



Education training and public awareness

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9 Education, training and public awareness

This chapter outlines the activities that have been undertaken over the last four years to increase New Zealanders' awareness and understanding of climate change and encourage long-term behavioural change.

9.1 Public awareness campaigns and behavioural change

Since 2005, a number of public awareness campaigns have been introduced to improve New Zealanders' understanding of climate change and inspire people to take individual action. These campaigns were part of the key steps that comprised the Government's Towards a Sustainable New Zealand programme. They have been focused on informing New Zealanders about the actions they can take to reduce greenhouse gas emissions and ways to become more sustainable.

9.1.1 Household sustainability

The Household Sustainability Campaign was established in February 2007 and focused on practical ways for New Zealanders to improve energy efficiency and reduce waste and water usage in their homes. It also encouraged people to think about alternative modes of transport and offered tips for renovating the home to help with energy efficiency and insulation.

The programme was designed to build on a broad constituency of people who understood sustainability and were "ready to act". It also built on existing regional and community-based programmes. Key elements of the programme included:

- building partnerships with regional and local organisations to promote sustainable action
- an internet-based sustainability portal linking households to initiatives run by central government with other partners
- implementing a sustained cross-government information and awareness-raising programme
- designing a research programme to inform development of the programme and measure New Zealanders' changing knowledge of, attitudes and behaviour towards, sustainability.

The sustainability portal can be viewed at <http://www.sustainability.govt.nz>.

9.1.2 Business Partnerships for Sustainability

The Business Partnerships for Sustainability programme was designed with the aim of positioning New Zealand as a world-leading exponent of smart, innovative and business-savvy responses to environmental issues, leveraging off its "clean, green image" and reputation for business integrity. It also promoted awareness of the competitive advantages of sustainability.

The programme was established in 2007 and has worked through existing networks such as the New Zealand Business Council for Sustainable Development, the Chambers of Commerce and the Sustainable Business Network to enhance business sustainability programmes. Initial meetings

with business were held in June and July 2007, led by the Ministry for the Environment and Ministry of Economic Development. These Sustainable Business Workshops addressed:

- ways to improve information services for business on how consumer preferences are evolving in key market segments
- the investigation of New Zealand's market leadership potential in selected areas.

For more information on the Business Partnerships for Sustainability programme, go to: <http://www.mfe.govt.nz/issues/sustainability/business-partnerships.html>.

9.1.3 Govt³

Govt³ stands for the three foundations of sustainability: economic, social and environmental. The Govt³ programme helped government organisations take practical steps to reduce their impact on the environment. Led by the Ministry for the Environment, the programme ran from 2005 until 2009, providing advice, guidance and tools to 58 state sector agencies. It promoted practical action and took a “learning by sharing” approach, whereby participating agencies learned from each other's experiences. It included regular network meetings and workshops, collaborations between government agencies and sectors, and the development of case studies and technical information.

Govt³ has been discontinued, partly as a result of a reprioritisation of work programmes at the Ministry for the Environment, but also because there is a general expectation from the Government that state agencies will now undertake such environmental initiatives as part of their normal business. The end of the Ministry's leadership of Govt³ does not therefore mean the end of the state sector's environmental responsibilities, which include:

- taking a “whole-of-life” approach when procuring goods and services
- minimising waste sent to landfill
- using resources such as energy and water more efficiently
- improving planning, design and construction when commissioning or operating buildings
- adopting transport policies that minimise agencies' environmental impact.

Govt³ successfully established a culture of minimising the environmental impact of operations in the state sector. Highlights in 2007/08 (measured as average use per full-time equivalent for agencies with comparable data) include:

- energy use in buildings reduced by 10 per cent
- kilometres travelled for ground transport reduced by 4 per cent, and domestic air travel reduced by 4 per cent
- waste to landfill reduced by 16 per cent
- paper consumption reduced by 9 per cent, and virgin paper use reduced by 23 per cent.

9.1.4 Enhanced Sustainable Government Procurement

The purpose of the Enhanced Sustainable Government Procurement project is to make sustainability a core component of government procurement policy and practice. The project was established in 2007, led by the Ministry of Economic Development, and was aimed at ensuring the Government was leading by example when making purchasing decisions.

In August 2007, a National Framework for Sustainable Procurement was implemented, and standards were established for paper, timber and wood products; travel; and light fittings for public service departments. In 2008, a carbon-costing methodology and policy in all public service departments was also implemented.

The expected benefits of Enhanced Sustainable Government Procurement include:

- government activity producing less carbon and waste
- operational cost savings through better demand and waste management, and the use of more goods and services that are energy, water and resource efficient
- dissemination of knowledge and methods for incorporating sustainability considerations into procurement, both within and beyond the public sector
- improved availability of sustainable and innovative goods and services in New Zealand
- increased supply opportunities for innovative and sustainable New Zealand firms
- New Zealand firms gaining a competitive advantage by adopting sustainable practices and credentials.

9.1.5 Other public awareness initiatives

Other major government initiatives on climate change include the New Zealand Emissions Trading Scheme, the Sustainable Land Management and Climate Change Plan of Action, the New Zealand Energy Strategy, and the New Zealand Energy Efficiency and Conservation Strategy.

The Sustainable Land Management and Climate Change Plan of Action provides a platform for the Government to work in partnership with the agricultural, horticultural and forestry sectors, Māori and local government on climate change issues. This is critical to secure the changes in land-use practices needed for New Zealand to successfully adapt to changes in climate, reduce agricultural emissions and secure new forest planting.

In partnership with these sectors, the Plan of Action will deliver a communications programme to facilitate the delivery of factual information and key messages to the sectors and ensure sustained action over the medium to long term. A number of activities to improve public awareness and information about energy efficiency, the benefits of energy efficiency (for people's health, wealth and the environment), and existing government initiatives to promote energy efficiency have been undertaken.

The ENERGYWISE project, run by the Energy Efficiency and Conservation Authority, helps to educate people on how to make their homes more energy efficient and, in turn, make less of an impact on the environment. It sets out easy and cost-effective ways of doing this, encouraging people to do what they can, where they can. Government funding is also available to help people improve energy efficiency in their homes. Assistance is available to install insulation, clean heating systems, general energy efficiency measures, and solar water heating systems.

The Ecowise Travel Guide is a leaflet for tourists explaining how to reduce their greenhouse gas emissions and environmental impact when travelling in New Zealand. The leaflet is available on the New Zealand Tourism website (<http://www.tourism.net.nz>).

The Ministry of Transport ran a campaign called Choke the Smoke, which involved the introduction of a visible smoke check from October 2006 for vehicles when they are taken for a warrant or certificate of fitness. The information campaign tells the public about the changes

and why it is important to ensure vehicle emissions are reduced. It also outlines other measures that motorists can take to reduce their carbon footprint. More information can be found at <http://www.transport.govt.nz/choke-the-smoke-index/>.

9.1.6 Measuring behavioural change

In 2008, the Household Sustainability programme team conducted a survey aimed at providing a “snapshot” of New Zealanders’ attitudes and behaviour in relation to being environmentally sustainable. Subjects of the survey included: using water efficiently, organic waste reduction, managing electrical waste, energy efficiency, transportation, building and renovating sustainably, and taking sustainability into account for purchasing decisions.

The survey was based on the UK’s Department of Environment, Food and Rural Affairs’ (Defra) framework for pro-environmental behaviours. Defra’s approach prioritises specific actions or behaviours, based on evidence of their potential environmental impact and knowledge of households’ willingness and ability to act. With the cooperation of Defra’s Behaviours Unit, this research uses a similar method to segment the population based on pro-environmental behaviours and attitudes, as used in Defra’s *Survey of Public Attitudes and Behaviours Toward the Environment 2007*.

The survey also served as an update to the results of the Household Sustainability Benchmark Survey, which was completed in November 2007. This survey covered New Zealanders’ beliefs, attitudes and behaviour towards becoming sustainable, including: heating and general energy use, rubbish and waste, water use, purchasing groceries and other items, transport, and major purchases. The overarching objective of the benchmark survey was to measure the current situation as it relates to household sustainability in order to:

- measure New Zealanders’ beliefs about, and attitudes and behaviour towards, becoming sustainable (or engaging in actions that are sustainable)
- inform the development of the Ministry for the Environment’s information, awareness and public education programme based on the results of the survey (priority groups, key messages, communication channels, etc.)
- establish a benchmark for future monitoring and evaluation.

More information on the Household Sustainability Benchmark Survey can be found at <http://www.mfe.govt.nz/publications/sus-dev/household-sustainability-benchmark-survey-feb08/html/index.html>.

9.2 Education and public engagement

9.2.1 2020 target engagement

In July 2009, the Government announced that it was going to set a mid-term emissions reductions target for New Zealand and wanted to consult with the public about what it should be. The Minister Responsible for Climate Change Issues, Dr Nick Smith, held a series of public meetings around the country at which he discussed the key issues and invited public feedback. Over 1600 people attended these meetings and aired their views about the target. Members of the public also took part in an online forum with the Minister.¹²³

¹²³ The transcript of the online discussion is available at <http://www.r2.co.nz/20090720/>

The Ministry for the Environment produced a brochure about the local and international aspects of climate change and encouraged the public to read it before the public meetings. The brochure can be read at <http://www.mfe.govt.nz/publications/climate/nz-2020-emissions-target/index.html>. After careful consideration, the Government decided that New Zealand is prepared to take on a responsibility target range of between 10 per cent and 20 per cent below 1990 levels by 2020, if there is a comprehensive global agreement. More details can be found at <http://www.beehive.govt.nz/release/2020+target+balances+economy+amp+environment>, and in section 4.3.1.

9.2.2 Raising awareness in schools

Students and teachers continue to be a key audience for building awareness of climate change because efforts in this area reach a wide audience. New Zealand has more than 2000 schools and each has an impact on the environment. The message conveyed to the schools as part of this work is that even by taking small actions, the education sector can make a real contribution.

Following are some of the programmes aimed at raising awareness of climate change and the steps schools can take to reduce its effects.

Enviroschools

The Enviroschools programme takes a whole-school approach by involving students in planning, designing and taking action to create a sustainable school environment. It has been successful in educating more than 195,000 children each year about developing environmentally friendly habits for a sustainable future.

The Enviroschools Foundation comprises a governing trust board and a national management team. Their role involves strategic planning, building and maintaining a network of partnerships, and providing core support services to regions, including programme development, resources and professional development. Its purpose is to support the creation of sustainable schools such that the school grounds, operation, management and curriculum are all part of the sustainability process.

