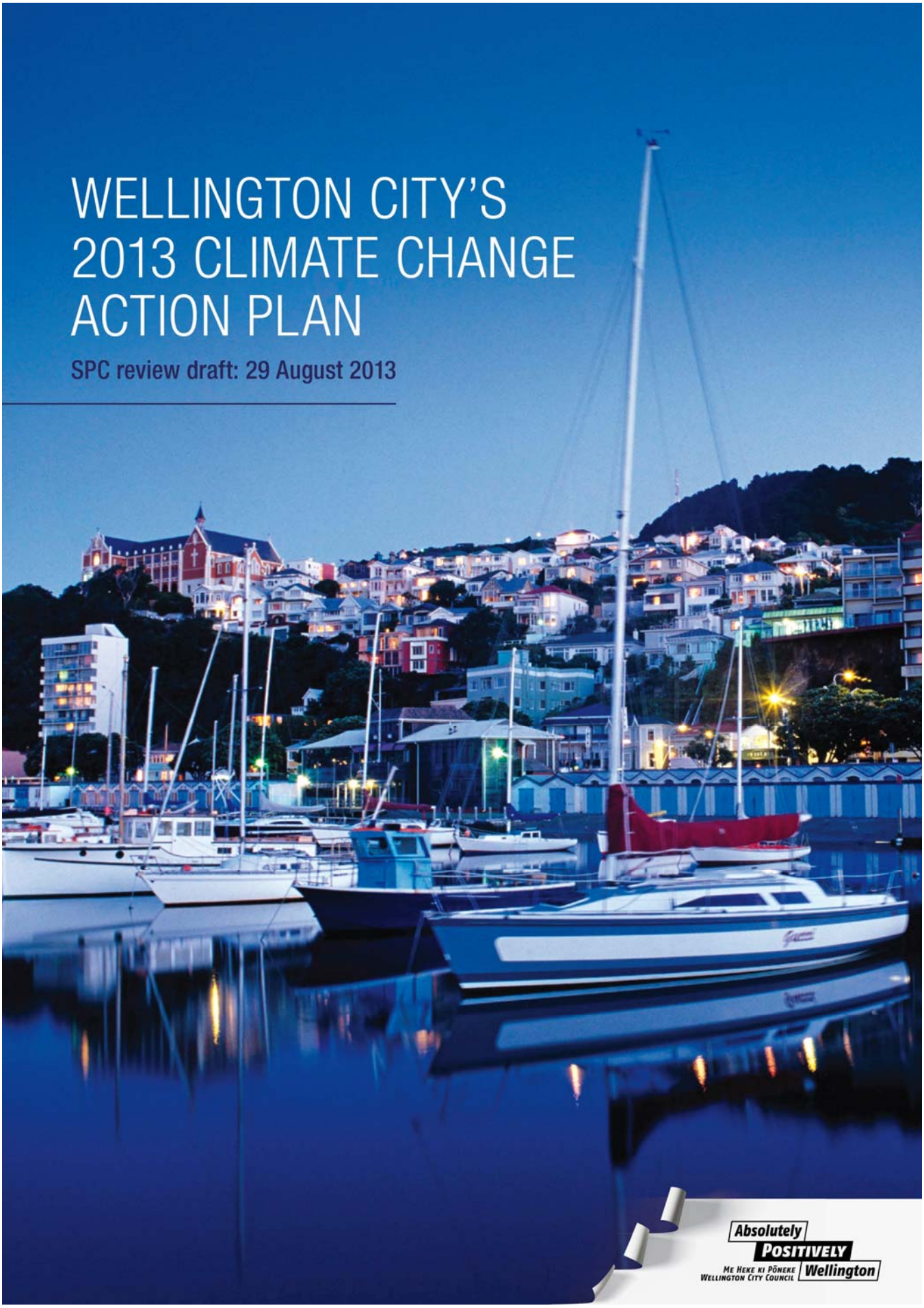
WELLINGTON CITY'S 2013 CLIMATE CHANGE ACTION PLAN

SPC review draft: 29 August 2013



Absolutely POSITIVELY Wellington
Me Heke ki Pōneke
Wellington City Council

Message from the Mayor

In July 2013, Sir Peter Gluckman, Chief Science Advisor to the Prime Minister, released a climate change assessment for New Zealand. He writes:

> "There is unequivocal evidence that the Earth's climate is changing, and there is strong scientific agreement that this is predominantly as a result of anthropogenic greenhouse gas emissions."

With significant climate impacts projected for our environment and economy, he makes the case that New Zealand must prepare for change. Our vulnerability to droughts and extreme storms has been driven home in the past year, and Wellington has just experienced its warmest winter on record. The local climate change impacts that we have experienced so far are modest compared to some of the impacts we are already seeing in other countries and on the global economy.

As climate science advances and we experience the realities of climate change, climate change action is shifting from the fringe to the mainstream, from the distant future to the present, and from a challenge to an opportunity.

This 2013 edition of Wellington City's Climate Change Action Plan builds on our accomplishments under the previous award-winning plan: increasing local renewable generation, insulating homes, improving energy efficiency, investing in public transport and encouraging more people to walk and cycle, trialling electric vehicles, planting trees and managing pests, increasing recycling and composting, and researching the impacts of a changing climate on our city.

This Plan sets out new initiatives that will help us to achieve the goals of our strategy *Wellington Towards 2040: Smart Capital*. These include:

- implementing Smart Energy Capital, which co-funds innovation in reducing energy use
- participating in the UN-Habitat City Resilience Profiling Programme and UNISDR Making Cities Resilient campaign
- growing Wellington's role as a centre of excellence for urban planning, resilience and ecological sustainability
- exploring opportunities for reducing emissions through an update of the Wellington Transport Strategy
- increasing the involvement of all communities in activities for climate change mitigation and adaptation.

Above all, this Plan is about working together as a city to safeguard our quality of life, our economic development and our natural capital. In 2012, Wellington won a first-place prize in the International Awards for Liveable Communities. The actions we take now on climate change will help determine the liveability of our beautiful city for generations to come.

Meeting Wellington's ambitious climate change objectives will require a major change in behaviour and investment across the city as part of our economic growth – not instead of our economic growth. We need to find cost-effective ways to increase renewable generation, make our homes and buildings more efficient, shift to low-carbon transport and enhance our forests. In the longer term, we need to shape our responses to sea level rise, whether through accommodation, strategic use of natural or engineered defences or retreat. Improving our resilience remains vital for both our physical safety and our economy.

In the coming year, Wellington City Council aims to launch major engagement on climate change mitigation and adaptation to build public support and commitment to action. The Council also expects to continue its efforts as an advocate for effective regional, national and international action on climate change.

We cannot respond to these challenges with "more of the same." Instead, let us work together as a city to unlock the transformational changes that will put us on a pathway toward resilient low-carbon development.

Wellington Mayor Celia Wade-Brown
September 2013

Contents

Overview

1. For Wellington to thrive in a future of growing carbon constraints and climate impacts, we need to take action to reduce our greenhouse gas emissions and our vulnerability to extreme weather events and sea level rise. Wellington is responding to this challenge through both mitigation and adaptation initiatives across the Council and the community.

2. The actions we have taken since 2010 are helping to limit emissions growth in the context of an expanding population and economy. They are also improving our quality of life, enhancing our resilience, creating business opportunities and helping to establish Wellington as a centre of excellence for urban planning, resilience and ecological sustainability.

3. In the 2013 Climate Change Action Plan, we are extending and improving existing initiatives and integrating new ones. Highlights include Smart Energy Capital, the refresh of the Wellington Transport Strategy, participation in UN resilience programmes and enhanced research partnerships.

4. Both the city and the Council have ambitious emission reduction targets. By 2020, the city aims for a 30 percent reduction from 2001 levels and the Council a 40 percent reduction from 2003 levels. By 2050, both the city and Council aim for an 80 percent reduction relative to the respective base year.

