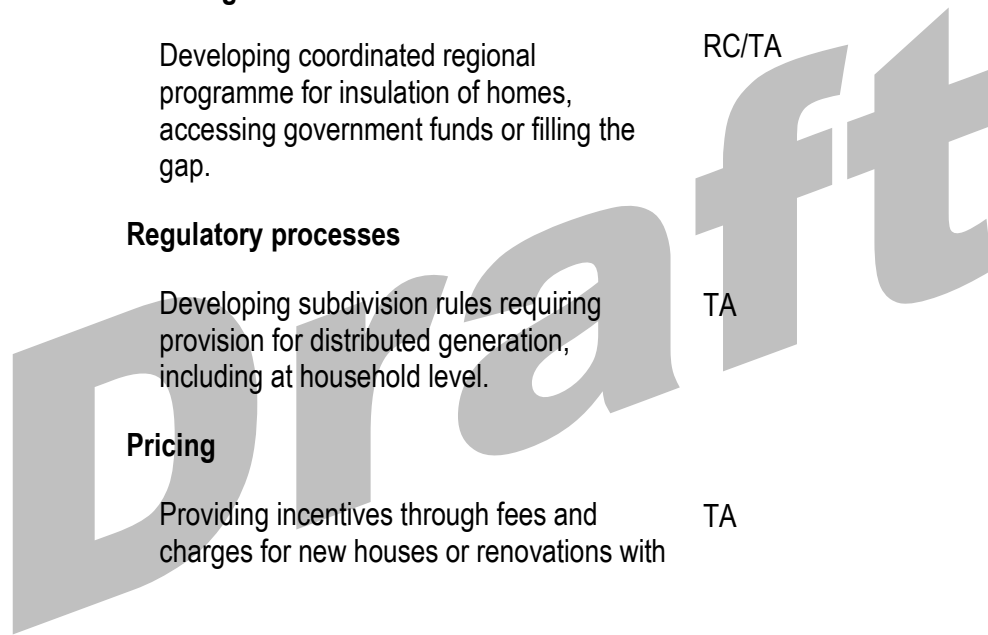
Pricing

Providing incentives through fees and charges for new houses or renovations with

TA

Short term and ongoing

- Significant health and financial benefits to residents
- Significant economic benefits to region through lower health costs, job creation and increased productivity



significant energy efficiency gains

Funding

Commissioning research.

RC/TA

Short term

Implementing a warm homes programme including insulation, clean heating methods.

RC/TA

Short term and ongoing

To encourage businesses to be more energy efficient

Leadership

Promoting energy efficiency measures to businesses

RC/TA

Short term and ongoing

Facilitating monitoring through developing close, cooperative relationships with businesses, industry, rural sector

RC/TA

Short term and ongoing

Sharing expertise with SMEs

RC/TA

Short term and ongoing

Developing councils' internal energy efficiency plans and publicising them

RC/TA

Short term

Leveraging councils' combined purchasing power to demonstrate early use of energy efficient appliances etc

RC/TA

Short term and ongoing

Advising businesses on government subsidies and grants for sustainable business initiatives

TA

Short term and ongoing

- Economic benefits through lowered costs
- Marketing advantage to businesses and region

	Regulatory processes				
	Developing incentives through green building codes for business refurbishments/new developments	TA			Short term and ongoing
	Funding				
	Implementing financial support programme for businesses wanting to become more energy efficient	RC/TA			Short term and ongoing
To develop a distributed generation network	Leadership				
	Advocating for and facilitating distributed generation from renewable sources, including at household level, local wind farms, possibly PV arrays etc	RC/TA	EECA?		Medium to long term
	Regulatory processes				
	Developing subdivision rules requiring provision of enabling infrastructure for distributed generation, including at household level	RC/TA			Short term
	Funding				
	Commissioning research	RC/TA			Short term and ongoing

- Improves resilience of system
- Financial benefits to businesses, households

To develop resilience of system through multi-source approach	Leadership				
	Advocating with community and central government for development of multiple sources of renewable energy in region – solar, wind, tidal, marine currents	RC/TA		Short term and ongoing	<ul style="list-style-type: none"> • Significant security of supply benefits • Financial benefits for households
	Advocating for and facilitating distributed generation from renewable sources, including at household level	RC/TA	EECA?	Medium and long term	<ul style="list-style-type: none"> • Household generation has major benefits in disaster recovery situations

2.4 Waste

Waste emissions are almost entirely within the control of local government, so although emissions from this sector are small, it is an area where significant gains may be possible at the local level.