Youth Environment Forum

The annual Youth Environment Forum was established in 2004. It provides an opportunity for up to 45 young people aged between 15 and 18 to take part in practical environmental projects, voice their opinion on environmental issues and learn firsthand about environmental management. The forum is hosted by the Ministry for the Environment in partnership with the Sir Peter Blake Trust, and many of the resulting projects have been focused on climate change.

Previous forum projects have included recycling cell phone and computer waste, household sustainability, climate change adaptation and coastal restoration. The delegates are encouraged to take what they learn from field trips, workshops and other activities back into their schools and communities.

Schoolgen

Genesis Energy's Schoolgen programme, which receives financial backing from the Government, promotes energy awareness in schools. Through Schoolgen, Genesis Energy has installed photovoltaic solar panels in almost 33 schools around New Zealand.¹²⁴ The programme makes

¹²⁴ <http://www.schoolgen.co.nz/>

students and teachers more aware of what energy is, how energy is used, and how energy can be wasted. It teaches students about renewable energy, electricity generation, energy efficiency and climate change through classroom learning sessions on the solar panels they install.

9.2.3 World Environment Day 2008

When New Zealand hosted World Environment Day in June 2008, climate change was the central theme of the event. The theme, “Kick the Carbon habit – working towards a low-carbon economy”, was an important recognition of today’s global interdependence and the responsibility we all share for securing human welfare. Five core events were run and organised by the Ministry for the Environment, and more than 120 community events were subsidised by the Ministry.

A number of high-profile international guests and journalists were in New Zealand to help celebrate World Environment Day 2008. Dr Rajendra Pachauri, Chair of the IPCC; Achim Steiner, Executive Director of the United Nations Environment Programme; and President Tong of Kiribati were among the high-profile international guests who attended World Environment Day events. In partnership with New Zealand as the host country, the United Nations Environment Programme (UNEP) organised:

- the Art for the Environment Exhibition, with works from renowned international artists
- a photographic exhibition from the UNEP International Photographic Competition on the Environment
- an international children’s painting competition.

In addition to these international events, and in conjunction with environmentally focused organisations throughout the country, a coordinated programme of national and regional events was developed and promoted through the World Environment Day website. Following is a selection of these.

- The Green Ribbon Awards, which are hosted annually on World Environment Day by the Ministry for the Environment, were held on 3 June at the Wellington Town Hall. The awards acknowledge the outstanding contribution New Zealanders are making to sustaining, protecting and enhancing our environment.¹²⁵
- A business breakfast organised by the Business Council for Sustainable Development was held in Auckland on 4 June. The topic was “The challenges and opportunities for business presented by climate change”. This was followed by a business symposium presented by the Victoria University of Wellington Institute of Policy Studies, in collaboration with the New Zealand Climate Change Research Institute. Achim Steiner also presented the lunchtime lecture, “Are we glimpsing the emergence of a green global economy?” at Auckland University.
- The first annual Hillary Symposium was held in Christchurch on 5 June. It marked the official launch of the Hillary Institute’s theme for the next four years – climate change. Dr Rajenda Pachauri led the symposium.

¹²⁵ <http://www.mfe.govt.nz/withyou/awards/green-ribbon.html>.

- “Lunchtime talk: How do we decarbonise the world?” was a panel discussion hosted by the Institute of Policy Studies and Climate Change Research Institute, and the School of Government, Victoria University of Wellington. Speakers at the discussion included Achim Steiner, Dr Rajendra Pachauri, President Anote Tong, and the Honourable David Parker, the former Minister Responsible for Climate Change Issues.

Schools and community groups also organised their own events and educational programmes to mark the occasion. Many of these had a long-term goal and will continue to be a part of the participants’ regular activities. Tree planting, beach clean-ups, art exhibitions and debating competitions were just a few of the ways that New Zealand communities celebrated World Environment Day.

New Zealand’s hosting of World Environment Day 2008 received a large amount of media coverage. In the lead-up to World Environment Day, a number of pieces were published or broadcast across all media. Media coverage focused on specific events, including those attended by New Zealand Government and UNEP officials. Numerous stories appeared, particularly in the print media, ahead of World Environment Day and there was good uptake of local news stories in regional “green pages”.

9.2.4 Sustainable Management Fund

The Ministry for the Environment’s Sustainable Management Fund is designed to encourage greater awareness of the environment by funding projects that support the Government’s main environmental priorities. The fund encourages proactive partnerships and promotes community action towards meeting the challenges of climate change.

The climate change category was established in the 2005/06 funding round. The purpose of this category is to fund practical initiatives that increase the capacity of communities to adapt to the effects of climate change and to help understand their vulnerability to climate change impacts. Examples of some of the projects funded last year include a community-based carbon management and environmental offset scheme, a native forest revegetation project, and a dune restoration programme aimed at empowering coastal communities to adapt to climate change.

Twenty-seven applications have been funded since the introduction of the category. The total Sustainable Management Fund funding granted for these projects is \$2.7 million. More details on the fund can be found at <http://www.mfe.govt.nz/withyou/funding/smf/index.html>.

9.2.5 Sustainable Farming Fund

The Ministry of Agriculture and Forestry’s Sustainable Farming Fund is designed to support the financial, environmental and social performance of New Zealand’s productive land-based sectors. The Sustainable Farming Fund was boosted in 2007 to include a climate change dimension, covering adaptation and mitigation. The Sustainable Farming Fund selects projects that are:

- based around solving problems, or taking up opportunities, related to sustainable resource use
- defined and driven by a farmer, grower or forester-led Community of Interest. These are groups of stakeholders drawn together by common problems or opportunities.

More information can be found here <http://www.maf.govt.nz/sff/>.

9.2.6 Emissions Trading Scheme

Officials from the Treasury, the Ministry of Agriculture and Forestry, the Ministry for the Environment, the Ministry of Transport, and Te Puni Kōkiri have worked together to develop key messages and to help stakeholders to fully understand the broad implications of the New Zealand Emissions Trading Scheme (NZ ETS) as government policy has been developed. A number of information sheets about the NZ ETS were published outlining how it would affect different sectors. These information sheets are available online at <http://www.mfe.govt.nz/publications/climate/#emissions>.

A Parliamentary Select Committee reviewed the NZ ETS in 2009. As part of this process, members of the public were invited to make submissions to the committee. The review provided a forum for public input and participation in the policy process.

The Ministry for the Environment hosted a Voluntary Carbon Markets Workshop in August 2008. The workshop was attended by more than 100 people from New Zealand's industrial, energy, financial, legal and consulting sectors. The purpose of the workshop was to:

- share the experiences of those involved in the voluntary carbon market in New Zealand
- identify opportunities for New Zealand businesses in the voluntary carbon market
- encourage debate around the drivers to enter, and the challenges posed by, the voluntary carbon market
- encourage credible and innovative responses to these challenges and opportunities.

The presentations and debate were extremely informative and insightful and showed the need for further discussion on such challenging issues as whether emissions reduction efforts with double beneficiaries can be considered credible, and whether the proposed NZ ETS will make covered sectors “carbon neutral”.

9.2.7 Educating the media

The Ministry for the Environment has been proactive in educating media outlets about climate change so that journalists can present current affairs on climate issues in a more informed way. An example is a workshop held between Radio New Zealand and the Ministry for the Environment on what the Government's climate change policy is and how the NZ ETS would work. The purpose was to help journalists to understand where arguments for and against the policy are coming from.

Discussions are also progressing with the television network TVNZ over potential programmes on climate change, with particular focus on the actions householders and businesses can take to reduce their climate change impact and adapt to the climatic changes that New Zealand will likely experience. This will heighten consumer awareness already achieved through television programmes such as *Wa\$ted* and *Mitre10 Dream Home*.

Mitre 10 Dream Home is a reality television series that follows the experience of two couples in creating their dream home. The Energy Efficiency and Conservation Authority and its ENERGYWISE programme played an important role in the development of the series. *Wa\$ted* is another reality television series aimed at encouraging people to adopt environmentally friendly habits. The programme helps New Zealand families to audit their waste and energy usage while showing them the long-term impacts of their behaviour and how to minimise their impact. *Wa\$ted* is supported by the Energy Efficiency and Conservation Authority and the Ministry for the Environment.

Government climate scientists from our two chief meteorological agencies have made themselves available to the media to publicly comment on climate change issues. These are primarily scientists from MetService and NIWA.

9.2.8 Educating businesses

The government agency New Zealand Trade and Enterprise runs sustainability workshops through its Enterprise Training Scheme, a programme for up-skilling businesses. These workshops are designed to educate small- to medium-sized companies about sustainable business practices and to help them develop more sustainable strategies and processes. They are run in many centres around the country at no cost.¹²⁶

9.2.9 Climate change adaptation work programme

The Government's climate change adaptation work programme has developed a range of informative guidance materials on the impacts of climate change and how New Zealanders can adapt to, and prepare for, these impacts. These publications are discussed in section 6.4.1. The Quality Planning website at <http://www.qualityplanning.org.nz/plan-topics/climate-change.php> provides information on expected climate change impacts in New Zealand and advice on methods for considering and addressing climate change effects under the Resource Management Act.

The Ministry of Agriculture and Forestry is working closely with land-based sectors, local government and Māori under the Plan of Action to ensure effective change can occur on the ground. Action to date includes raising awareness; working with industry groups and education providers; and developing case studies, fact sheets, learning packages and information sheets.

9.2.10 International engagement

The New Zealand Government has been active in promoting climate change to a broader regional audience. In 2007, following the release of the IPCC's Fourth Assessment Report, two of New Zealand's lead authors and contributors promoted the report at workshops around the Pacific. Their attendance was supported financially by the New Zealand Ministry for the Environment. The workshops were organised by the Secretariat of the Pacific Islands GeoScience Commission (SOPAC)¹²⁷ and the South Pacific Regional Environment Programme (SPREP).¹²⁸

At the workshops, scientists from MetService and NIWA gave presentations and participated in panel discussions about the Fourth Assessment Report and what it means for Pacific Island communities. The workshops provided an opportunity for senior government representatives, non-government organisations and members of the public to discuss the most recent scientific findings on climate change, the likely impacts of climate extremes and changes, and the Pacific region's response. Workshop participants also discussed the best ways to progress IPCC outreach activities in the Pacific with other regional stakeholders, including SPREP, SOPAC, the Australian Greenhouse Office and the Australian Bureau of Meteorology.

¹²⁶ <http://www.nzte.govt.nz/access-international-networks/Explore-opportunities-in-growth-industries/new-global-business-trends/Pages/Sustainability.aspx>

¹²⁷ <http://www.sopac.org/tiki-index.php>

¹²⁸ <http://www.sprep.org/>

9.3 Websites and publications

An increase in awareness of environmental issues, as shown through research and evaluation, has brought about a stronger demand for information on practical actions that New Zealanders can take to reduce the effects of climate change. The Government has provided information on the science and impacts of climate change and specific actions that people can take to reduce greenhouse gas emissions through a variety of websites and publications. Two key websites are the sustainability website (<http://www.sustainability.govt.nz>) and the climate change website (<http://www.climatechange.govt.nz>).