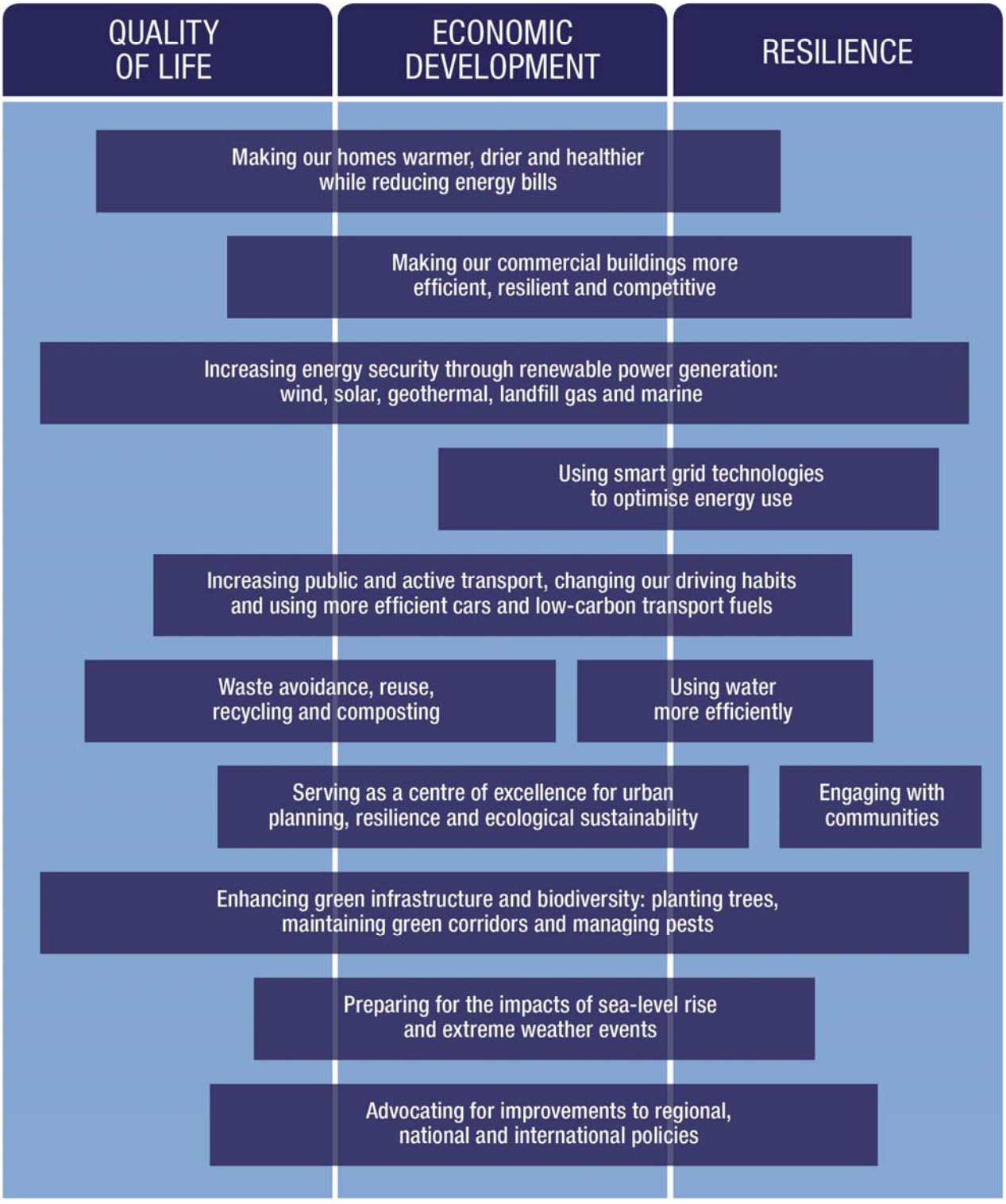
5. Achieving the plan's emission reduction targets and the longer-term objectives for change will require major shifts in behaviour, investment and action by Wellingtonians.

6. To help lead this change, the Council proposes to target the leverage points to gain big shifts: how we generate energy and use it in our homes and buildings, how we manage transport challenges, how we enhance our forests and how we achieve gains from compact development.

7. The 2013 plan creates a platform for launching stakeholder engagement on both mitigation and adaptation starting in the coming year. We want to gain broad support for resilient low-carbon development from businesses, communities and Māori as well as household and organisational commitment to action. We want to leverage public and private investment and create new partnerships to drive change.

8. Wellington will need supporting policies from, and partnerships with, regional and central government to achieve its ambitious climate change objectives. The Council aims to advocate for improving regional and national policies that have implications for climate change mitigation and adaptation.

CLIMATE CHANGE ACTION IS *SMART* ACTION FOR NEW ZEALAND'S CAPITAL



Wellington City's 2013 Climate Change Action Plan

Action area	Priorities for 2013–2015
Adaptation	Research climate impacts in Wellington Integrate adaptation into strategic resilience planning Engage with communities and stakeholders on risk and resilience Implement water-sensitive urban design
Buildings and energy	Implement the Smart Energy Capital fund Implement NABERS NZ™ benchmarking Extend Home Energy Saver Extend Warm Up Wellington Develop a rental housing warrant of fitness Incentivise solar energy development
Land transport and shipping	Improve public transport, road networks, walking and cycling Support compact city development Promote efficient vehicle technology and low-carbon fuels
Waste	Investigate improved sewage sludge treatment Develop a Regional Waste Education Strategy Improve packaging product stewardship Expand Kai to Compost
Council operations	Optimise the Council fleet Verify and benchmark the Council's corporate emissions Develop a Council energy management strategy Implement the Karori Recreation Centre solar project Improve water conservation Strengthen research partnerships Update the Carbon Management Policy
Forestry	Enhance forest sinks Extend pest management Enhance local government forestry partnerships
Aviation	Investigate emission reduction options under the proposed extension of the airport runway Develop an agreement with the airport Advocate for climate mitigation in the aviation sector
2020 emission reduction target	Target the leverage points to gain big shifts Measure our progress Grow community ownership, investment and action Advocate for progress beyond Wellington

Introduction

Climate change: A global and a local challenge

The climate has always shaped Wellington's way of life and helped to define our unique character. We are world famous for our wind, green spaces, harbour and exposed, rugged coastline.

Globally, significant and sustained changes to the climate system are being caused by emissions of greenhouse gases from human activity. If current emission trends continue, then over time changes such as higher temperatures, more frequent extreme weather events and sea-level rise will have serious and, in some cases, irreversible impacts on our environment, human health, economy and society. Although countries have agreed on a long-term goal to limit temperature increases to no higher than 2°C above pre-industrial levels, growing global emissions threaten to push this goal out of reach. Negotiations between countries are ongoing and the Intergovernmental Panel on Climate Change will issue its next comprehensive assessment report in 2014.

Leadership at all levels of government will be essential to deliver the required change in global emissions and prepare for the impacts of climate change. This includes local government, which shapes urban design and land-use planning, guides local economies and operates closest to the point of production, consumption and climate impacts.

Responding to climate change, however, is not just a matter of government policy. It is also up to individuals, organisations and communities to take meaningful and responsible action. We all have a part to play in the choices we make as producers, consumers and advocates for change.

Responding to climate change

Adaptation refers to preparing for the impacts of climate change so we can safeguard the community, the environment and the economy from likely risks.

Mitigation refers to avoiding or reducing greenhouse gas emissions or storing (sequestering) carbon dioxide in forests or geological formations.

Wellington's approach to climate change

Wellington City's approach to climate change will affect how we thrive as a city, demonstrate our leadership and support our international reputation. Smart actions we take with regard to climate change will also enhance our quality of life, economic development and resilience. For example, measures with climate benefits can:

- help make our city's environment, economy and society more adaptable to change

- promote biodiversity, effective land-use planning and improved air and water quality
- safeguard human health
- improve housing quality and transport
- provide secure sources of energy
- make our commercial buildings more competitive
- reduce waste generation and inefficient use of non-renewable resources
- provide incentives for technological innovation
- generate new business opportunities.

For the past decade, Wellington City Council has been committed to reducing the city's greenhouse gas emissions and planning for the effects of climate change. The Council published a Climate Change Action Plan in 2007 and an update in 2010 that was a category award winner in the Ministry for the Environment Green Ribbon Awards 2011. Through past plans, we have set ambitious emission reduction targets through until 2050. These are absolute targets; for example, they are not indexed to population or economic growth.

Greenhouse gas emission reduction targets for Wellington City and Wellington City Council

Scope	Base year	2010 (2009/10)	2013 (2012/13)	2020 (2019/20)	2050 (2049/50)
Wellington City	2001 (2000/01)	Stabilise (0% increase)	-3%	-30%	-80%
Wellington City Council	2003 (2002/03)	Stabilise (0% increase)	NA	-40%	-80%

This 2013 edition of the Climate Change Action Plan builds on the progress made to date in the broader context of *Wellington Towards 2040: Smart Capital*, which sets the long-term strategic direction for the city. This plan extends and improves measures started under the prior plan, and integrates more recent initiatives (consulted on previously) that will boost our effectiveness and improve how we measure our progress.

A key feature of this plan is that it places more emphasis on major engagement and active partnerships on climate change mitigation and adaptation across the city through 2015 and beyond.

Tailoring smart climate action to the Smart Capital

The 2013 Climate Change Action Plan is designed to accommodate the city's geography, climate and economy. As a hilly, coastal city close to the intersection of two major tectonic plates, Wellington experiences considerable seismic activity and intense weather. Most residents live within 3km of the sea, and significant parts of the city's infrastructure and economy are at risk from sea-level rise and tsunamis. Wellington can boast having over 200sq m of green space for every person.

Wellington's geographic location provides a critical transport link between the North and South Islands. It maintains strong national and international

connections through an international airport and a busy commercial and ferry port. Wellington has an exceptionally high quality of life, as reported by its citizens in regular surveys. Wellington was awarded first place in the 2012 International Awards for Liveable Communities.

Wellington has some important features that support effective climate action. In particular:

- there is access to renewable electricity generation from the city and the national grid
- our compact design, extensive public transport network, footpaths and cycleways help to reduce car use and improve travel efficiency in a city with a growing population and economy
- our local economy is dominated by service industries, creating opportunities for low-emission economic development and linkages to emerging clean-tech and knowledge-based global markets
- new commercial buildings are reflecting market demand for competitiveness and efficiency as shown by Green Star ratings
- the city has world-class universities and institutions engaged in research on mitigating and adapting to climate change
- improving our resilience to natural events is ingrained in our government institutions, businesses and communities.

In the 2010 Nielsen Quality of Life survey (which involves the eight major cities in New Zealand), 82 percent of Wellingtonians agreed or strongly agreed that they would change their lifestyle to help prevent global warming if they knew it would make a difference. This compared to a figure of 76 percent for the eight cities as a group.[i]

Climate impacts for Wellington

In July 2013, Sir Peter Gluckman, Chief Science Advisor to the Prime Minister, released an overview of the projected impacts of climate change for New Zealand. An increase of 1 ^{o}C (within a range of ±0.28^{o}C) has been observed since 1910. Under mid-range projections, New Zealand's temperature could increase by 0.9^{o}C by 2040 and 2.1^{o}C by 2090 above the average for 1980–2000. He writes:

> "For New Zealand, the resulting impact of changes in wind patterns, precipitation, and the chemistry of our oceans can be expected to be at least as significant as the changes in temperature itself. Such changes are not expected to be uniform across New Zealand; there may be pronounced differences between the North and South Island and between the East and West coasts, and there

are also likely to be unequal and important effects on seasonal patterns of rainfall and extreme weather events." [ii]

The impacts of climate change on Wellington over time could include:

- more frequent extreme storms causing flooding, slips and wind damage
- changing rainfall patterns and increased temperatures leading to pressures on water supplies and public health
- sea-level rise leading to increased coastal erosion and effects on underground infrastructure.