Most of the following initiatives will be driven by the new Waste Management and Minimisation Plans (WMMP) that councils with waste management responsibilities are required to establish by the Waste Minimisation Act by 2012. In the Wellington region, the city and district councils are responsible for waste management and are exploring a regional WMMP. Any future waste initiatives will be driven by the legally required WMMP process, which may also affect current projects.

A small number of private operators are licensed to operate cleanfills but, under the conditions of their licences, these should not be accepting waste which generates emissions. As a result, it is likely that significant reductions in this part of the footprint can be achieved without having to depend on the actions of other agencies.

2.4.1 Waste Assumptions

1. Wainuiomata landfill closes by 2020.
2. Private cleanfills only receive clean fill (i.e. non-emissions producing).
3. Private landfills meet the same standards as council-owned landfills, including capturing landfill gas.
4. There is a growing local market for recycled and reused resources.
5. Cheap or profitable technologies for treatment/use of sewage sludge are available by 2050.
6. Most organic matter is diverted from the landfill waste stream by 2050, to composting or other beneficial uses.

Table 7 Suggested waste emissions reduction initiatives

Objective	Suggested initiatives to achieve target	Led by	Assisted by	Time frame	Co-benefits
To ensure landfill gas is collected	Leadership				
	Capturing gas at all council operated landfills.	TA		Short to medium term	
	Disposing of all council-controlled waste at landfills with gas capture facilities	RC/TA			
	Planning				
	Ensuring all landfill operators have plans to capture landfill gas in place by 2015	TA		Short term	

	Regulatory processes				• Improved air quality
	Establishing air quality rules which require landfill gas capture	RC		Short term	
	Funding				
	Implementing programme of migration of all council landfills to gas capture	TA		Short term	
To ensure organic waste is diverted from landfills	Leadership				
	Putting in place diversion schemes at all council landfills	TA		Short term	
	Supporting community composting schemes	TA		Short term and ongoing	
	Modelling desired behaviours at council events	RC/TA		Short term and ongoing	
	Advising and supporting schools and businesses	TA		Short term and ongoing	
	Planning				
	Beginning to plan for diversion of organic waste by 2012/22 LTCCPs	TA		Short term	
	Pricing				
	Putting in place incentives for diversion of	TA		Short to	

	organic waste at source		medium term	
	Funding	TA		
	Supporting community composting schemes through the various council funding policies		Short to medium term	
To use sewage sludge beneficially	Leadership			
	Supporting feasibility studies/pilot programmes to test beneficial uses	RC/TA	Short to medium term	
	Planning			
	Planning through LTCCPs as soon as viable beneficial use schemes identified	TA	Medium to long term	<ul style="list-style-type: none"> • Reduced water demand
	Regulatory processes			
	Changing discharge to land and discharge to water rules to provide incentives for beneficial use of sewage sludge once viable schemes identified	RC	Short to medium term	<ul style="list-style-type: none"> • More sustainable resource use
	Funding			
	Providing infrastructure, possibly through JVs	TA	Medium to long term	
To reduce construction and demolition waste	Leadership			
	Participating in REBRI and similar	RC/TA	Short term and	

schemes for own construction projects

ongoing

Developing collaborative relationships with businesses to promote reduction/reuse/recycling initiatives

TA

Short term and ongoing

Modelling desired behaviours at council events

RC/TA

Short term and ongoing

Advising and supporting schools and businesses

RC/TA

Short term and ongoing

Pricing

Developing and applying incentives for diversion of construction waste

TA

Short term

Providing financial incentives through consent fees, rates

RC/TA

Short to medium term

- More sustainable resource use.