9.3.1 Publications

Guidance manuals for local government

The Ministry for the Environment has produced several manuals to guide local authorities on how to plan for the expected impacts of climate change. The two most important are *Climate Change Effects and Impacts Assessment: A Guidance Manual for Local Government in New Zealand*, and *Coastal Hazards and Climate Change*. More detail on these manuals can be found in chapter 6.

Climate Change and Long-term Council Community Planning

This publication provides an overview of how local authorities can incorporate climate change into Long-term Council Community Plans and provides links to more detailed information and guidance. The Plans set out the activities for councils and provide a long-term focus for their decision-making. The Ministry for the Environment has also released information on its website that provides guidance to local government about climate change. This can be found at <http://www.mfe.govt.nz/publications/climate/climate-change-long-term-planning/index.html>.

Climate change publications for the general public

The Ministry for the Environment has developed three booklets to educate the general public about climate change: *Understanding Climate Change*, *Taking Action on Climate Change* and *Preparing for and Adapting to Climate Change*. These publications explore the science of climate change and its potential impact, and provide tips for reducing emissions. They were distributed at no charge to local government, libraries, non-government agencies, at events, and to other government agencies to provide to their stakeholders. They are also available online: <http://www.mfe.govt.nz/publications/climate/#general>.

New Zealand's 2020 Emissions Target

This brochure provides information about climate change and New Zealand's emissions to help people develop an informed opinion about what New Zealand's 2020 emissions target should be. The Ministry for the Environment produced the publication for a series of public meetings held by the Minister Responsible for Climate Change Issues around the country in July 2009 (see also section 9.2.1). The brochure sets out the causes and likely impacts of climate change, provides an introduction to the international response to climate change, and gives details of New Zealand's emission trends and profile, as well as detailing other countries' announced targets. It is available at: <http://www.mfe.govt.nz/publications/climate/nz-2020-emissions-target/index.html>. The Minister's PowerPoint presentations are also available online at: <http://www.mfe.govt.nz/issues/climate/emissions-target-2020/index.html>.

ENZ 07

Climate change was a feature in the *Environment New Zealand 2007* report, which was launched in December 2007. This report is the second national-level state of New Zealand's environment report. It takes the pulse of the physical well-being of New Zealand's land, water, air, plants and animals, and measures the impact of transport, energy, waste and our consumption on the environment. It identifies trends in, and selected pressures on, our natural resources and introduces benchmark environmental indicators, as well as 80 specific measures to capture hard data, which will be used to build a clear picture of trends and pressures over time.

Although not dedicated to climate change policy, significant components of the analysis are directly related to the issue. It also provides a wider environmental context for developing the future direction of climate change policy. The *Environment New Zealand 2007* report can be found at <http://www.mfe.govt.nz/publications/ser/enz07-dec07>.

9.3.2 Other resources and educational tools

Climate change DVD

With the support of the Government, the non-governmental organisation Communities for Climate Protection has developed a DVD for councils to support them in educating their communities about climate change. The DVD, *Climate Change: We Can Make a Difference*, looks at the science of climate change and emphasises the importance of acting now.

Online carbon footprint calculators

The carboNZero programme was established in 2001 by Landcare Research, a Crown research institute. The goal of the programme is to provide robust tools for individuals and organisations to reduce their greenhouse gas emissions or carbon footprint with the highest level of credibility and integrity. As part of the programme, Landcare Research developed online tools to educate consumers and encourage them to reduce their emissions. These online calculators can be used to calculate the approximate carbon footprint of homes, schools and businesses. They are available at <http://www.carbonzero.co.nz/calculators/index.asp>.

9.3.3 Websites

Climate change website

The Government's Climate Change Solutions website was established in November 2008 as a key source for climate change information. The website contains information about climate change, including the causes of, the evidence for, and the effects of climate change. It describes the key government policies to reduce emissions and the work being done to help people prepare for, and adapt to, climate change. It also acts as a portal to a number of other government and non-government organisations involved in climate change work. The climate change website can be found at <http://www.climatechange.govt.nz>.

Sustainability website

The sustainability website has been active since February 2007 and has information on how climate change will affect New Zealand, how New Zealand contributes to climate change, what New Zealanders can do about climate change, and what they need to do to be prepared. It also outlines what the Government is doing about climate change. The site is a key resource for the kind of grassroots action – both small and large – people can take on a wide range of environmental issues. The site can be found at: <http://www.sustainability.govt.nz>.

4 Million Careful Owners

The 4 Million Careful Owners website and brand are no longer in use. From its inception in December 2003, the website housed information about climate change, ways to take action, and examples of initiatives underway across New Zealand to reduce greenhouse gas emissions and the effects of climate change. The website was designed to be interactive and contained educational information and tools for schools to use. With the development of the Government's new public education programmes this website has been subsumed by the sustainability and climate change websites.

Online ecolabel directory

The Ministry of Economic Development has created an online directory to improve the availability of information about ecolabels and other sustainability indicators to consumers, suppliers and other organisations. It provides summary information about each label, and users are encouraged to access further detail from ecolabel owner websites using the links provided. The directory is available at: <http://www.med.govt.nz/ecolabels>.

Environmental sustainability and cars

The Land Transport Agency has developed two websites for consumers and businesses to encourage them to consider environmental sustainability when purchasing a car, and to promote actions to cut down on fuel use while driving: see <http://www.rightcar.govt.nz/> and <http://www.fuelsaver.govt.nz/>.

Other key website links

- At <http://www.mfe.govt.nz/issues/climate> – all of the climate change issues from mitigation to impacts and assessment are described.
- At <http://www.mfe.govt.nz/issues/climate/resources/adaptation/index.html#schools> – information is provided for schools about what they can do to adapt to the impacts of climate change.
- At <https://www.eur.govt.nz/eats/nz> – the Emission Unit Register allows people to manage the accounting, reporting and reconciliation of emission unit holdings and transactions as part of the NZ ETS and to meet New Zealand's commitments and obligations under the Kyoto Protocol.
- At <http://www.maf.govt.nz/climatechange> – the Ministry of Agriculture and Forestry's website explains what climate change means for the rural sector and has links to forestry and agriculture in the NZ ETS, sustainable forestry and sustainable land management, international climate change, and legislation and regulation.
- At <http://www.climatechange.govt.nz/carbon-reports/reports.html#greenhousegas> – New Zealand's actual and projected greenhouse gas emissions, by sources and removals by sinks, are shown.
- At <http://www.climatechange.govt.nz/emissions-trading-scheme/index.html> – the NZ ETS is described in detail.
- At <http://www.transit.govt.nz/planning/climate.jsp> – Transit New Zealand outlines its climate change adaptation planning.

Links to other government ministries and departments with important climate change programmes are available at <http://www.climatechange.govt.nz/reducing-our-emissions/who-does-what.html>.

Annex A: Summary of emissions and removals from New Zealand's 2007 national inventory

Common Reporting Format for the provision of inventory information by Annex I Parties to the UNFCCC.

Table A.1: Emission trends (CO₂ – Part 1 of 2)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
1. Energy	22,593.02	22,999.98	24,719.15	24,075.12	24,271.89	24,180.93	25,205.05	27,556.99	26,026.65	27,098.59
A. Fuel Combustion (Sectoral Approach)	21,953.11	22,273.51	24,023.50	23,407.63	23,554.30	23,495.74	24,505.46	26,800.33	25,299.20	26,419.47
1. Energy Industries	6,006.15	6,099.19	7,452.38	6,522.76	5,399.31	4,670.56	5,236.55	6,840.30	5,137.73	6,394.07
2. Manufacturing Industries and Construction	4,527.24	4,923.62	4,623.58	4,767.03	5,108.63	5,031.21	5,528.13	5,904.49	5,976.96	5,465.66
3. Transport	8,616.96	8,623.48	9,086.85	9,441.46	10,132.76	10,855.47	10,935.36	11,289.55	11,476.63	11,695.58
4. Other Sectors	2,802.76	2,627.22	2,860.69	2,676.37	2,913.60	2,938.49	2,805.43	2,765.98	2,707.88	2,864.15
5. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B. Fugitive Emissions from Fuels	639.91	726.47	695.64	667.49	717.59	685.20	699.59	756.66	727.46	679.12
1. Solid Fuels	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE
2. Oil and Natural Gas	639.91	726.47	695.64	667.49	717.59	685.20	699.59	756.66	727.46	679.12
2. Industrial Processes	2,731.64	2,867.48	2,984.73	3,052.80	2,937.20	3,016.00	2,981.75	2,921.62	3,019.50	3,214.75
A. Mineral Products	547.53	557.92	633.17	630.86	609.84	658.27	630.08	679.10	635.22	711.40
B. Chemical Industry	429.96	446.78	401.95	427.98	449.62	422.77	409.74	440.81	479.14	526.01
C. Metal Production	1,754.14	1,862.77	1,949.62	1,993.96	1,877.75	1,934.96	1,941.93	1,801.71	1,905.14	1,977.34
D. Other Production	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
E. Production of Halocarbons and SF ₆										

Total CO ₂ emissions including net CO ₂ from LULUCF	7,143.57	8,554.01	12,504.60	12,166.71	11,250.00	11,251.27	11,475.19	11,806.09	10,137.63	11,121.10
Total CO ₂ emissions excluding net CO ₂ from LULUCF	25,337.57	25,880.37	27,716.78	27,140.71	27,221.88	27,209.55	28,199.04	30,490.77	29,058.20	30,324.75
Memo Items:										
International Bunkers	2,368.07	2,190.12	2,170.07	2,239.94	2,786.98	2,702.23	2,717.16	2,827.19	2,780.47	2,762.34
Aviation	1,338.17	1,277.75	1,306.31	1,327.12	1,439.10	1,571.00	1,640.65	1,710.77	1,706.14	1,846.61
Marine	1,029.90	912.38	863.76	912.82	1,347.88	1,131.24	1,076.51	1,116.42	1,074.33	915.73
Multilateral Operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO ₂ Emissions from Biomass	2,601.53	2,793.90	2,663.03	2,693.75	3,168.15	3,198.42	3,142.70	2,957.60	3,088.86	3,802.58

All footnotes for this table are provided at the end of the table on page 184.