Sea-level rise is a very important consideration for New Zealand even though the specific rate is difficult to project. While global sea level has increased on average by about 1.7mm per year over the last century, that rate has increased to 3.5mm per year since the early 1990s. [iii] Wellington Harbour has experienced an average rise in sea level of about 2mm per year over the past 100 years; this includes the contribution from subsidence due to tectonic activity.

The Ministry for the Environment recommends that local government should plan for a base sea-level rise up through 2090–99 of 0.5 m relative to 1980–99, but consider the consequences of a 0.8m increase. Longer-term planning should account for further increases of 10mm per year.[iv] A report from the Potsdam Institute concluded that each degree of warming would lead to over 2m of sea-level rise in the long term.[v]

National context for climate change mitigation

The national context for Wellington City's climate change action continues to evolve. From 2008–2012, New Zealand had a target under the Kyoto Protocol to reduce net greenhouse gas emissions (including forestry) to 1990 gross levels (excluding forestry) on average. The Government expects New Zealand to have complied with this obligation when international reporting concludes in 2015. However, national emissions excluding forestry have increased over 22% between 1990 and 2011, and Kyoto compliance has been achieved largely through domestic forestry and purchasing Kyoto emission units generated from offshore reductions.

The Emissions Trading Scheme (NZ ETS), which came into force in 2008, is New Zealand's primary climate change measure. It covers all six greenhouse gases under the Kyoto Protocol and all economic sectors except agriculture (obligations for non-energy agriculture emissions have been deferred). Wellington City Council and other entities in the city with obligations must comply with the NZ ETS. Eligible owners of forest land established after 1989 can opt into the NZ ETS to receive emission units.

In late 2012, the Government announced that it would not enter into a second commitment period under the Kyoto Protocol, but would instead set a non-binding target through to 2020 under the UN Framework Convention on Climate Change. In August 2013, the Government announced an

unconditional emission reduction target of 5 percent below 1990 levels by 2020. This is less ambitious than the conditional pledge of a 10-20 percent reduction initially tabled in the negotiations; however, it is possible that during further negotiations New Zealand might increase its target ambition.

Wellington's commitment to climate change action sends an important signal. City leadership and partnerships across the city and at all levels of government will remain critical to meeting Wellington's ambitious greenhouse gas emission reduction targets for 2020 and beyond.

Facts and figures for Wellington City

General

- Population: 202,200 (June 2012)
- Projected population by 2031: 230,614
- Land area: 28,990ha
- Total greenhouse gas emissions excluding forestry: 1.1 million tonnes CO_2-e (2009–10)
- Greenhouse gas emissions per person excluding forestry: 5.8 tonnes CO_2-e (2009–10)

Stationary energy (e.g. electricity and heat)

- Share of Wellington's emissions from energy: 94% (2009–10)
- Share of renewable electricity in New Zealand: 77% (2011)
- Households powered from Wellington's landfill gas-to-energy plant: about 1000

Transport energy

- Share of Wellington's emissions from land transport: 35% (2009–10)
- Share of Wellington's emissions from aviation: 17% (2009–10)
- Share of workers who walk, run or cycle to work: 17%
- Share of workers commuting by public transport: 17%
- Average number of motor vehicles per household: 1.3 (the lowest among New Zealand cities)
- Average distance travelled from home to work and back per day: 12.2km
- Share of commuting trips made by car, truck or van: 45%
- Share of commuting trips made by public transport, walking or cycling: 34%
- Share of the workforce located in the central city: 70%

Forests

- Impact of forestry on Wellington's emissions: 4% offset (2009–10)
- Council land enrolled in the Government's Permanent Forest Sink Initiative: 1464ha
- Council pine forest registered in the NZ ETS: 32.3ha
- Area of Council-owned reserve land: 3500ha

Adaptation

- Total sea-level rise in Wellington over the last 100 years: 200mm
- Current rate of sea-level rise in Wellington: about 2mm per year
- Population living within 5m above sea level: 10%

2013 Residents' Monitoring Survey

- Share of Wellingtonians who agree or strongly agree:
  - Wellington is working to reduce its greenhouse gas emissions: 43%
  - Wellington is well prepared to respond to natural events: 36%
  - Wellington is taking appropriate action to prepare for long-term sea level rise: 17%
- Breakdown of weekday travel into central Wellington: car (33%), motorbike/scooter (2%), bike (3%), walk (20%), bus (34%), train (6%), other (2%)

- Perceived proportion of Wellington businesses that are taking at least some actions to reduce their environmental impact: 77%

Wellington City inventory data for 2009-10 are based on best available information and may be revised.
Data on transport behaviour are from Statistics New Zealand (2006).
Data on sea level rise include subsidence due to tectonic movement.

Wellington's greenhouse gas emissions

Most of Wellington's greenhouse gas emissions come from energy used to power homes, commercial buildings and transport. Industrial production, waste management and agriculture are relatively minor contributors. Forests offset about 4 percent of the city's emissions by removing carbon dioxide from the atmosphere.

Overall, Wellington's emissions differ significantly from the national profile; nationally, nearly half of the emissions are methane and nitrous oxide from agriculture, and forests offset nearly 20 percent of emissions.

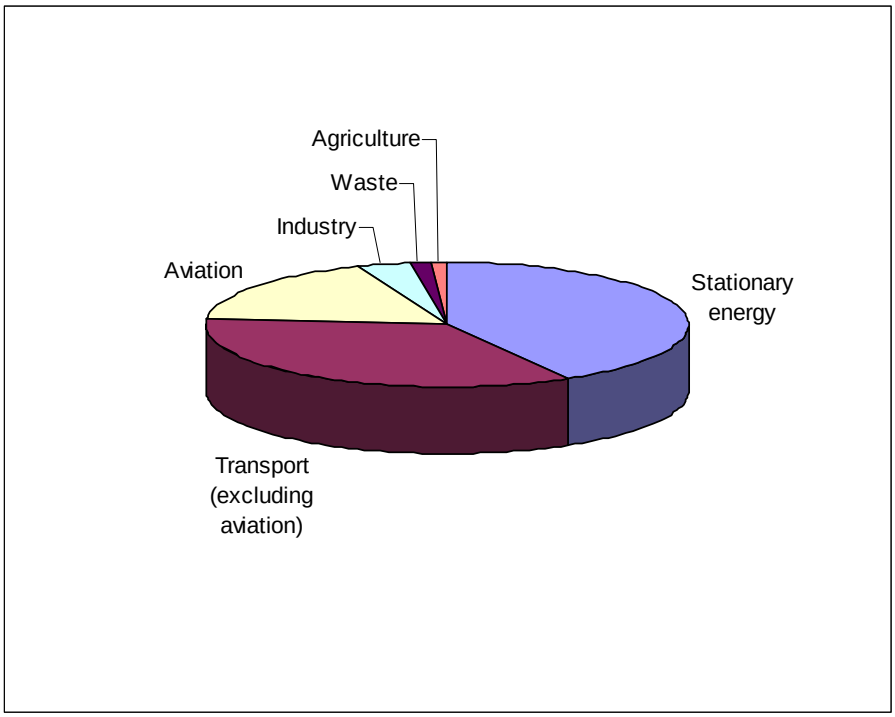
Wellington City's most recent inventory of greenhouse gas emissions was prepared for 2009–10 using a methodology developed under the Communities for Climate Protection Programme. Its methodology diverges from the national GHG inventory in some respects.[vi] The table and graph below give an overview of the city's emissions profile using the best available data at the time of publication. Excluding forestry, Wellington's emissions totalled about 1.1 million tonnes CO_2-e in 2009–10, which was equivalent to 5.8 tonnes CO_2-e per person per year.

Wellington City greenhouse gas inventory 2009–10

Sector	kt CO_2-e	% of total gross emissions
Stationary energy	475.9	41.6
Transport (excluding aviation)	397.8	34.8
Aviation	199.8	17.5
Industry	39.8	3.5
Waste	17.1	1.5
Agriculture	12.3	1.1
Total gross emissions	1142.6	100.0
Forestry	-48.9	-4.3
Total net emissions	1093.7	NA

Note: These data are subject to revision.

Wellington City greenhouse gas inventory excluding forestry 2009–10



Based on the best available information at the time of publication, the city appeared to have tracked well against the target to stabilise emissions at the 2000–01 level in 2009–10. However, methodological differences and data uncertainties may mean that the two numbers are not fully comparable and further assessment is needed. The city's progress against its targets will be reassessed when revised greenhouse gas inventory data become available from the first quarter of 2014.

It is worth noting that during that decade, the city's population increased by about 20 percent and GDP by about 29 percent, which suggests movement toward decoupling of economic growth and greenhouse gas emissions.

Overview of the Climate Change Action Plan

The 2013 Climate Change Action Plan builds on the approach taken in the 2010 Plan. Actions continue to be grouped into seven areas: adaptation, buildings and energy, land transport and shipping, Council operations, forestry, waste and aviation.

However, we are adapting the Plan in alignment with the Council's strategy *Wellington Towards 2040: Smart Capital*. Among other goals, this involves strengthening the transition to a low-carbon city, achieving high standards of performance against environmental measures and developing an economy increasingly based on 'green' innovation.

In order to deliver on this strategy, a cross-Council team was brought together to create the Our Living City work programme. This team focuses on projects to grow and enjoy our natural capital, transform our economy, reduce our impact on the environment and show leadership. The Climate Change Action Plan now falls within the scope of the Our Living City programme so it can be integrated with other Council projects.