Draft

2.5 Agriculture

Central government has recently announced plans to establish a Centre for Agricultural Greenhouse Gas Research by early 2010 which will focus on developing technologies that reduce emissions and improve on-farm efficiency and productivity. In particular it will concentrate on methane from farm animals and waste systems; nitrous oxide from farm animals and nitrogen fertiliser; and soil carbon from agriculture and horticulture. The councils in the Wellington region will monitor progress with this research with a view to implementing reduction measures for methane emissions as soon as is practicable. In the meantime, some measures are already available to reduce nitrous oxide emissions from agriculture and the councils will discuss these with the farming community.

Table 8 Suggested agriculture emissions reduction initiatives

Objective	Suggested initiatives to achieve target	Led by	Assisted by	Time frame	Co-benefits
To reduce N ₂ O emissions to the atmosphere	Leadership				
	Advocating for nitrification inhibitors, better fertiliser management with farmers	RC/TA		Short term and ongoing	
	Sharing knowledge and ideas with farmers.	RC/TA		Short term and ongoing	
	Planning				
	Conducting early research and consultation on incentive schemes	RC/TA		Short and medium term	<ul style="list-style-type: none"> • Potential productivity gains for farmers • Improved animal welfare with some initiatives
	Pricing				
	Establishing differential rates or service pricing schemes as incentives to farmers	RC/TA		Short and medium term	<ul style="list-style-type: none"> • Costs savings/efficiency gains with fertiliser use
	Regulatory processes				
				Medium term	<ul style="list-style-type: none"> • Fresh water quality improvements

Requiring N2O emissions reductions measures through rules and consent conditions RC/TA

Funding

Establishing grants/loan schemes to assist farmers with infrastructural costs RC/TA