Table A.1: Emission trends (CO₂ – Part 2 of 2)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	2005	2006	2007	Change from base to latest reported year
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
1. Energy	27,908.10	29,725.00	29,817.34	31,417.18	30,739.49	32,349.66	32,743.51	31,559.93	39.69
A. Fuel Combustion (Sectoral Approach)	27,271.30	29,040.87	29,150.86	30,718.62	29,804.99	31,381.90	31,743.53	30,503.89	38.95
1. Energy Industries	6,061.79	7,280.48	6,472.07	7,699.40	7,290.11	9,318.40	9,325.92	7,845.32	30.62
2. Manufacturing Industries and Construction	5,734.96	5,881.84	6,221.17	6,016.57	5,082.13	4,746.25	5,043.79	5,313.75	17.37
3. Transport	12,273.14	12,640.00	13,210.90	13,820.98	14,170.26	14,326.48	14,541.45	14,661.44	70.15
4. Other Sectors	3,201.41	3,238.54	3,246.73	3,181.67	3,262.49	2,990.77	2,832.37	2,683.39	-4.26
5. Other	NA	NA	NA	NA	NA	NA	NA	NA	0.00

B. Fugitive Emissions from Fuels	636.80	684.13	666.48	698.55	934.49	967.76	999.97	1,056.04	65.03
1. Solid Fuels	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	0.00
2. Oil and Natural Gas	636.80	684.13	666.48	698.55	934.49	967.76	999.97	1,056.04	65.03
2. Industrial Processes	3,174.28	3,270.07	3,278.65	3,483.90	3,450.80	3,499.06	3,498.43	3,670.62	34.37
A. Mineral Products	702.01	700.93	698.96	689.68	660.17	749.55	713.59	860.38	57.14
B. Chemical Industry	512.50	555.32	537.68	572.60	553.70	558.50	616.86	584.95	36.05
C. Metal Production	1,959.77	2,013.81	2,042.01	2,221.63	2,236.93	2,191.01	2,167.98	2,225.29	26.86
D. Other Production	NA	NA	NA	NA	NA	NA	NA	NA	0.00
E. Production of Halocarbons and SF ₆									
F. Consumption of Halocarbons and SF ₆									
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	0.00
3. Solvent and Other Product Use	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	0.00
4. Agriculture									
A. Enteric Fermentation									
B. Manure Management									
C. Rice Cultivation									
D. Agricultural Soils									
E. Prescribed Burning of Savannas									
F. Field Burning of Agricultural Residues									
G. Other									
5. Land Use, Land-Use Change and Forestry⁽¹⁾	-20,026.32	-20,409.44	-20,084.30	-21,291.41	-24,911.95	-25,337.90	-23,940.25	-23,915.12	31.45
A. Forest Land	-20,785.40	-21,212.49	-20,860.61	-22,006.78	-25,646.16	-26,039.91	-24,595.71	-24,565.23	31.55
B. Cropland	-492.38	-492.79	-497.57	-504.45	-506.42	-511.53	-517.53	-520.99	8.93
C. Grassland	1,118.67	1,162.25	1,139.48	1,084.59	1,104.59	1,076.68	1,035.31	1,032.61	23.89
D. Wetlands	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.00

Table A.2: Emissions trends (CH₄ – Part 1 of 2)

Inventory 2007 Submission 2009 v1.2 NEW ZEALAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base Year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
1. Energy	34.11	28.94	28.23	27.48	29.72	32.46	32.73	34.77	38.54	40.78
A. Fuel Combustion (Sectoral Approach)	5.97	5.68	5.32	5.16	5.02	4.84	4.60	4.53	4.38	4.23
1. Energy Industries	0.26	0.28	0.31	0.29	0.24	0.19	0.22	0.27	0.20	0.26
2. Manufacturing Industries and Construction	0.37	0.40	0.37	0.38	0.46	0.47	0.48	0.47	0.50	0.58
3. Transport	3.34	3.35	3.29	3.22	3.05	2.90	2.67	2.55	2.43	2.19
4. Other Sectors	2.00	1.65	1.34	1.27	1.27	1.28	1.24	1.24	1.25	1.20
5. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B. Fugitive Emissions from Fuels	28.15	23.25	22.91	22.31	24.70	27.62	28.13	30.24	34.15	36.55
1. Solid Fuels	12.96	8.73	9.04	8.61	10.19	13.47	13.94	13.88	16.26	16.84
2. Oil and Natural Gas	15.19	14.52	13.87	13.71	14.52	14.15	14.19	16.36	17.89	19.71
2. Industrial Processes	0.96	1.64	1.39	1.56	1.96	2.75	3.69	3.81	3.59	4.13
A. Mineral Products	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B. Chemical Industry	0.96	1.64	1.39	1.56	1.96	2.75	3.69	3.81	3.59	4.13
C. Metal Production	IE,NA,NE,NO	IE,NA,NE,NO	IE,NA,NE,NO	IE,NA,NE,NO	IE,NA,NE,NO	IE,NA,NE,NO	IE,NA,NE,NO	IE,NA,NE,NO	IE,NA,NE,NO	IE,NA,NE,NO
D. Other Production										
E. Production of Halocarbons and SF ₆										
F. Consumption of Halocarbons and SF ₆										
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use										

4. Agriculture	1,067.70	1,067.56	1,045.34	1,053.20	1,081.82	1,099.94	1,100.96	1,125.64	1,101.46	1,115.83
A. Enteric Fermentation	1,039.00	1,038.64	1,016.59	1,023.80	1,051.04	1,058.39	1,068.73	1,092.70	1,068.94	1,083.52
B. Manure Management	27.56	27.87	27.81	28.31	29.68	30.64	31.16	31.74	31.48	31.29
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO
E. Prescribed Burning of Savannas	0.13	0.15	0.11	0.11	0.08	0.05	0.07	0.06	0.03	0.03
F. Field Burning of Agricultural Residues	1.02	0.90	0.83	0.97	1.01	0.86	1.00	1.14	1.01	0.99
G. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
5. Land Use, Land-Use Change and Forestry	2.38	2.32	2.79	2.79	3.17	2.68	2.93	2.57	2.42	2.35
A. Forest Land	1.06	1.01	1.48	1.48	1.86	1.37	1.61	1.26	1.11	1.04
B. Cropland	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
C. Grassland	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31
D. Wetlands	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO
E. Settlements	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
F. Other Land	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
G. Other	IE,NE	IE,NE	IE,NE	IE,NE	IE,NE	IE,NE	IE,NE	IE,NE	IE,NE	IE,NE
6. Waste	108.10	109.63	108.01	109.10	108.36	99.27	100.30	99.83	96.70	90.09
A. Solid Waste Disposal on Land	98.25	99.52	97.81	98.79	97.89	88.66	89.54	88.97	85.94	79.44
B. Waste-water Handling	9.85	10.11	10.21	10.31	10.47	10.61	10.76	10.86	10.76	10.65
C. Waste Incineration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
7. Other (as specified in Summary 1.A)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total CH₄ emissions including CH₄ from LULUCF	1,213.26	1,210.09	1,185.77	1,194.12	1,225.03	1,227.10	1,240.61	1,266.62	1,242.70	1,253.17
Total CH₄ emissions excluding CH₄ from LULUCF	1,210.88	1,207.76	1,182.98	1,191.33	1,221.85	1,224.42	1,237.68	1,264.05	1,240.28	1,250.82

Memo Items:																		
International Bunkers	0.13	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Aviation	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Marine	0.10	0.09	0.08	0.08	0.09	0.09	0.13	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.08
Multilateral Operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO₂ Emissions from Biomass																		

All footnotes for this table are provided at the end of the table on page 184.

Table A.2: Emission trends (CH₄ – Part 2 of 2)

Inventory 2007 Submission 2009 v1.2 NEW ZEALAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	2005	2006	2007	Change from base to latest reported year
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	
1. Energy	41.05	43.09	42.75	41.96	40.48	41.00	47.52	39.61	16.12
A. Fuel Combustion (Sectoral Approach)	5.75	5.76	5.83	5.98	6.01	6.03	6.00	6.04	1.24
1. Energy Industries	0.25	0.29	0.25	0.24	0.18	0.24	0.25	0.27	4.94
2. Manufacturing Industries and Construction	0.52	0.53	0.57	0.56	0.58	0.60	0.60	0.62	68.96
3. Transport	2.23	2.29	2.41	2.52	2.58	2.55	2.57	2.63	-21.25
4. Other Sectors	2.75	2.65	2.60	2.66	2.67	2.65	2.58	2.52	25.89
5. Other	NA	NA	NA	NA	NA	NA	NA	NA	0.00
B. Fugitive Emissions from Fuels	35.29	37.33	36.93	35.98	34.46	34.96	41.52	33.57	19.27
1. Solid Fuels	16.19	16.97	16.86	15.82	14.85	14.57	21.44	12.47	-3.78
2. Oil and Natural Gas	19.10	20.36	20.07	20.16	19.61	20.39	20.08	21.10	38.94
2. Industrial Processes	4.82	4.26	4.56	1.94	2.18	0.69	0.81	0.87	-9.44
A. Mineral Products	NA	NA	NA	NA	NA	NA	NA	NA	0.00
B. Chemical Industry	4.82	4.26	4.56	1.94	2.18	0.69	0.81	0.87	-9.44

C. Metal Production	IE,NA,NE, NO	IE,NA,NE, NO	IE,NA,NE, NO	IE,NA,NE, NO	IE,NA,NE, NO	IE,NA,NE, NO	IE,NA,NE, NO	IE,NA,NE, NO	IE,NA,NE, NO	IE,NA,NE, NO	IE,NA,NE, NO	IE,NA,NE, NO	IE,NA,NE, NO	0.00
D. Other Production														
E. Production of Halocarbons and SF ₆														
F. Consumption of Halocarbons and SF ₆														
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
3. Solvent and Other Product Use														
4. Agriculture	1,150.68	1,157.98	1,149.67	1,165.15	1,164.38	1,174.89	1,178.54	1,146.17	7.35					
A. Enteric Fermentation	1,116.99	1,123.62	1,114.94	1,129.23	1,128.84	1,139.89	1,143.31	1,110.78	6.91					
B. Manure Management	32.66	33.22	33.55	34.80	35.04	34.38	34.69	34.72	25.99					
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	0.00					
D. Agricultural Soils	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0.00					
E. Prescribed Burning of Savannas	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	-68.00					
F. Field Burning of Agricultural Residues	0.98	1.11	1.13	1.07	0.46	0.58	0.50	0.63	-38.46					
G. Other	NO	NO	NO	NO	NO	NO	NO	NO	0.00					
5. Land Use, Land-Use Change and Forestry	2.09	1.91	1.87	2.30	2.14	2.37	2.28	2.96	24.50					
A. Forest Land	1.03	0.99	0.72	0.74	0.63	0.94	0.79	1.61	51.80					
B. Cropland	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00					
C. Grassland	1.05	0.92	1.15	1.56	1.51	1.43	1.49	1.34	2.38					
D. Wetlands	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	IE,NE,NO	0.00					
E. Settlements	NE	NE	NE	NE	NE	NE	NE	NE	0.00					
F. Other Land	NE	NE	NE	NE	NE	NE	NE	NE	0.00					
G. Other	IE,NE	IE,NE	IE,NE	IE,NE	IE,NE	IE,NE	IE,NE	IE,NE	0.00					
6. Waste	90.82	88.48	86.19	85.63	82.58	80.17	78.16	78.12	-27.74					
A. Solid Waste Disposal on Land	80.25	77.99	76.05	75.38	72.45	70.28	68.56	68.47	-30.30					
B. Waste-water Handling	10.57	10.49	10.14	10.25	10.13	9.89	9.60	9.64	-2.16					