The 2010 Plan identified high-level objectives which are relevant to *Wellington Towards 2040: Smart Capital* and have been updated with minor modifications in the 2013 Plan as follows:

- **Resilient communities**: Wellington's communities, government agencies and businesses will be well prepared for the impacts from climate change.
- **Renewable energy**: Wellington generates more renewable electricity than we need, with the surplus going to the rest of the country, and supports broader fuel switching to renewable energy (e.g. for transport).
- **Growing sustainable transport**: Wellington makes the most of its compact form and high use of public transport by focusing development around existing centres. More people are walking, cycling and using public transport, and making fewer trips by car.
- **Early adopter of electric vehicles**: Wellington encourages electric vehicle use.
- **Centre of excellence:** The Wellington region becomes a centre of excellence for urban planning, resilience and ecological sustainability through partnerships with research institutions and support for clean technology development.
- **Green office hub**: Wellington's CBD is recognised as a hub for sustainable, energy-efficient commercial buildings and green building design innovation.
- **Warm, efficient homes**: Wellington's older housing stock is upgraded to create healthier living environments and more energy-efficient homes.
- **A city of forests**: Wellington continues to expand forest networks on public and private land through natural regeneration of reserves and rural land, plantation forestry, planting in road reserves and tree planting along main streets.
- **Resources from waste**: Wellington City and our regional partners develop new approaches to waste management that result in commercially-viable ways of reducing the amount of waste going to landfills and increasing the use of methane to produce energy.
- **Carbon neutral vision**: Wellington City aspires to become carbon neutral.

The 2013 Climate Change Action Plan reflects these longer-term climate change objectives for the city but focuses on measures to be achieved from 2013–15. These measures are supported by budget allocations in the Long-term Plan 2012-22 and the Annual Plan 2013-14.

During 2013–14, we will start longer-term engagement with the public to help us plan how the city will achieve its 2020 target for reducing greenhouse gas emissions and address city-wide planning in preparation for sea-level rise. The outcome of this will form the basis of the 2015 update of the Climate Change Action Plan and be reflected in decisions under the Long-term Plan 2015-25.

Action area 1: Adapting to a changing climate

The Council's work on adapting to climate change has highlighted the importance of holistic assessment of the likely impacts and including other major risks or hazards faced by the city – such as earthquakes, tsunamis and storms. Our involvement in resilience programmes with UN agencies and leadership by the city's research institutions on resilience planning puts us in a strong position to work collaboratively with a wide range of organisations.

The Council has been recognised for its leading work in this area, particularly on sea-level rise. The Council was on the organising committee for the New Zealand Climate Change Centre's annual conference in May 2012 (on the topic of sea-level rise), and a member of the steering committee for the Victoria University series of Climate Change Roundtables (run by the Institute of Governance and Policy Studies). However, much work remains to be done.

Extreme weather events

Climate change is impacting on the conditions underlying extreme weather events, with more frequent, higher-intensity storms and periods of drought expected as temperatures increase. The combination of such events with sea-level rise will pose significant challenges to the city. Our resilience has been tested by the experience of extreme weather events over the past year.

The summer of 2012–13 was the driest in over 90 years in Wellington. The pressure this placed on regional water supplies, stormwater and sewerage systems was magnified because the city's bulk supply reservoirs were being earthquake strengthened. The estimated cost of the drought to the country was $1-2 billion.

In June 2013, the city was hit by a storm comparable to the 1968 Wahine storm, with significant damage to roads, seawalls and houses. The cost to the city was initially estimated at $4 million.

The winter of 2013 was the warmest in Wellington since records began in the 1860s, with temperatures 1.3^{o}C above average.

Now is the right time for us to begin considering climate change adaptation in all that we do – as a city and as a Council. It is not just an issue for the distant future; there will also be significant short-term impacts. It is not just an issue for city planning; businesses also need to consider how climate change will impact on their business models, supply chains and customer demand. We have an array of choices in how we respond. For example, in the case of sea level rise, we can accommodate the changes, enhance natural or engineered defences, or retreat and focus longer-term development in less vulnerable parts of the city. Planning and decision-making can take some time, so acting

early allows time to explore the options and respond appropriately to improve our resilience. We have a vision of becoming a true international 'Centre of Excellence' in resilience planning.

Progress: 2010–12

Sea-level rise impact assessment

We have carried out scenario mapping and modelling, and completed an initial assessment of the likely impacts and response options for sea-level rise. Areas of the city most likely to be most affected are low-lying and often on reclaimed land, including the CBD, Kilbirnie, Rongotai, State Highway 2, Miramar and Makara Beach. Research commissioned in collaboration with Greater Wellington Regional Council has shown that Wellington has the highest rate of relative sea-level rise in New Zealand, as the land is also subsiding. Further research has modelled storm-surge and wave run-up throughout the region, which can be combined with sea-level scenarios to identify the most at-risk areas.

Resilience and asset management

The vulnerability of Council assets to the effects of climate change has been assessed, and comprehensive guidance for including climate change considerations in asset management plans has being provided to our asset managers. Guidelines to encourage low-impact urban design are being developed. A guide to water-sensitive urban design (WSUD) has been produced to improve stormwater management through the use of natural drainage and planting. Work is continuing to assess the potential for a green roof on the Central Library.

In 2012, Wellington was selected as one of only 10 international cities for the four-year UN-Habitat City Resilience Profiling Programme. This involves developing measures of urban resilience and emphasises establishing links between climate change adaptation and natural hazards. Wellington has also been selected by an international scientific committee[vii] as an 'International Centre of Excellence' in community resilience research. This will provide opportunities for scientific work in the Asia-Pacific region and put the city on the map for research into community resilience.

Collaboration

We have worked closely on climate change adaptation with other local authorities, particularly on coastal issues, and aim to strengthen connections with Dunedin City Council particularly on coastal erosion and groundwater salination. We are learning from the development of coastal hazard zoning on the Kapiti Coast. A number of councils have sought our expertise, including Auckland, Lower Hutt, Nelson and Tasman, and we have also provided advice to Apia in Samoa (via a referral by Local Government New Zealand).

The Council has worked with researchers at Victoria University in the Psychology Department (which surveyed public perceptions of sea-level rise); the Climate Change Research Institute (which held workshops for invited local government participants in Nelson and Tasman districts); and the Institute of

Governance and Policy Studies (which runs a regular series of roundtable discussions on climate change).

We have assisted the National Institute of Water and Atmospheric Research (NIWA) in the development of its Urban Impacts toolbox for local government adaptation. Collaboration with central government has included giving presentations on climate change adaptation to the Ministry for the Environment and the Treasury's National Infrastructure Unit, and input into the climate change section of the Environmental Domain Plan by Statistics New Zealand.

Priorities: 2013–15

Research climate change impacts in Wellington

The science of global warming is clear; however, some of the impacts from climate change are not. For example, with sea-level rise, the damage potential from storm surges, rising water tables and groundwater salination should be considered, but there are gaps in our knowledge regarding these effects.

The Council will continue to work with research institutes on projects related to climate change adaptation and resilience. We are involved in a four-year project with NIWA and Landcare Research, with funding from the Ministry of Science and Innovation, on climate change, impacts and implications.

As a City Council, we also need to better understand the likely impact of the planning decisions we take (or the implications if we choose not to make decisions and continue with business as usual).

Integrate adaptation into resilience planning

Planning for climate change adaptation must be considered alongside other natural hazards. For example, a higher water table caused by rising seas may exacerbate the potential for liquefaction in some areas.

It is also more efficient and effective to engage with citizens on wider issues of risk and resilience. When talking with a community about earthquake preparedness, we can include discussions on climate change adaptation and response options. Preparation for tsunami hazard is also relevant to coping with sea-level rise.

While the 2010 Plan advocated a city climate change adaptation strategy, the Council is supporting a more holistic approach to city risk management. This is reinforced by the recent experience with damage from landslides, storms and the July 2013 Wellington earthquakes, including damage to coastal margins at the port and on the south coast.

Engage with the public on risk and resilience

Under the 2013 Plan, we will conduct in-depth engagement on risk and resilience with citizens and stakeholders. This engagement is currently in the planning phase, and possible approaches will be tested internally across the Council, Council Controlled Organisations and Council reference groups.

Wider public engagement that builds on the testing phase is scheduled to begin in 2014.

Using a mix of panel sessions, community displays and discussions, design competitions and other processes, we will gather ideas from communities which can be shared more broadly and will, in turn, feed into our asset management investment, review of the District Plan, and the Wellington spatial plan. We hope that this engagement will:

- Increase common understanding of the risks we face
- Clarify what decisions will be required, and when
- Facilitate community dialogue and problem solving
- Guide strategic decision making with broad public support on coastal planning and economic development.

Implement water-sensitive urban design

Prescribing WSUD represents a monumental shift in water management and urban development with the potential for significant cost savings. WSUD will reduce rainwater inundation of the drainage network and incidents of flooding and sewer overflows to the sea, helping to improve marine water quality, reduce energy consumption for water management, bring more native flora and fauna into urban areas and improve the quality of life for Wellingtonians. We will produce an action plan for the implementation of WSUD across the city and continue to implement WSUD projects. One example is the National War Memorial Park, which will incorporate tree pits and rain gardens to detain and filter stormwater.

Action area 2: Buildings and energy

Stationary energy (i.e. energy consumption excluding energy for transport) accounts for over 40 percent of Wellington's greenhouse gas emissions. These emissions mainly come from burning fossil fuels (eg coal, natural gas and LPG) for electricity generation, heating and industrial production. In Wellington, most of this energy is used to power homes and buildings.

In the Climate Change Action Plan, the buildings and energy sector has three main components:

- emissions from energy used in residential buildings
- emissions from energy used in commercial and industrial buildings
- large- and small-scale energy generation in Wellington.