Medium and long term

2.6 Forestry

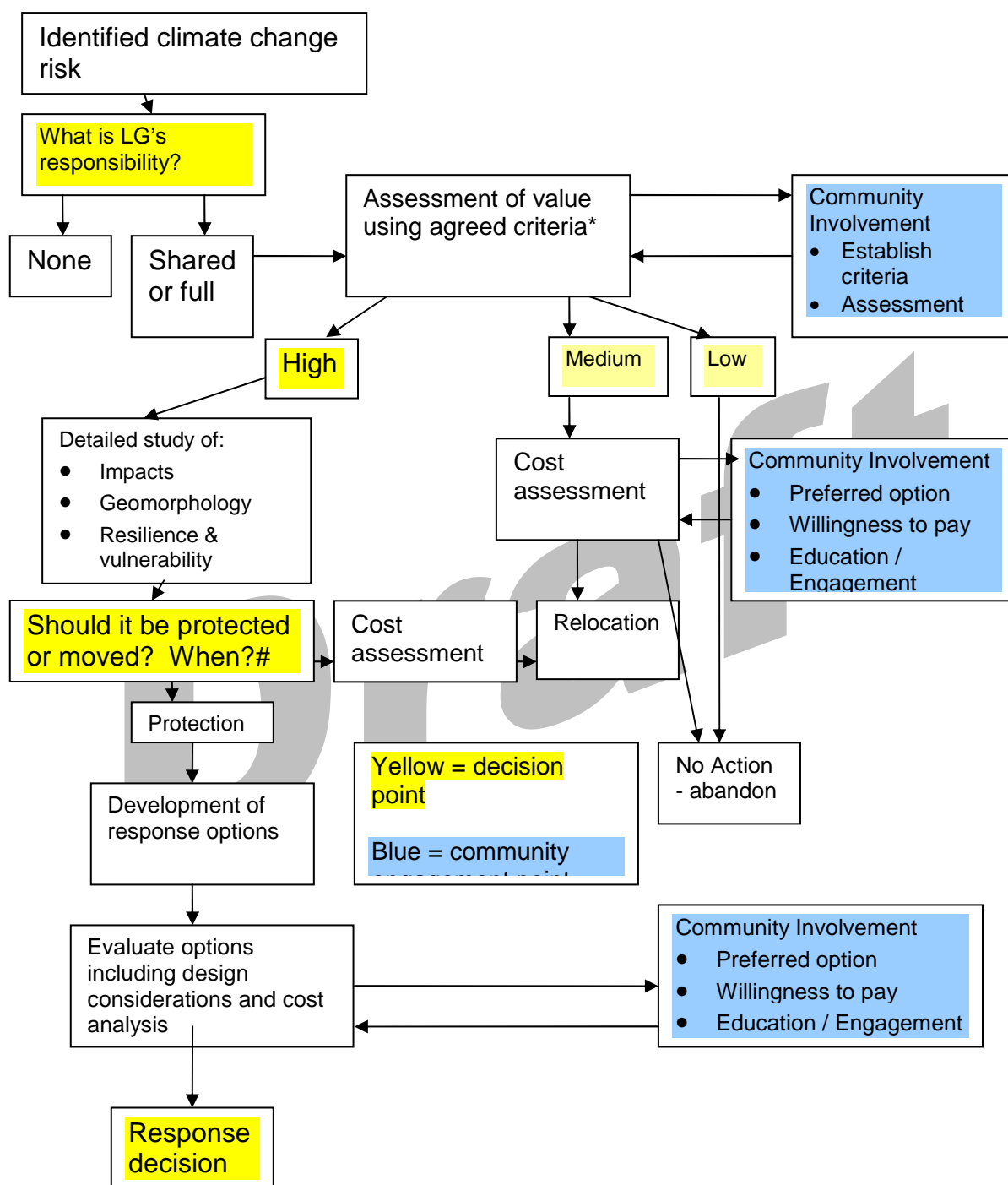
This area of focus will require significant discussion and input from the community. Forestry is a potential alternative activity to pastoral farming in some areas and a useful erosion control activity in the face of increased rainfall and storm intensity. Thus, increased activity in this area could both assist with emissions reduction and constitute a viable adaptation initiative. One of the issues to be resolved will be that of native versus exotic species and a balance between commercial forestry and permanent revegetation initiatives will need to be established.

Table 9 Suggested forestry initiatives

Objective	Suggested initiatives to achieve target	Led by	Assisted by	Time frame	Co-benefits
To achieve greater sequestration of carbon through increased forestry activity in region	Leadership				
	Increasing all councils' revegetation programmes	RC/TA	Reveg groups	Short term and ongoing	
	Support community groups and individuals with access to expertise and plants through council nurseries	TA	Universities/ CRIs	Short term and ongoing	
	Supporting research into appropriate species for planting	RC/TA		Short to medium term	

	Planning					
	Identifying suitable areas for reforestation to be included in Plans	RC/TA			Short term	
	Establishing forward programmes for reforestation of council controlled lands	RC/TA			Short term and ongoing	<ul style="list-style-type: none"> • Opportunity to support survival of key native flora and fauna
	Pricing					
	Identifying effective pricing incentives to encourage uptake of forestry on appropriate land	RC/TA			Short to medium term	
	Regulatory processes					
	Facilitating land use change to forestry through rules	RC/TA			Short to medium term	
	Funding					
	Including budgets in LTCCPs for revegetation programmes and community support	RC/TA			Short term and ongoing	
To ensure all regional sequestration activity is accounted for	Leadership					
	Working with appropriate central government agencies to ascertain accurate sequestration levels for native forests.	RC	CRIs		Short to medium term	<ul style="list-style-type: none"> • Opportunity to develop exportable IP

Appendix 3: summary of prototype adaptation decision-making framework



*Criteria used need to be developed and could include such factors as cultural significance, environmental impact, existence of key infrastructure, social/community importance, economic or financial value, opportunity costs, costs of doing nothing etc.

The timing of decision-making and initiation of responses will vary with the rate at which climate change effects play out. As a result, a contingency planning approach will be more effective than a fixed timeline. Planning lead times will need to be considered.