C. Waste Incineration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-87.43
D. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00
7. Other (as specified in Summary 1.A)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00
Total CH₄ emissions including CH₄ from LULUCF	1,289.46	1,295.72	1,285.05	1,296.97	1,291.74	1,299.11	1,307.31	1,267.72								4.49
Total CH₄ emissions excluding CH₄ from LULUCF	1,287.37	1,293.82	1,283.18	1,294.67	1,289.61	1,296.74	1,305.03	1,264.76								4.45
Memo Items:																
International Bunkers	0.12	0.13	0.15	0.15	0.14	0.16	0.16	0.16								21.30
Aviation	0.05	0.05	0.05	0.07	0.07	0.07	0.07	0.07								93.87
Marine	0.07	0.08	0.10	0.08	0.07	0.09	0.09	0.09								-7.08
Multilateral Operations	NE	NE	NE	NE	NE	NE	NE	NE								0.00
CO₂ Emissions from Biomass																

All footnotes for this table are provided at the end of the table on page 184.

Table A.3: Emissions trends (N₂O – Part 1 of 2)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990) (Gg)	1991	1992	1993	1994	1995	1996	1997	1998	1999
		(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
1. Energy	0.46	0.46	0.49	0.51	0.55	0.58	0.59	0.61	0.62	0.66
A. Fuel Combustion (Sectoral Approach)	0.46	0.46	0.49	0.51	0.55	0.58	0.59	0.61	0.62	0.66
1. Energy Industries	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.03	0.02	0.03
2. Manufacturing Industries and Construction	0.12	0.12	0.12	0.12	0.14	0.14	0.14	0.13	0.13	0.16
3. Transport	0.24	0.24	0.26	0.28	0.31	0.34	0.35	0.37	0.38	0.39
4. Other Sectors	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09
5. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B. Fugitive Emissions from Fuels	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO
1. Solid Fuels	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE
2. Oil and Natural Gas	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO
2. Industrial Processes	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
A. Mineral Products	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B. Chemical Industry	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
C. Metal Production	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
D. Other Production										
E. Production of Halocarbons and SF ₆										
F. Consumption of Halocarbons and SF ₆										
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15
4. Agriculture	32.55	32.63	32.23	32.95	34.17	34.97	35.32	35.94	35.61	36.22
A. Enteric Fermentation										
B. Manure Management	0.12	0.12	0.12	0.13	0.14	0.15	0.15	0.16	0.17	0.17

Aviation	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05
Marine	0.03	0.02	0.02	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.02
Multilateral Operations	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
CO ₂ Emissions from Biomass												

Table A.3: Emission trends (N₂O – Part 2 of 2)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	2005	2006	2007	Change from base to latest reported year %
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	
1. Energy	0.70	0.73	0.76	0.81	0.82	0.87	0.87	0.84	82.20
A. Fuel Combustion (Sectoral Approach)	0.70	0.73	0.76	0.81	0.82	0.87	0.87	0.84	82.20
1. Energy Industries	0.03	0.03	0.03	0.06	0.07	0.09	0.09	0.05	157.30
2. Manufacturing Industries and Construction	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.17	48.76
3. Transport	0.41	0.43	0.45	0.47	0.48	0.50	0.51	0.52	115.27
4. Other Sectors	0.12	0.12	0.13	0.12	0.11	0.11	0.10	0.10	16.01
5. Other	NA	NA	NA	NA	NA	NA	NA	NA	0.00
B. Fugitive Emissions from Fuels	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0.00
1. Solid Fuels	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	0.00
2. Oil and Natural Gas	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	0.00
2. Industrial Processes	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
A. Mineral Products	NA	NA	NA	NA	NA	NA	NA	NA	0.00
B. Chemical Industry	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
C. Metal Production	NA	NA	NA	NA	NA	NA	NA	NA	0.00
D. Other Production									

Table A.4: Emission trends (HFCs, PFCs and SF₆ – Part 1 of 2)

Inventory 2007 Submission 2009 v1.2 NEW ZEALAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
Emissions of HFCs⁽²⁾ – (Gg CO₂ equivalent)	NA,NO	NA,NO	1.43	2.86	62.48	148.30	214.03	123.87	300.40	300.04
HFC-23	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-32	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00	NA,NO	NA,NO	NA,NO	NA,NO
HFC-41	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-43-10mee	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-125	NA,NO	NA,NO	NA,NO	NA,NO	0.00	0.00	0.00	0.01	0.01	0.02
HFC-134	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-134a	NA,NO	NA,NO	0.00	0.00	0.04	0.09	0.14	0.06	0.17	0.15
HFC-152a	NA,NO	NA,NO	NA,NO	NA,NO	0.00	0.00	0.00	0.00	0.00	0.00
HFC-143	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-143a	NA,NO	NA,NO	NA,NO	NA,NO	0.00	0.01	0.00	0.01	0.01	0.01
HFC-227ea	NA,NO	NA,NO	NA,NO	NA,NO	0.00	0.00	0.00	0.00	0.00	0.00
HFC-236fa	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-245ca	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Unspecified mix of listed HFCs ⁽³⁾ – (Gg CO ₂ equivalent)	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Emissions of PFCs⁽²⁾ – (Gg CO₂ equivalent)	642.22	318.03	296.59	199.58	188.15	150.26	265.89	164.47	104.96	61.20
CF ₄	0.08	0.04	0.04	0.03	0.02	0.02	0.03	0.02	0.01	0.01
C ₂ F ₆	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C ₃ F ₈	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00	0.00	0.00	0.01	NA,NO
C ₄ F ₁₀	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO

C-4F ₆	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
C ₃ F ₁₂	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
C ₆ F ₁₄	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Unspecified mix of listed PFCs ⁽³⁾ – (Gg CO ₂ equivalent)	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Emissions of SF₆⁽²⁾ – (Gg CO₂ equivalent)	15.20	15.77	16.49	16.92	17.28	17.88	17.66	18.16	16.90	16.06				
SF ₆	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

All footnotes for this table are provided at the end of the table on page 184.

Table A.4: Emission trends (HFCs, PFCs and SF₆ – Part 2 of 2)

Inventory 2007 Submission 2009 v1.2 NEW ZEALAND

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	2005	2006	2007	Change from base to latest reported year	
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	%
Emissions of HFCs⁽²⁾ – (Gg CO₂ equivalent)	304.28	346.24	482.82	643.94	449.75	675.47	612.40	856.63	100.00	100.00
HFC-23	NA,NO	NA,NO	NA,NO	0.00	NA,NO	NA,NO	0.00	NA,NO	0.00	0.00
HFC-32	NA,NO	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	100.00
HFC-41	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
HFC-43-10mee	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
HFC-125	0.02	0.02	0.03	0.05	0.04	0.06	0.05	0.08	0.08	100.00
HFC-134	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
HFC-134a	0.16	0.16	0.20	0.22	0.17	0.21	0.24	0.27	0.27	100.00
HFC-152a	NA,NO	0.00	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
HFC-143	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
HFC-143a	0.01	0.02	0.03	0.06	0.03	0.06	0.04	0.07	0.07	100.00
HFC-227ea	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00

HFC-236fa	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
HFC-245ca	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
Unspecified mix of listed HFCs ⁽³⁾ – (Gg CO ₂ equivalent)	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
Emissions of PFCs⁽²⁾ – (Gg CO₂ equivalent)	57.68	60.55	78.92	101.53	84.34	58.98	90.56	41.67	-93.51								
CF ₄	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-93.69
C ₂ F ₆	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-93.96
C ₃ F ₈	NA,NE,NO	NA,NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00
C ₄ F ₁₀	NA,NE,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
c-C ₄ F ₈	NA,NE,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
C ₅ F ₁₂	NA,NE,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
C ₆ F ₁₄	NA,NE,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
Unspecified mix of listed PFCs ⁽³⁾ – (Gg CO ₂ equivalent)	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00
Emissions of SF₆⁽²⁾ – (Gg CO₂ equivalent)	10.52	10.87	14.89	17.57	22.25	18.95	15.39	14.70	-3.30								
SF ₆	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-3.30

All footnotes for this table are provided at the end of the table on page 184.

Table A.5: Emissions trends summary (Part 1 of 2)

Inventory 2007 Submission 2009 v1.2 NEW ZEALAND

GREENHOUSE GAS EMISSIONS	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)
CO ₂ emissions including net CO ₂ from LULUCF	7,143.57	8,554.01	12,504.60	12,166.71	11,250.00	11,251.27	11,475.19	11,806.09	10,137.63	11,121.10
CO ₂ emissions excluding net CO ₂ from LULUCF	25,337.57	25,880.37	27,716.78	27,140.71	27,221.88	27,209.55	28,199.04	30,490.77	29,058.20	30,324.75
CH ₄ emissions including CH ₄ from LULUCF	25,478.40	25,411.86	24,901.14	25,076.56	25,725.56	25,769.11	26,052.76	26,599.10	26,096.62	26,316.62
CH ₄ emissions excluding CH ₄ from LULUCF	25,428.52	25,363.06	24,842.56	25,017.90	25,658.92	25,712.75	25,991.32	26,545.03	26,045.84	26,267.23
N ₂ O emissions including N ₂ O from LULUCF	10,435.00	10,465.27	10,353.47	10,583.38	10,978.12	11,237.01	11,352.77	11,553.43	11,454.44	11,657.98
N ₂ O emissions excluding N ₂ O from LULUCF	10,429.35	10,459.13	10,345.75	10,575.05	10,968.38	11,227.72	11,342.37	11,543.18	11,443.94	11,647.02
HFCs	NA,NO	NA,NO	1.43	2.86	62.48	148.30	214.03	123.87	300.40	300.04
PFCs	642.22	318.03	296.59	199.58	188.15	150.26	265.89	164.47	104.96	61.20
SF ₆	15.20	15.77	16.49	16.92	17.28	17.88	17.66	18.16	16.90	16.06
Total (including LULUCF)	43,714.39	44,764.94	48,073.73	48,046.01	48,221.59	48,573.82	49,378.30	50,265.11	48,110.94	49,472.99
Total (excluding LULUCF)	61,852.85	62,036.37	63,219.60	62,953.02	64,117.09	64,466.46	66,030.31	68,885.49	66,970.23	68,616.31
GREENHOUSE GAS SOURCE AND SINK CATEGORIES										
	Base year (1990)	1991	1992	1993	1994	1995	1996	1997	1998	1999
	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)
1. Energy	23,452.84	23,750.84	25,465.10	24,809.33	25,066.92	25,042.72	26,075.27	28,477.39	27,027.43	28,160.81
2. Industrial Processes	3,409.22	3,235.72	3,328.44	3,304.93	3,246.19	3,390.23	3,556.89	3,308.12	3,517.08	3,678.69
3. Solvent and Other Product Use	41.54	42.78	43.09	43.71	44.33	44.95	45.88	46.19	46.50	46.81