Wellington has around 70,000 rateable residential units, which include single family homes, apartments and townhouses. The city also has several thousand commercial, institutional and industrial buildings – from office buildings, municipal facilities, schools, universities and hospitals to corner dairies.

On the energy-generation side, Wellington is proud to be home to one of the world's most productive wind farms and a new commercial wind farm under

construction. We also have potential for more solar and marine generation. While New Zealand typically generates over 70 percent of its electricity from renewable sources (77 percent in 2011), the remainder comes from fossil fuels. The electricity that Wellington imports from the national grid reflects the national power mix and the associated emissions are counted in our city's greenhouse gas inventory.

The buildings sector offers significant potential for a reduction in emissions. The primary mitigation options in Wellington are to increase renewable generation and improve the energy efficiency of households and businesses.

Progress: 2010–12

Council-led initiatives

Home Energy Saver programme

With our service provider Home&dry, we have completed free home energy assessments for over 1200 households since August 2011. As part of the programme, we have installed 1400 energy-efficient light bulbs, 400 efficient showerheads and 370 draught stoppers for doors and windows.

Warm Up Wellington

We have worked with the Energy Efficiency and Conservation Authority (EECA), Capital Coast District Health Board and other funding partners to insulate over 560 low-income homes with our service providers Eco Insulation and Sustainability Trust.

Business energy saver programme

In 2011, the Council entered into a funding partnership with EECA as part of their Energising Business programme. This involved supporting businesses to undertake energy assessments and energy retrofits. There was very little uptake of the programme in Wellington, which reflects a national trend. We have since focused our business partnerships in other areas, as discussed below.

Encouraging renewable energy

We have initiated several projects to encourage and promote the uptake of renewable energy technology, including:

- new rules in the District Plan to exempt solar panels from requiring a resource consent (which applies to most installations)
- new rules in the District Plan to allow small-scale wind turbines of less than 5kW in residential areas, providing they comply with noise and height requirements
- creating a solar map that allows residents, businesses and other users to calculate the solar energy potential of their rooftops.

What others are doing

Green buildings

Wellington has eight Green Star-rated commercial buildings and three offices that have received Green Star ratings for office fit-outs. The city is home to the first ever Green Star-rated building in New Zealand, the first 6-Star-rated office fit-out and the first 5-Star-rated building from a building renovation. Since 2007, nearly 95 percent of the net leasable area of newly constructed office buildings of A-grade and above has been Green Star rated.[viii]

The city's universities are also leading the way with innovative building designs. Victoria University's Alan MacDiarmid Building won a gold award for excellence for its heating and ventilation system, and Massey University's new, award-winning College of Creative Arts building, known as Te Ara Hihiko, uses world-leading seismic engineering technology and passive heating and cooling.

Examples of building innovation

Meridian First Light House

Victoria University was selected as one of 20 university teams to compete in the US Department of Energy Solar Decathlon 2011 – the only entry, ever, from the Southern Hemisphere.

Their entry – the Meridian First Light House – was awarded third place overall. The house also won the Engineering section, came first equal in Hot Water and Energy Balance, second for Architecture and third for Market Appeal. The Meridian First Light House produced more energy than it consumed over the competition period, achieving net zero energy consumption despite 10 days of unfavourable weather.

Amesbury School – Churton Park

Amesbury School opened in 2012 – the first new school in Wellington for some 25 years – and caters for 400 students. The school received a Green Star 5 rating for design of an educational facility and is the first Green Star-rated school in Wellington. The design incorporates passive solar heating as well as very high insulation levels.

Warm Up New Zealand

EECA's Warm Up New Zealand programme started in July 2009. Up until June 2013 more than 12,000 Wellington homes had insulation installed or topped up and around 2160 homes received a clean-heat retrofit.

Including the substantial health benefits from insulating homes, the benefit/cost ratio of Warm Up New Zealand has been assessed at 3.6.[ix]

Renewable generation

Wellington already has a significant renewable energy resource with Meridian Energy's Project West Wind. Located 7km from the city centre, this 62-turbine, 142MW wind farm is among the most productive wind farms in the world. Last year it produced 475GWh of electricity – enough energy to power

71,000 average homes (for reference, Wellington had about 69,000 occupied dwellings in 2006).

Meridian Energy has also commissioned work on the Mill Creek wind farm. The 26-turbine project in Ohariu Valley will generate up to 59MW. Unlike Project West Wind, which feeds into the national grid, the Mill Creek wind farm will feed directly into the Wellington grid through the Otari sub station.

On a smaller scale, the Brooklyn wind turbine operates with a 0.225MW capacity (enough to power about 80 homes) and the Southern Landfill gas generator has capacity of 1MW.

Low-carbon technologies

Business owners in Wellington are starting to invest in low-carbon technologies. Examples include:

- Food wholesaler Moore Wilson's has installed a 25 kWp solar array on its roof to help power its operations.
- The Wharewaka building on Wellington Waterfront uses a seawater-powered heat pump to heat the building.

Marine energy testing centre

The Heavy Engineering Research Association (HERA) is taking the lead on setting up a marine energy testing centre, which would test devices for capturing the marine energy potential off the Wellington coastline.

HERA will submit a detailed business case to the Government later this year, and is working with international companies and organisations for sponsorship and to identify potential customers for the centre (should it be implemented). The Council has provided a grant to HERA to assist with the business case.

Priorities: 2013-2015

Implement the Smart Energy Capital fund

The Council has allocated $250,000 per year from 2013–15 to the Smart Energy Capital fund to catalyse energy projects in Wellington. By partnering with organisations with similar objectives, we will co-fund and implement projects that can be implemented at a significant scale, focus on reduced energy consumption and distributed energy generation, and result in co-benefits (eg health and economic development). The Council has invited "expressions of innovation" from interested parties.

Implement NABERS NZ™ benchmarking

We are working with EECA, commercial property owners and tenants to encourage uptake of the NABERS NZ™ energy benchmarking tool, which helps property owners and tenants assess and improve their building's energy performance.

Extend Home Energy Saver

The Home Energy Saver programme will continue through to 2015 with some refinements. We are working with banks, energy companies, energy specialists and social enterprises to explore more integrated approaches to home assessment combining energy efficiency, water efficiency, earthquake resilience and potential for distributed renewable generation.

Extend Warm Up Wellington

We are continuing to work closely with EECA, Capital and Coast District Health Board and the Sustainability Trust as our service provider, so that more low-income homes can be insulated under the Warm Up scheme.

Develop a rental housing warrant of fitness

Work is underway with our partners in local government, research institutions and the health sector to develop a voluntary warrant of fitness tool for rental housing. If the tool is developed, we would run a pilot programme for stand-alone Council housing and with responsible landlords.

Encourage uptake of solar energy

Banks, energy companies and solar panel installers are setting up new financial products to make solar technology more affordable. We are working with the various partners to see how we can help to encourage uptake of solar energy.

Action area 3: Road transport and shipping

Greenhouse gas emissions are generated by the use of fossil fuels such as diesel, petrol and LPG for road transport and shipping. Emission rates can be brought down by reducing traffic congestion and the number of car journeys (e.g. by carpooling and increasing use of public transport as well as walking and cycling), improving how we drive, using more fuel-efficient vehicles, and switching to low-carbon transport fuels such as renewable electricity and biofuels.

Transport is one of the Council's strategic priorities, with funding made available for projects on walking, cycling and public transport as well as urban transport planning. Encouraging people to consume less transport fuel not only reduces the city's greenhouse gas emissions but can also improve people's health and safety, reduce noise, lower vehicle operating costs and make the city less reliant on oil supply. The Council works alongside regional and central government to prioritise, fund and implement major transport projects.

NZ has a total of 103 registered electric cars (as of June 2013); of these, 23 are registered in the Wellington region. The regions' rate of ownership of electric cars and motorcycles is about twice the national average. Use of electric motorcycles, scooters and bicycles has grown significantly in the city in recent years.

Progress: 2010-2012

Public transport, walking and cycling

To help speed up bus travelling times and reduce congestion, more bus lanes have been installed along the Golden Mile and on other main bus routes. Real-time information screens also help to provide a more reliable service. More bus shelters have also been installed. Cycle lanes have been extended and cycle boxes installed in parts of the city

The Council supports targets for increased public transport use as identified in the Regional Land Transport Strategy, and has partnered with Greater Wellington Regional Council and the New Zealand Transport Agency (NZTA) in the development and implementation of the Ngauranga to Airport corridor plan. We are involved in the development and delivery of the Regional Land Transport Programme.

Compact city development

Growth has continued to consolidate within the urban growth corridor which aligns with public transport routes. Recent work to improve infrastructure, redesign roads and implement policies that encourage more mixed-use and higher-density development in key centres has been occurring in the Central City, Kilbirnie, Johnsonville and Miramar. The city also benefits from continual improvements to broadband infrastructure, which provides an opportunity for more people to work from home, easing pressure on transport infrastructure.

In 2012, an initial progress review under the 2006 Urban Development Strategy found less greenfield and low-density development than projected (22 percent compared to the projected 34 percent), more high-density and apartment growth (41 percent compared to the projected 36 percent), and more medium-density infill (37 percent compared to the projected 30 percent). This indicates a changing pattern of settlement in Wellington and underscores the growing demand to live near convenient urban sub-centres, allowing more active travel and lower car dependency and carbon emissions.

New fuels and transport technology

We led a pilot project with business partners to trial eight Mitsubishi iMiEV electric cars. Our partners included NZ Post, The Wellington Company and Meridian Energy. With Z-Energy an electric vehicle charging post was installed. The Council continues to run one pure electric car as part of its vehicle fleet.

EECA assisted with monitoring and analysis of vehicle use, including a survey of users showing overwhelming support. We also worked with EECA and others to develop an online tool for comparing the costs of running electric vehicles and petrol- or diesel-powered vehicles. The Council ran a successful electric vehicle display outside Te Papa in June 2012, featuring a range of electric cars, motorcycles, scooters and bicycles.

We have also tested biofuels in some of our fleet vehicles. We are monitoring progress in the development of more advanced biofuels technologies.

Financial mechanisms and government standards

The Council has advocated for more efficient transport operations across regional and central government including improved infrastructure for all modes, higher fuel-efficiency standards, electric vehicles, ethical biofuels, investigating road-pricing regulations and investment in public transport networks.

Priorities: 2013-2015

Improve public transport, road networks, walking and cycling

We will review and update the Wellington Transport Strategy to better align and integrate the city's desired outcomes for transport, land use and spatial planning. Councillors have expressly requested an emphasis on travel demand management, emergency and freight priority, and better walking, cycling and public transport to provide real transport choices for more people. We will also identify opportunities to enhance walking, cycling and public transport alongside Roads of National Significance projects within Wellington.

We will collaborate regionally on continued improvements to public transport resulting from the Public Transport Spine Study. This study, commissioned jointly by Wellington City Council, Greater Wellington Regional Council and NZTA, assesses some possible future public transport options for Wellington, including bus priority, bus rapid transit and light rail transit. The study was completed in June 2013 and released for public consultation.

Consistent with the Ngauranga to Airport Corridor Plan, the Basin Reserve bridge is planned for construction within this period. This is seen as a significant opportunity to ease congestion and improve public transport to the southern and eastern suburbs.

Support compact city development

The Council will continue to look for transport and access gains that can be achieved through a strategic focus on compact development, which can reduce travel demand. This goal will be addressed under the Wellington Movement Strategy, Urban Development Strategy and review of the District Plan. The Council is working with Victoria University and the New Zealand Centre for Sustainable Cities to assess the benefits and costs of the trends in housing demand towards sub-centres which offer more compact, mixed land use and better access to amenities, goods and services. Consistent with the "connected city" goal of *Wellington Towards 2040: Smart Capital*, the Council will also continue to assess opportunities for improved telecommunications technologies and infrastructure to reduce travel demand.

Promote efficient vehicle technology and low-carbon fuels

Our support of innovation in vehicle and fuel technologies will continue. This includes encouraging more businesses to add electric vehicles and bicycles to

their fleets, and assessing requirements for electric vehicle charging infrastructure. As part of this effort, we are working with stakeholders to set up a consortium of fleet operators to bulk purchase electric vehicles. With combined buying power, the consortium would aim to reduce capital or lease costs for electric vehicles to make them more affordable. The feasibility of this project is being assessed. We will also work with Centreport on options for reducing greenhouse gas emissions from shipping through efficiency improvements and fuel switching.

Action area 4: Waste

When organic waste breaks down in a landfill it produces methane, a greenhouse gas which is 25 times more damaging to the atmosphere than carbon dioxide.over 100 years.[x] Emissions from waste in landfills are only a small proportion of Wellington's emissions (around 1 percent). The Council has direct liabilities for those emissions under the NZ ETS because we own the Southern Landfill in Brooklyn and part-own (22 percent share) the Spicer Landfill in Porirua. Both landfills capture and burn methane to reduce its impact as a greenhouse gas – the Southern Landfill uses it to generate electricity for Wellington.

In the 2013 Siemens Green City Index study for Australia and New Zealand, Wellington drew recognition for having the lowest rate of waste generation in the region (250kg per person per year compared to the average of 427kg) and the highest recycling rate (53 percent compared to the average of 42 percent).[xi] However, countries in other regions have achieved even better results and we can continue to improve.

Progress: 2010-2012

Kai to Compost

We have expanded our Kai to Compost service to attract more customers, make the service profitable and increase the amount of food waste collected. Kai to Compost now operates seven-days-a-week and the number of customers has doubled since June 2010. Z Energy uses Kai to Compost at all of its Wellington sites and Westfield Queensgate shopping centre has also joined.

New Zealand Emissions Trading Scheme

Liability for emissions from the waste sector under the NZ ETS began in 2013. The Council is fulfilling its requirements as a landfill owner and recording data from our landfill gas generation system so we can apply for a unique emissions factor from the Ministry for the Environment and more accurately account for our emissions. Once our unique emissions factor is agreed, we can formally publish our NZ ETS emissions liability for waste.

New recycling system

We have introduced a new split recycling system for Wellington households that separates glass from other recyclables. The new system makes all of the recycling material collected more valuable as a commodity and makes kerbside recycling more financially sustainable. All paper and glass collected are reprocessed in New Zealand, adding to the country's economic base and reducing global emissions from shipping the commodities to Asia. In addition, because the glass is separated by colour at the kerb, less processing is required at the glass recycling plant, which uses less energy.

Sewage sludge pyrolysis trial

With Kapiti Coast District Council, we co-funded SpectioNZ, a company based at the Otaki Clean Technology Centre, to trial a new method of treating sewage sludge using pyrolysis technology. Pyrolysis uses microwaves to heat the sludge, which produces methane gas and bio-char. The main conclusion was that pyrolysis could not process Wellington's sewage sludge because of its moisture content and the Council decided not to invest in this any further.

Regional waste minimisation and management

The Council agreed on the Wellington Regional Waste Minimisation and Management Plan, which contained several actions aimed at reducing the amount of organic material going to landfills. These are discussed further below.

Waste programmes for schools and not-for-profits

The Council is providing recycling services for schools, preschools and not-for-profit organisations, as well as education on waste and composting for primary and intermediate students.

EnviroComp nappy recycling

Residential and commercial customers can now access the EnviroComp nappy recycling service at several drop-off points in Wellington. The Council subsidises the service in Wellington to help encourage more people to use it.

Priorities: 2013-2015

Under the Wellington Regional Waste Minimisation and Management Plan, the Council will work with the Wellington Regional Waste Forum on the following projects.

Investigate improved sewage sludge treatment

Technologies for converting sewage sludge to energy or other valuable by-products are becoming more common in other countries. Starting in 2015, a business case will be investigated for developing new sewage sludge treatment/disposal techniques.

Develop a regional waste education strategy

The strategy would be agreed with the Waste Forum and include public education on home composting, worm farms and other ways to reduce organic waste going to landfills.

Improve packaging product stewardship

We will jointly lobby the Government to introduce a national packaging product stewardship scheme, which would cover the organic materials of paper and cardboard.

Expand Kai to Compost

We will continue to market and expand our Kai to Compost service.

Increase e-waste recycling

In July 2013, Council announced a new partnership with e-recycler RemarkIT enabling Wellingtonians to dispose of most e-waste for free at the Southern Landfill's recycling centre. This partnership is the first of its kind in New Zealand. Recycling e-waste components helps to reduce manufacturing emissions compared to using virgin materials, while diverting waste with hazardous components from landfills.

Action area 5: Council operations

The Council owns, manages and provides a range of community services which directly or indirectly produce greenhouse gas emissions. The major sources of emissions for Council operations are the landfills and the energy used to run our offices, pools, water treatment and pumping, streetlights and vehicle fleet. We are working towards the following emission reduction targets:

- reduce emissions by 40 percent below 2003 levels by 2020
- reduce emissions by 80 percent below 2003 levels by 2050.

These targets include the Council Controlled Organisations: Basin Reserve Trust, Capacity, Positively Wellington Tourism, Positively Wellington Venues, Wellington Cablecar, Wellington Museums Trust, Westpac Stadium, Wellington Waterfront and Wellington Zoo.

Progress: 2010-2012

Energy management programme

The Council continues to deliver an energy data monitoring system and energy management programme through our Energy Manager. Since June 2010, projects included:

- undertaking energy audits at Newtown Park Apartments, Freyberg Pool and Fitness Centre, and the Civic Complex buildings
- reducing shower flows, automating lighting controls and levels, and installing a thermal blanket on the pool at the Wellington Regional Aquatic Centre.

Vehicle fleet

We have introduced GPS tracking technology in our vehicle fleet, which has helped us optimise fleet routes and fleet numbers. Through monitoring vehicle use, we have removed 22 light vehicles and utilities from the fleet. A vehicle fleet purchasing policy, which includes minimum standards for fuel efficiency and emissions, has been introduced and, through driver training and fuel-saving measures, we saved over 50,000 litres of petrol from 2009–2013. As noted under the section on land transport and shipping, we trialled electric vehicles as part of the Council fleet and continue to operate one purely electric vehicle. The Council has a total of four fleet bicycles available for staff use.

Procurement Policy

The Council-wide Procurement Policy includes measures supporting sustainable business practices and minimising adverse environmental impacts of procurement decisions. Under standard templates, bidders are asked to supply information about their environmental/sustainability policies, strategies and targets, including steps being taken to reduce greenhouse gas emissions. The Council's Travel Information Handbook for staff prescribes the purchase of offset units to cover emissions associated with international air travel outside of the European Union as these emissions are not covered by either domestic or international emissions trading legislation. The cost of offsetting is treated as part of overall trip costs.

Carbon Management Policy

The Carbon Management Policy was produced in 2010 to guide management of the Council's greenhouse gas emission liabilities and holdings under the NZ ETS and the Permanent Forest Sink Initiative.

Water Conservation Plan

We are introducing a Water Conservation Plan to reduce the amount of energy used for pumping and treatment of the city's water supply. As part of this, we undertook active water leak detection in Johnsonville, Northland, Roseneath, Brooklyn, Onslow, Wadestown, Woodridge and Kilbirnie, and any leaks found were scheduled for repair.

To help with leak detection, water meters were installed in Newlands and Johnsonville on Horokiwi Road, Fitzpatrick Street, Glanmire Road, Newlands Road and Fraser Avenue to measure flow and pressure. From 2011-12 to 2012-13, water use in the city dropped 3%, or 4015 litres per person per year, as a result of leak detection and public education.