4. Agriculture	32,511.08	32,534.11	31,943.20	32,331.50	33,310.35	33,728.91	34,069.97	34,780.45	34,171.11	34,660.80
5. Land Use, Land-Use Change and Forestry ⁽⁴⁾	-18,138.46	-17,271.43	-15,145.88	-14,907.01	-15,895.50	-15,892.64	-16,652.01	-18,620.37	-18,859.29	-19,143.31
6. Waste	2,438.18	2,472.91	2,439.78	2,463.55	2,449.30	2,259.65	2,282.30	2,273.33	2,208.12	2,069.20
7. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total (including LULUCF)⁽⁴⁾	43,714.39	44,764.94	48,073.73	48,046.01	48,221.59	48,573.82	49,378.30	50,265.11	48,110.94	49,472.99

All footnotes for this table are provided at the end of the table on page 184.

Table A.5: Emissions trends summary (Part 2 of 2)

Inventory 2007 Submission 2009 v1.2 NEW ZEALAND

GREENHOUSE GAS EMISSIONS	2000	2001	2002	2003	2004	2005	2006	2007	Change from base to latest reported year (%)
	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	
CO ₂ emissions including net CO ₂ from LULUCF	11,061.95	12,591.52	13,017.01	13,614.40	9,282.81	10,514.45	12,304.10	11,316.37	58.41
CO ₂ emissions excluding net CO ₂ from LULUCF	31,088.27	33,000.95	33,101.31	34,905.81	34,194.76	35,852.35	36,244.36	35,231.49	39.05
CH ₄ emissions including CH ₄ from LULUCF	27,078.60	27,210.19	26,986.05	27,236.37	27,126.62	27,281.24	27,453.53	26,622.17	4.49
CH ₄ emissions excluding CH ₄ from LULUCF	27,034.75	27,170.16	26,946.73	27,188.17	27,081.72	27,231.57	27,405.59	26,560.06	4.45
N ₂ O emissions including N ₂ O from LULUCF	12,113.19	12,538.25	12,839.50	13,161.25	13,234.66	13,351.93	13,245.82	12,862.64	23.26
N ₂ O emissions excluding N ₂ O from LULUCF	12,102.20	12,527.05	12,827.77	13,148.03	13,221.18	13,337.38	13,230.85	12,845.63	23.17
HFCs	304.28	346.24	482.82	643.94	449.75	675.47	612.40	856.63	100.00
PFCs	57.68	60.55	78.92	101.53	84.34	58.98	90.56	41.67	-93.51
SF ₆	10.52	10.87	14.89	17.57	22.25	18.95	15.39	14.70	-3.30

Total (including LULUCF)		50,626.21	52,757.61	53,419.19	54,775.05	50,200.42	51,901.03	53,721.80	51,714.18	18.30
Total (excluding LULUCF)		70,597.69	73,115.82	73,452.44	76,005.05	75,053.99	77,174.70	77,599.14	75,550.19	22.15
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2000	2001	2002	2003	2004	2005	2006	2007	Change from base to latest reported year (%)	
	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)	CO ₂ equivalent (Gg)		
1. Energy	28,987.28	30,855.88	30,951.43	32,550.05	31,845.21	33,479.00	34,010.64	32,653.10	39.23	
2. Industrial Processes	3,648.00	3,777.28	3,951.10	4,287.59	4,052.82	4,266.87	4,233.76	4,601.88	34.98	
3. Solvent and Other Product Use	47.12	47.43	56.11	52.39	48.36	44.33	40.30	43.40	4.48	
4. Agriculture	35,835.96	36,403.89	36,509.36	37,136.19	37,188.73	37,519.09	37,491.19	36,430.00	12.05	
5. Land Use, Land-Use Change and Forestry ⁽⁴⁾	-19,971.47	-20,358.21	-20,033.25	-21,230.00	-24,853.57	-25,273.67	-23,877.33	-23,836.01	31.41	
6. Waste	2,079.33	2,031.33	1,984.44	1,978.83	1,918.86	1,865.41	1,823.25	1,821.80	-25.28	
7. Other	NA	NA	NA	NA	NA	NA	NA	NA	0.00	
Total (including LULUCF)⁽⁴⁾	50,626.21	52,757.61	53,419.19	54,775.05	50,200.42	51,901.03	53,721.80	51,714.18	18.30	

⁽¹⁾ The signs for removals are always negative (-) and for emissions positive (+).

⁽²⁾ Enter actual emissions estimates. If only potential emissions estimates are available, these should be reported in this table and an indication for this be provided in the documentation box. Only in these rows are the emissions expressed as CO₂ equivalent emissions.

⁽³⁾ In accordance with the UNFCCC reporting guidelines, HFC and PFC emissions should be reported for each relevant chemical. However, if it is not possible to report values for each chemical (ie. mixtures, confidential data, lack of disaggregation), this row could be used for reporting aggregate figures for HFCs and PFCs, respectively. Note that the unit used for this row is Gg of CO₂ equivalent and that appropriate notation keys should be entered in the cells for the individual chemicals.

⁽⁴⁾ Includes net CO₂, CH₄ and N₂O from LULUCF.

Annex B: Supplementary information under Article 7.2 of the Kyoto Protocol

National system

National entity contact

Title	National focal point	National inventory compiler
Name	Helen Plume	Sonia Petrie
Organisation	Ministry for the Environment	Ministry for the Environment
Address	Environment House 23 Kate Sheppard Place PO Box 10362 Wellington New Zealand	Environment House 23 Kate Sheppard Place PO Box 10362 Wellington New Zealand
Email	helen.plume@mfe.govt.nz	sonia.petrie@mfe.govt.nz
Phone	+64 4 439 7627	+64 4 439 7498
Fax	+64 4 439 7700	+64 4 439 7700
Website	http://www.mfe.govt.nz	http://www.mfe.govt.nz

Roles and responsibilities and institutional, legal and procedural arrangements in inventory preparation

The Climate Change Response Act 2002 enables New Zealand to meet its international obligations under the Climate Change Convention and the Kyoto Protocol. A prime ministerial directive for the administration of the Climate Change Response Act names the Ministry for the Environment as New Zealand's "inventory agency". The Climate Change Response Act specifies that the primary functions of the inventory agency are to:

- estimate annually New Zealand's human-induced emissions by sources, and removals by sinks, of greenhouse gases
- prepare the following reports for the purpose of discharging New Zealand's obligations:
 - New Zealand's annual inventory report under Article 7.1 of the Protocol, including (but not limited to) the quantities of long-term certified emission reduction units and temporary certified emission reduction units that have expired or have been replaced, retired or cancelled

- New Zealand’s National Communication (or periodic report) under Article 7.2 of the Protocol and Article 12 of the Convention
- New Zealand’s report for the calculation of its initial assigned amount under Article 7.4 of the Protocol, including its method of calculation.

In carrying out its functions, the inventory agency must:

- identify source categories
- collect data by means of:
 - voluntary collection
 - collection from government agencies and other agencies that hold relevant information
 - collection in accordance with regulations made under the Act (if any)
- estimate the emissions and removals by sinks for each source category
- undertake assessments on uncertainties
- undertake procedures to verify the data
- retain information and documents to show how the estimates were determined.

Section 36 of the Climate Change Response Act provides for the authorisation of inspectors to collect the information needed to estimate emissions or removals of greenhouse gases.

Inventory roles and responsibilities

The Ministry for the Environment is New Zealand’s single national entity for the greenhouse gas inventory, responsible for the overall development, compilation and submission of the inventory to the UNFCCC secretariat. The Ministry coordinates all of the Government agencies and contractors involved in the inventory. The national inventory compiler is based at the Ministry. Arrangements with other government agencies have evolved over time as resources and capacity have allowed, and as a greater understanding of the reporting requirements has been attained.

The Ministry for the Environment calculates estimates of emissions for the waste sectors, and emissions and removals from the land use, land-use change and forestry (LULUCF) sector.

The Ministry of Economic Development collects and compiles all emissions from the energy sector and carbon dioxide emissions from the industrial processes sector. Emissions of the non-carbon dioxide gases from the industrial processes sector are obtained through industry surveys by consultants, contracted to the Ministry for the Environment.

The Ministry of Agriculture and Forestry compiles emissions from the agricultural sector and provides data to the Ministry for the Environment to estimate emissions and removals from the LULUCF sector. Estimates provided by the Ministry of Agriculture and Forestry are underpinned by the research and modelling of researchers at New Zealand’s Crown research institutes and universities.

New Zealand’s national statistical agency, Statistics New Zealand, provides many of the official statistics for the agricultural sector through regular agricultural censuses and surveys. Statistics New Zealand also provides statistics on fuel consumption through the *Deliveries of Petroleum Fuels by Industry Survey* and the *New Zealand Coal Sales Survey*. Population census data from Statistics New Zealand is used in the waste and solvent and other product use sectors.

Consultants are used to provide essential data for the industrial processes, solvent and other product use, waste, agriculture and LULUCF sectors of the inventory.

Where an expert in a relevant sector is identified outside the Ministry for the Environment, or any of the other key contributing government departments, a contract is established to ensure the inventory can be completed in an accurate and timely manner and to a standard that meets the satisfaction of the Minister responsible for Climate Change Issues. The contracts are legally binding and require transparency in their work and processes. Legislation relating to the public sector accountability framework is extensive and includes the:

- Public Finance Act 1989
- Public Audit Act 2001
- Official Information Act 1982
- Ombudsman Act 1975
- Public Records Act 2005
- Crown Entities Act 2004.