Priorities: 2013-2015

Optimise our fleet

We plan to further reduce the size of the light vehicle fleet by reducing demand, including through more effective car pooling. We will also work to improve driver behaviour to save fuel.

Verify and benchmark our emissions

The Council will commission independent verification of our greenhouse gas emissions and formally benchmark them using international best practice. This will help us to identify emission reduction opportunities and better measure our progress.

At this point in time, the Council is choosing to focus its investment on emission reductions that support Wellington's low-carbon development and generate a return for the city. Consistent with the objectives for the Climate Change Action Plan, we aspire toward carbon neutrality as a Council in the longer term.

Develop an energy management strategy

We plan to develop a Council energy management strategy to reduce energy costs, optimise systems and reduce emissions. As part of this strategy, we will look at models to overcome financing barriers to Council energy projects.

Implement the Karori Recreation Centre solar project

We have secured funding from EECA and will install solar panels on the roof of Karori Recreation Centre. We anticipate installation during the 2013-14 financial year.

Improve water conservation

We will work with large commercial water users to help them reduce their water use, and continue our leak detection programme around the city. This will help to reduce energy consumption for water management.

Strengthen research partnerships

As part of the Our Living City work programme, the Council will continue to strengthen its research partnerships with institutions including Victoria University of Wellington, the Otago University Centre for Sustainable Cities, the Centre for Transforming Cities and the UN-Habitat City Resilience Profiling Programme. This will help to inform Council decision making across disciplines relevant to climate change mitigation and adaptation, including urban planning, resilience and ecological sustainability.

Update the Carbon Management Policy

We will update the Carbon Management Policy as needed to maintain and enhance the value of our emission unit assets and manage our emission liabilities in alignment with Council priorities.

Wellington Zoo is carbon neutral

In 2013, Wellington Zoo became the first zoo globally to receive carboNZero certification. The zoo was supported with funding from ASB Bank and the Department of Internal Affairs.

The zoo commissioned a greenhouse gas inventory, developed a plan to manage and reduce emissions, and committed to offset any remaining emissions.

Wellington Zoo's achievement comes after previous recognition for sustainability, including the Central/Southern Sustainable Business Network Sustainable Business of the Year Award and Not for Profit Award, the NZI National Sustainable Business Network People's Choice Award, the Wellington Green Gold Award and the Encore Business Environmental Leadership Award in 2010.

Action area 6: Forestry

Forests remove carbon dioxide from the atmosphere through photosynthesis. This is sometimes referred to as sequestration and such forests are referred to as forest sinks. Under the Government's Permanent Forest Sink Initiative and the NZ ETS, landowners can earn tradable emission units for eligible forests larger than one hectare that were established after 31 December 1989.

As well as managing city-owned forests, the Council also works to encourage tree planting on private land. Two important considerations for the Council's planting programme are to ensure that we meet our objectives of biodiversity protection and restoration, and fulfil our kaitiakitanga or guardianship role. While exotic pine plantations tend to absorb carbon dioxide at much faster rates than native forests, the Council has broader objectives to return parts of the city to native forest. Over the last 10 years, we are proud to have grown, planted and supplied about 700,000 native plants around the city.

Progress: 2010-2012

Forest sinks

A number of Council reserves and pine forests have been placed into government forest-sink schemes since 2010. The Council successfully registered 1464ha of regenerating native bush under the Permanent Forest Sink Initiative. An additional 32.3ha of post-1989 pine forest were registered with the NZ ETS. The Council also applied for and received a one-off allocation of New Zealand Units for its 212ha of pre-1990 pine forests.

The Council made its first sale of carbon credits (a sale of voluntary units) in 2012. The sale resulted in a net profit of $100,000 for the Council.

The Council now how has a healthy carbon balance with over 137,000 Assigned Amount Units from the Permanent Forest Sink Initiative and over 19,000 New Zealand Units from pre-1990 forests and post-1989 forests registered under the NZ ETS. At the time of publication, carbon prices were near a historic low; however, at a carbon price of $10 per tonne, the Council's carbon assets would be worth over $1.5 million.

Since 2010, around 200,000 native trees and shrubs have been planted in our parks and reserves, on stream banks, coastal areas and alongside roads. Half of these are planted and looked after by the Council, and the others by community groups, business, schools and residents. A number of these planting areas are within Council forests.

Pest control
Our work to control browsing animal pests such as possums and goats is ongoing in most of our forests to enable increased native regeneration (and therefore increased carbon sequestration).

Priorities: 2013-2015

Enhance forest sinks
The Council has set a target of planting two million trees in Wellington between 2003 and 2020 and is developing partnerships to help meet this target. We will work with our rural communities to promote tree planting to establish forest sinks on private land. We will manage existing forest sinks to maintain effective carbon sequestration. We will also investigate the development of additional forest sinks as a cost-effective tool to maintain and enhance our city's valuable forest carbon assets and to meet our NZ ETS liabilities.

Extend pest management
Pest management programmes will continue so that native forests can regenerate and increase carbon uptake. We will investigate funding opportunities to extend pest management within some of our forests (particularly possum control in Te Kopahou Reserve overlooking Cook Strait).

Enhance local government forestry partnerships
We will investigate opportunities to work with other councils on managing forests to increase sequestration and meet associated obligations under the NZ ETS.

Action area 7: Aviation

About 17 percent of Wellington's greenhouse gas emissions are from fuel use in the aviation sector. The Council has no influence on international trends in aviation fuel choice and adoption of efficient aircraft technology. As a shareholder in Wellington International Airport, however, the Council can play a role in encouraging new technology, improved efficiency and market measures.

The Wellington International Airport Master Plan expects passenger numbers to double by 2030 from 5 to 10 million each year although ongoing improvements in aircraft and fuel technologies could help to limit future growth in aviation emissions. Indeed, larger and more modern aircraft (which would require lengthening of the airport runway for operation in Wellington) are also more efficient, resulting in lower average emissions per passenger.

Internationally, the aviation industry has an emissions reduction strategy,[xii] which includes annual fuel efficiency improvements, carbon-neutral growth from 2020, and a halving of net aviation CO_2 emissions by 2050. The strategy targets improved technology, efficient operations and infrastructure, and market-based measures. The industry has so far:

- agreed on a certification and baseline design standard for CO_2 emissions from aircraft
- recently agreed to establish a single global market-based measure to support its goal of achieving carbon-neutral growth by 2020
- demonstrated that alternative fuels are safe and technically sound with operation of over 1500 flights using biofuel blends.

Air New Zealand continues to lead the industry globally; by 2014, it will have the youngest and most fuel-efficient commercial fleet in the world. The airline has cut fuel use by 15 percent through a range of measures, including reducing on-board weight, advocating for more efficient routes, fitting aerodynamic winglets to its fleet, and taxiing on only one engine to reduce fuel burn. The airline's ground operations have also received attention, with vehicles in some centres running on 20 percent biodiesel.

Progress: 2010-2012

Memorandum of understanding on airport operations

Wellington International Airport has completed a greenhouse gas inventory for all direct airport operations (excluding airline emissions). The Council and the airport entered into discussions on a draft memorandum of understanding with regard to managing aviation emissions and identifying emissions-reduction opportunities within airport operations. It was agreed that such a document should be consolidated with planning and zoning agreements.

Improvements to airline technology and fuels

As noted above, airlines have taken steps to increase their use of fuel-efficient technology, sustainable alternative fuels and investigation of improved flight plans.

Priorities: 2013-2015

Investigate emission reduction options under the proposed extension of the airport runway

A proposed extension of the airport runway to enable direct long-haul flight connections with Wellington has been proposed as an economic development measure. The Council will contribute to the cost of resource consents given the important economic benefit that Wellington International Airport brings to the region. The Council will work with the airport to assess the climate change impacts of the runway extension and identify mitigation opportunities.

Develop an agreement with the airport

The Council will continue to pursue a consolidated agreement with Wellington International Airport that addresses multiple aspects of the relationship between the Council, the airport, the city and the region. This would include consideration of climate change mitigation and adaptation.

Advocate for climate mitigation in the aviation sector

The Council will continue to work with the airport and airlines to encourage the adoption of best practice emission-reporting. The Council will also support and monitor the development of climate change mitigation measures, including market measures, by the International Civil Aviation Organisation.

2020 emissions reduction target – how we will get there

Actions taken by the Council and others, combined with national circumstances, have helped to constrain Wellington's emissions growth while producing other valuable benefits for the city. They are not sufficient, however, to position the city for meeting its ambitious 2020 emissions reduction target or achieving the longer-term transformational objectives contained in this plan. This will require a significant change in behaviour, investment and action across the city.

To help lead this change, the Council proposes to target the leverage points to gain big shifts; improve how we measure our progress; grow community ownership, investment and action; and advocate for change in areas outside our direct control. Each of these points is discussed below.