Contractors for the annual greenhouse gas inventory are selected for being experts in their fields. Although it is preferable to use the same contractor each year, contractors are reviewed annually. Through this competitive process the best contractor is selected, ensuring inventory data is of the highest quality in accordance with good practice guidance.

Inventory preparation processes

Consistent with the UNFCCC's reporting guidelines, each inventory report is published 15 months in arrears of the calendar year reported, allowing time for data to be collected and analysed. Sector-based data analysis, data entry into the UNFCCC common reporting format database, and quality checking occur over the period October to December. The national inventory report is also updated over this three-month time period.

Once the sector-based emissions estimates are updated, the national inventory compiler at the Ministry for the Environment calculates the inventory uncertainty, undertakes the key category assessment and further quality checking, and finalises the national inventory report. The inventory is reviewed within the Ministry for the Environment, Ministry of Economic Development and Ministry of Agriculture and Forestry before being approved and submitted to the UNFCCC secretariat.

The inventory and all required data for the submission to the UNFCCC secretariat are stored on the Ministry for the Environment's central computer network in a controlled file system. The inventory submission is available from the websites of the Ministry for the Environment and the UNFCCC.

Following the annual submission of the national inventory, a post-inventory review is undertaken. The review focuses on the lessons learnt and how improvements can be incorporated into the inventory for the following year. Questions asked include:

- Was the timing of activities suitable?
- What activities went well?
- What activities could be improved?

The review encompasses key contributors to the inventory.

Activity data, emission factors and methods

The guiding documents in inventory preparation are the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*,¹²⁹ the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*¹³⁰ (the Good Practice Guidance), *Good Practice Guidance for Land Use, Land-Use Change and Forestry*,¹³¹ and the Climate Change Convention guidelines on reporting and review.¹³² The concepts contained in the Good Practice Guidance are implemented in stages, according to sector priorities and national circumstances.

Energy

Greenhouse gas emissions from the energy sector are calculated using the IPCC Tier 1 approach. Activity data is compiled from industry-supplied information via the Ministry of Economic Development and Statistics New Zealand. New Zealand-specific emission factors are used for carbon dioxide emission calculations. Applicable IPCC default factors are used for non-carbon dioxide emissions where New Zealand emission factors are not available.

Industrial processes and solvent and other product use

Activity data and carbon dioxide emissions are supplied directly to the Ministry of Economic Development by industry sources. The IPCC Tier 2 approach is used and emission factors are New Zealand specific. Activity data for the non-carbon dioxide gases is collected via an industry survey. Emissions of hydrofluorocarbons and perfluorocarbons are estimated using the IPCC Tier 2 approach, and sulphur hexafluoride emissions from large users are assessed via the Tier 3a approach from the IPCC 2006 guidelines.¹³³

Agriculture

Livestock population data is obtained from Statistics New Zealand through the agricultural production census and surveys. A Tier 2 (model) approach is used to estimate methane emissions from dairy cattle, non-dairy cattle, sheep and deer. This method uses New Zealand animal productivity data to estimate dry-matter intake and methane production. The same dry-matter intake data is used to calculate nitrous oxide emissions from animal excreta. A Tier 1 approach is used to calculate methane and nitrous oxide emissions from livestock species present in insignificant numbers.

Land Use, Land-use Change and Forestry (LULUCF)

The LULUCF sector is completed using a mix of IPCC Tier 2 and Tier 1 approaches. A Tier 2 approach is used for the planted forest subcategory of forest land. Changes in planted forest stocks are assessed from national forest survey data and computer modelling of the planted forest estate. A Tier 1 approach is used for the cropland, grassland, wetland, settlements and other land categories. Changes in land area for these categories are based on modified national land-cover databases reclassified to the IPCC LULUCF categories. Results from the Land Use and Carbon Analysis System (LUCAS), as described in New Zealand's national greenhouse gas

¹²⁹ <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html>.

¹³⁰ <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>

¹³¹ <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html>.

¹³² http://unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&preref=600003988#beg

¹³³ *2006 IPCC Guidelines for National Greenhouse Gas Inventories* <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>.

inventory, will improve the reporting in the LULUCF sector and will provide better consistency with reporting under the Kyoto Protocol in the 2010 inventory submission.

Waste

Emissions from the waste sector are estimated using waste survey data combined with population data from Statistics New Zealand. Calculation of emissions from solid waste disposal uses the model from the IPCC 2006 guidelines. A mix of New Zealand-specific and IPCC default parameters is used. Methane and nitrous oxide emissions from domestic and industrial wastewater handling are calculated using a refinement of the IPCC methodology. There is no incineration of municipal waste in New Zealand. Emissions from incineration from medical, quarantine and hazardous wastes are estimated using the Tier 1 approach consistent with the 2006 IPCC guidelines.

Process and results of key category identification

The IPCC's *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* identifies a key category as "one that is prioritised within the national inventory system because its estimate has a significant influence on a country's total inventory of direct greenhouse gases in terms of the absolute level of emissions, the trend in emissions, or both". Key categories identified within the inventory are used to prioritise inventory improvements.

The key categories in the New Zealand inventory have been assessed using the Tier 1 level and trend methods from the IPCC good practice guidance. The methods identify sources of emissions and removals that sum to 95 per cent of the total level of emissions, and 95 per cent of the trend of the inventory in absolute terms.

In accordance with the *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, the key category analysis is performed once for the inventory excluding LULUCF categories and is then repeated for the inventory including the LULUCF categories. Non-LULUCF categories that are identified as key in the first analysis but that do not appear as key when the LULUCF categories are included, are still considered to be key categories.

The key categories identified in the 2007 year are summarised in table B.1. The major contributions to the level analysis including LULUCF (table B.2) were methane from enteric fermentation in domestic livestock (23.0 per cent), carbon dioxide from conversion to forest land (15.0 per cent) and carbon dioxide from road transportation (13.1 per cent).

The key categories that were identified as having the largest relative influence on New Zealand's emissions trend in 2007, including LULUCF (table B.3), were carbon dioxide emissions from road transportation (20.5 per cent), methane emissions from enteric fermentation in domestic livestock (18.7 per cent), and carbon dioxide emissions from forest land remaining forest land (12.2 per cent).

Table B.1: Summary of key categories for 2007 (including and excluding LULUCF activities)

Quantitative method used: Tier 1		
IPCC source categories	Gas	Criteria for identification
Energy sector		
CO ₂ emissions from stationary combustion – solid	CO ₂	level, trend
CO ₂ emissions from stationary combustion – liquid	CO ₂	level, trend
CO ₂ emissions from stationary combustion – gas	CO ₂	level, trend
Mobile combustion – road vehicles	CO ₂	level, trend
Mobile combustion – aviation	CO ₂	level
Fugitive emissions from oil and gas operations	CO ₂	level, trend
Fugitive emissions from geothermal operations	CO ₂	trend
Industrial processes sector		
Emissions from cement production	CO ₂	level, trend
Emissions from the iron and steel industry	CO ₂	level
PFCs from aluminium production	PFCs	trend
Ammonia production	CO ₂	qualitative
Consumption of halocarbons and SF ₆ – refrigeration & air conditioning	HFCs & PFCs	level, trend
Agricultural sector		
Emissions from enteric fermentation in domestic livestock	CH ₄	level, trend
Emissions from manure management	CH ₄	level
Direct emissions from agricultural soils	N ₂ O	level, trend
Emissions from agricultural soils – animal production	N ₂ O	level, trend
Indirect emissions from nitrogen used in agriculture	N ₂ O	level
LULUCF sector		
Forest land remaining forest land	CO ₂	trend
Conversion to forest land	CO ₂	level, trend
Conversion to grassland	CO ₂	trend
Cropland remaining cropland	CO ₂	level
Conversion to cropland	CO ₂	trend
Waste sector		
Emissions from solid waste disposal sites	CH ₄	level, trend

Table B.2 (a & b): Key category analysis for 2007 – Tier 1 level assessment including LULUCF (a) and excluding LULUCF (b)

(a) Tier 1 Category Level Assessment – including LULUCF				
IPCC categories	Gas	2007 estimate (Gg CO₂-e)	Level assessment	Cumulative total
Emissions from enteric fermentation in domestic livestock	CH ₄	23326.38	23.0	23.0
Conversion to forest land	CO ₂	15253.73	15.0	38.0
Mobile combustion – road vehicles	CO ₂	13281.35	13.1	51.1
Forest land remaining forest land	CO ₂	9311.50	9.2	60.3
Emissions from stationary combustion – gas	CO ₂	8723.65	8.6	68.9
Emissions from agricultural soils – animal production	N ₂ O	7346.67	7.2	76.1
Emissions from stationary combustion – solid	CO ₂	4473.87	4.4	80.5
Indirect emissions from nitrogen used in agriculture	N ₂ O	3270.66	3.2	83.8
Emissions from stationary combustion – liquid	CO ₂	2644.94	2.6	86.4
Direct emissions from agricultural soils	N ₂ O	1680.74	1.7	88.0
Emissions from the iron and steel industry	CO ₂	1646.24	1.6	89.7
Emissions from solid waste disposal sites	CH ₄	1437.95	1.4	91.1
Mobile combustion – aviation	CO ₂	915.10	0.9	92.0
Consumption of halocarbons and SF ₆ – refrigeration and air conditioning	HFCs & PFCs	779.64	0.8	92.7
Fugitive emissions from oil and gas operations	CO ₂	754.57	0.7	93.5
Emissions from manure management	CH ₄	729.10	0.7	94.2
Emissions from cement production	CO ₂	687.90	0.7	94.9
Cropland remaining cropland	CO ₂	649.67	0.6	95.5
Emissions from aluminium production	CO ₂	579.05	0.6	96.1
Conversion to grassland	CO ₂	436.83	0.4	96.5
Fugitive emissions from oil and gas operations	CH ₄	378.72	0.4	96.9
Fugitive emissions from geothermal operations	CO ₂	301.47	0.3	97.2
Mobile combustion – marine	CO ₂	300.11	0.3	97.5

Fugitive emissions from coal mining and handling	CH ₄	261.83	0.3	97.7
Emissions from hydrogen production	CO ₂	224.90	0.2	98.0
Emissions from wastewater handling	CH ₄	202.49	0.2	98.2
Emissions from wastewater handling	N ₂ O	179.19	0.2	98.3
Emissions from ammonia/urea production	CO ₂	360.06	0.4	98.7
Mobile combustion – rail	CO ₂	164.88	0.2	98.9
Mobile combustion – road vehicles	N ₂ O	147.48	0.1	99.0