Target the leverage points to gain big shifts

The leverage points for achieving the city's 2020 emissions reduction target could include:

- stationary energy – increased renewable generation including distributed generation, reduced demand from more efficient homes and commercial buildings (existing and new) and efficient supply/demand management with smart grid technology

- transport – increased use of more innovative public transport, walking and cycling, fuel switching (to renewable electricity and biofuels), vehicle efficiency improvements and demand reduction (carpooling, telecommuting and behaviour change)

- forestry – pest management and increased planting

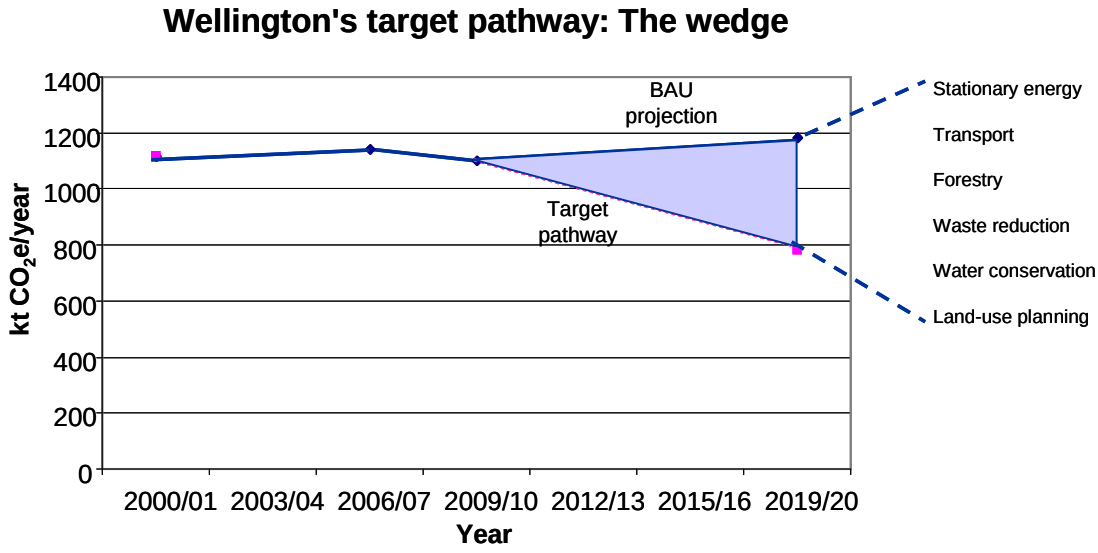
- compact development – smart land-use planning and mixed-use development to reduce travel and energy demand and encourage active transport.

Two cross-cutting measures deserve attention. First, increasing the ambition of the NZ ETS would reduce emissions across different sectors, although sectors respond to emission pricing differently and transport is particularly challenging. Second, the use of smart grid technology could more effectively balance electricity supply and demand, facilitate the uptake of distributed

renewable generation, reduce demand for fossil fuel generation and support the transition to electric vehicles powered by renewable energy.

Other incentives for these changes could include other forms of electricity, transport, waste and water pricing; regulations; facilitative or voluntary measures; public/private partnerships and educational programmes. Some of these could be controlled or influenced by the Council but others would likely be directed by central and regional government. The Council should also reinforce connections between its own strategies to mitigate and adapt to climate change.

The diagram below illustrates how various interventions could stack up over time to reach the target, relative to a hypothetical emissions projection under business-as-usual (BAU). A participatory process could be used to develop in detail an agreed emission reduction scenario for Wellington.



Measure our progress

There are limitations to the greenhouse gas inventory data and methodologies used by the city and the Council. City and corporate inventories are inherently more difficult than national inventories because of data collection and boundary issues.

In mid-2013, the Council launched a joint effort with other regional and territorial authorities to develop an updated greenhouse gas inventory and projections for the Greater Wellington Region. As part of this, the Greater Wellington Region joined an international pilot project to apply the Global Protocol for Community-Scale Greenhouse Gas Emissions, which is led by the World Resources Institute, C40 Cities Climate Leadership Group and ICLEI Local Governments for Sustainability, and is emerging as best international practice. The regional approach supports leveraging funding, data and expertise and ensuring consistency in methodologies, all of which will

facilitate ongoing regional collaboration. As noted above, we are also working to improve our own corporate inventory.

Grow community ownership, investment and action

The Council will not be able to achieve the 2020 and later targets acting alone. In the coming year, the Council will start engaging with the public and stakeholders to define an agreed approach for meeting the city's 2020 target that is technically and economically viable and at the same time generates a range of positive outcomes for the community. The Council will also identify joint actions with regional and central government that would support this outcome. This will build on improved inventory and projection information as discussed above. It will also be coordinated with engagement on adaptation to sea-level rise and other Council policies (eg transport).

Business action on climate change

Many businesses are responding to climate change, whether by improving the resilience of their business models and supply chains to climate impacts, reducing their emissions and their exposure to higher energy costs and emission pricing, tapping into new markets for low-carbon technologies and services, or engaging in triple-bottom-line reporting. Business commitment to effective climate action can attract new customers.

One initiative supporting voluntary business action to reduce emissions is the carboNZero programme administered by Landcare Research. It offers two levels of independent certification: CEMARS for emission measurement and reduction planning, and carboNZero for carbon neutrality through offsetting remaining emissions. In Wellington to date, 4 firms have received CEMARs certification and 11 firms have received carboNZero certification, the latter offsetting over 6500 tonnes of CO2-e in their most recent year of certification. Under current accounting, offsets purchased outside the city do not contribute to Wellington's greenhouse gas targets but are supporting global progress.

Advocate for progress beyond Wellington

Wellington City's ambitious emission reduction goals point to the need for supporting policies from regional and central government policies, particularly in the areas of transport, energy and planning. The Council aims to advocate for the adoption and strengthening of positive regional and national policies that support climate change mitigation and adaptation.

Wellington's international connections

Recognising the important roles of cities in providing global leadership on climate change, Wellington City has joined a number of international projects to help with information sharing and collaboration. These include:

- World Mayor's Council on Climate Change
  http://www.worldmayorscouncil.org/home.html

- carbonn® Cities climate registry
  http://citiesclimateregistry.org/

- Carbon War Room
  http://www.carbonwarroom.com/

- Urban Climate Change Research Network
  http://uccrn.org/

- UN-Habitat Cities Resilience Profiling Programme
  http://www.unhabitat.org/content.asp?cid=12122&catid=5&typeid=6

- UNISDR Making Cities Resilient Campaign
  http://www.unisdr.org/campaign/resilientcities/

Council budget for climate change action

The total budget and actual expenditure for implementing the Climate Change Action Plan are difficult to measure because the actions are fully integrated across a broad array of Council operations (e.g. infrastructure, transport, waste, energy, water, biodiversity, land-use management, procurement, etc.). Since 2010-11, the Council has allocated funding to some specific measures implemented under the Climate Change Action Plan. These are summarised below.

Council expenditure specific to the Climate Change Action Plan

Action area	Category	Expenditure ($000)					
		2010-11	2011-12	2012-13	2013-14	2014-15	Total
Adaptation	OPEX	30	100	100	100	100	430
Buildings and energy	OPEX	25	125	100	100	100	450
Smart Energy Capital	OPEX				250	250	500
Land transport	OPEX	50	50				100
Council operations	OPEX	25	25				50
	CAPEX	50	150				200
Total		180	450	200	450	450	1730

Conclusion

All cities facing the reality of climate change are struggling with the size of the problem and the challenge of balancing the needs of current and future generations. Wellington City's Climate Change Action Plan sets out our intention to shape development in ways that achieve important gains for the city while reducing our carbon footprint and improving resilience. These goals are ambitious. Our success will depend on the actions we take – as individuals, organisations, communities and government – to serve as a positive force for change in and beyond our city.

Contact information

If you would like more information about Wellington City Council's 2013 Climate Change Action Plan, please email info@wcc.govt.nz or contact us at:

Freepost 2199, Climate Change Action Plan
Wellington City Council, Wellington 6140
Phone: +64 4 803 8373 Fax: +64 4 801 3231

If you want more general information on Wellington, Wellington City Council or the Our Living City work programme, go to our website at Wellington.govt.nz.

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[i] See http://www.qualityoflifeproject.govt.nz/pdfs/Quality_of_Life_2010.pdf.
[ii] Gluckman, P. 2013. *New Zealand's Changing Climate and Oceans: The Impact of Human Activity and Implications for the Future*. Wellington: Office of the Prime Minister's Science Advisory Committee.
[iii] National Oceanographic and Atmospheric Administration. "Global Climate Change Indicators." Accessed in July 2013. See http://www.ncdc.noaa.gov/indicators/
[iv] New Zealand Ministry for the Environment. 2008. Coastal Hazards and Climate Change: A Guidance Manual for Local Government in New Zealand. Wellington: MfE. Available from http://www.mfe.govt.nz/publications/climate/coastal-hazards-climate-change-guidance-manual/coastal-hazards-climate-change-guidance-manual.pdf
[v] Levermann, A., Clark, P., Marzeion, B., Milne, G., Pollard, D., Radic, V., Robinson, A. 2013. *The Multimillennial Sea-Level Commitment of Global Warming*. Proceedings of the National Academy of Sciences (early online edition) [DOI: 10.1073/pnas.1219414110].
[vi] Due to data limitations, Wellington City's inventory currently reports aggregate emissions from both domestic and international transport fuels; emissions from international transport fuels are reported separately under the national greenhouse gas inventory and excluded from the national emission reduction targets. Wellington City's inventory also accounts for all forest carbon stock changes, not just those associated with land uses covered under the Kyoto Protocol.
[vii] Integrated Research on Disaster Risk (IRDR) is a decade-long research programme co-sponsored by the International Council for Science (ICSU), the International Social Science Council (ISSC), and the United Nations International Strategy for Disaster Reduction (UNISDR).
[viii] Prins, H. 2013. *The Attributes of Wellington's Green Buildings: Phase One*. Report from the School of Architecture, Victoria University of Wellington to Wellington City Council. Wellington.

[ix] Grimes, A. et al. 2012. *Costs Benefit Analysis of the Warm Up New Zealand: Heat Smart Programme*. Report prepared for the Ministry of Economic Development. Available from: http://www.med.govt.nz/sectors-industries/energy/pdf-docs-library/energy-and-the-environment/energy-efficiency/nzif-cba-report.pdf/view

[x] As reported by the IPCC Fourth Assessment Report. See http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html.

[xi] Economist Intelligence Unit. 2013. *Australia and New Zealand Green City Index: Results for Wellington*. Munich: Siemens AG.

[xii] www.iata.org/policy/environment/Documents/policy-climate-change.pdf