(b) Tier 1 Category Level Assessment – excluding LULUCF

IPCC categories	Gas	2007 estimate (Gg CO₂-e)	Level assessment	Cumulative total
Emissions from enteric fermentation in domestic livestock	CH ₄	23326.38	30.9	30.9
Mobile combustion – road vehicles	CO ₂	13281.35	17.6	48.5
Emissions from stationary combustion – gas	CO ₂	8723.65	11.6	60.1
Emissions from agricultural soils – animal production	N ₂ O	7346.67	9.7	69.8
Emissions from stationary combustion – solid	CO ₂	4473.87	5.9	75.7
Indirect emissions from nitrogen used in agriculture	N ₂ O	3270.66	4.3	80.1
Emissions from stationary combustion – liquid	CO ₂	2644.94	3.5	83.6
Direct emissions from agricultural soils	N ₂ O	1680.74	2.2	85.8
Emissions from the iron and steel industry	CO ₂	1646.24	2.2	88.0
Emissions from solid waste disposal sites	CH ₄	1437.95	1.9	89.9
Mobile combustion – aviation	CO ₂	915.10	1.2	91.1
Consumption of halocarbons and SF ₆ – refrigeration and air conditioning	HFCs & PFCs	779.64	1.0	92.1
Fugitive emissions from oil and gas operations	CO ₂	754.57	1.0	93.1
Emissions from manure management	CH ₄	729.10	1.0	94.1
Emissions from cement production	CO ₂	687.90	0.9	95.0

Table B.3: Key category analysis for 2007 – Tier 1 trend assessment including LULUCF (a) and excluding LULUCF (b)

(a) Tier 1 Category Trend Assessment – including LULUCF						
IPCC categories	Gas	Base year estimate (Gg CO₂-e)	2007 estimate (Gg CO₂-e)	Trend assessment	Contribution to trend	Cumulative total
Mobile combustion – road vehicles	CO ₂	7516.28	13281.35	0.032	20.5	20.5
Emissions from enteric fermentation in domestic livestock	CH ₄	21818.97	23326.38	0.029	18.7	39.1
Forest land remaining forest land	CO ₂	5614.43	9311.50	0.019	12.2	51.3
Emissions from agricultural soils – animal production	N ₂ O	6853.06	7346.67	0.009	5.8	57.0
Emissions from solid waste disposal sites	CH ₄	2063.21	1437.95	0.009	5.7	62.7
Direct emissions from agricultural soils	N ₂ O	487.19	1680.74	0.009	5.5	68.3
Conversion to forest land	CO ₂	13059.41	15253.73	0.007	4.5	72.8
Emissions from stationary combustion – gas	CO ₂	7691.22	8723.65	0.006	4.0	76.8
Consumption of halocarbons and SF ₆ – refrigeration and air conditioning	HFCs & PFCs	0.00	779.64	0.006	4.0	80.8
PFCs from aluminium production	PFCs	642.22	40.27	0.006	3.9	84.7
Emissions from stationary combustion – solid	CO ₂	3139.65	4473.87	0.005	3.0	87.7
Emissions from stationary combustion – liquid	CO ₂	2505.28	2644.94	0.004	2.3	90.0
Fugitive emissions from oil and gas operations	CO ₂	263.75	754.57	0.003	2.2	92.2
Fugitive emissions from geothermal operations	CO ₂	376.16	301.47	0.001	0.8	93.1
Conversion to grassland	CO ₂	482.70	436.83	0.001	0.8	93.9
Emissions from cement production	CO ₂	441.67	687.90	0.001	0.7	94.6
Conversion to cropland	CO ₂	37.35	128.68	0.001	0.4	95.0

(b) Tier 1 Category Trend Assessment – excluding LULUCF

IPCC Categories	Gas	Base year estimate (Gg CO ₂ -e)	2007 estimate (Gg CO ₂ -e)	Trend assessment	Contribution to trend	Cumulative total
Mobile combustion – road vehicles	CO ₂	7516.28	13281.35	0.045	26.6	26.6
Emissions from enteric fermentation in domestic livestock	CH ₄	21818.97	23326.38	0.036	21.3	48.0
Direct emissions from agricultural soils	N ₂ O	487.19	1680.74	0.012	7.0	55.0
Emissions from solid waste disposal sites	CH ₄	2063.21	1437.95	0.012	7.0	62.0
Emissions from agricultural soils – animal production	N ₂ O	6853.06	7346.67	0.011	6.6	68.6
Consumption of halocarbons and SF ₆ -refrigeration and air conditioning	HFCs & PFCs	0.00	779.64	0.008	5.1	73.6
PFCs from aluminium production	PFCs	642.22	40.27	0.008	4.8	78.5
Emissions from stationary combustion – gas	CO ₂	7691.22	8723.65	0.007	4.3	82.7
Emissions from stationary combustion – solid	CO ₂	3139.65	4473.87	0.007	4.2	86.9
Emissions from stationary combustion – liquid	CO ₂	2505.28	2644.94	0.004	2.7	89.6
Fugitive emissions from oil and gas operations	CO ₂	263.75	754.57	0.005	2.8	92.4
Fugitive emissions from geothermal operations	CO ₂	376.16	301.47	0.002	1.0	93.4
Emissions from cement production	CO ₂	441.67	687.90	0.002	1.0	94.4
Consumption of halocarbons and SF ₆ -aerosols and metered dose inhalers	HFCs & PFCs	0.00	75.57	0.001	0.5	94.8
Fugitive emissions from coal mining and handling	CH ₄	272.13	261.83	0.001	0.5	95.3

Recalculation of previously submitted inventory data

Activity data, emission factors, methods and modelling techniques used in the inventory compilation process may be refined as government agencies and consultants identify areas for improvement. Re-calculations that may result from the improvement process are regarded as a standard element of inventory compilation. Before the annual inventory is compiled, areas for improvement are identified at a planning session. The quality assurance and quality control (QA/QC) plan is reviewed annually during the inventory debrief and planning phase. Cross-government inventory managers and general managers are consulted when a large improvement is anticipated for adoption. For the 2010 inventory submission and beyond, all recalculations will be required to be approved through a recalculations approval form before changes are made to the inventory data tables.

QA/QC plan, quality objectives, internal and external evaluation and review processes and their results

Quality assurance and quality control plan

Quality assurance (QA) and quality control (QC) are an integral part of preparing New Zealand's inventory. The Ministry for the Environment developed a QA/QC plan in 2004, as required by the UNFCCC reporting guidelines, to formalise, document and archive the QA/QC procedures. The plan is updated annually in conjunction with New Zealand's inventory improvement plan.

New Zealand's greenhouse gas inventory QA/QC plan has been designed to improve the transparency, consistency, comparability, completeness and accuracy of New Zealand's annual greenhouse gas inventory in order to meet IPCC good practice. The plan closely follows the definitions, guidelines and processes presented in Chapter 8 "Quality assurance and quality control" of the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. New Zealand's plan is an open document and is subject to modification and improvement when changes in processes are updated, or on advice from independent reviewers.

The QA/QC plan is intended to ensure transparency and the quality of New Zealand's inventory. The principles of the plan include:

- applying greater quality control efforts for key categories and for those categories where data and methodological changes have recently occurred
- periodically checking the validity of all information as changes in sample size, methods of collection, or frequency of data collection occur
- conducting general quality control procedures (Tier 1) on all parts of the inventory over a period of time
- balancing efforts between development and implementation of QA/QC procedures and continuous improvement of inventory estimates
- customising the quality control procedures to the resources available and the particular characteristics of New Zealand's greenhouse gas inventory
- confirming that the national statistical agency and other agencies supplying data to the inventory have implemented QA/QC procedures.

The QA/QC coordinator is defined as the person who is the national inventory compiler for New Zealand. The responsibilities of the role include:

- keeping the QA/QC plan current by updating it as necessary
- ensuring all planned Tier 1 and Tier 2 quality checks are carried out as planned (these may be undertaken in the agencies where the data is compiled)
- ensuring New Zealand's inventory improvement plan is implemented.

The QA/QC plan, combined with annual inventory experience, indicates areas for future improvements for the inventory, which are then incorporated into the following inventory and each subsequent inventory thereafter.

Quality control

For the 2009 inventory submission, the Ministry for the Environment used the IPCC Tier 1 QC check sheets. The Tier 1 checks are based on the procedures suggested in the good practice guidance.¹³⁴ All key categories for the 2007 inventory year were checked.

Recent reviews under the UNFCCC have recommended New Zealand intensify the time and resources directed at implementing the QA/QC plan, with the aim of reducing the number of minor errors and inconsistencies. New Zealand responded to the recommendation by changing the inventory compilation schedule to allow more time for quality checking.

For the 2009 inventory submission, all sector-level data was entered into the common reporting format database by January 2009. The earlier deadline allowed two months for further quality checking at the sector level (between data spreadsheets and the common reporting format tables) and checking consistency between the common reporting format tables and the national inventory report.

An additional person was contracted into the inventory team at the Ministry for the Environment from December 2008 through to February 2009 to complete quality checks on key categories for the 2007 inventory year. Checks included ensuring the data from the spreadsheets and models was accurately transferred to the common reporting format database, and that data from the database was accurately represented in the draft national inventory report. No significant errors within the source data spreadsheets or between the spreadsheets and the common reporting format database and the draft national inventory report were identified.

Data in the common reporting format database was checked visually for anomalies, errors and omissions. The Ministry for the Environment used the QC checking procedures included in the database to ensure the data submitted to the UNFCCC secretariat was complete.

Quality assurance

New Zealand's inventory is progressively improving its quality control and assurance system to ensure quality is built in at all stages of the inventory compilation process. In 2008, KPMG, an audit specialist, developed a risk register for the Ministry to highlight potential risks in the data compilation process. The Ministry for the Environment will continue to use the risk register to help prioritise further improvements to the inventory.

For the 2009 inventory submission, improvements focused on building the capacity of the national inventory system. This involved recruitment within the national inventory team and providing documentation for the national inventory compiler role. This has lowered the risk of losing specialised knowledge of New Zealand's national inventory system.

¹³⁴ IPCC, 2000. <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

Quality assurance reviews of individual sectors and categories were included in the national inventory plan and commissioned by the Ministry for the Environment. A list of previous quality assurance reviews, their major conclusions and follow-up are included in the MS Excel worksheets available with New Zealand's 2009 inventory submission from the Ministry for the Environment's website.¹³⁵

Most of the energy and agricultural activity data (the two largest components of New Zealand's inventory) is provided by Statistics New Zealand, which conducts its own rigorous quality assurance and quality control procedures on the data.

Internal review

A review of the complete inventory check is performed to ensure all planned checks have been completed before the inventory is submitted. This review includes checking that all the planned Tier 1 and 2 QC checks have been completed and the results filled out in the appropriate Excel tables, any QA exercises have been completed, and the compulsory checks in the CRF software are complete for all sectors.

Before submitting the inventory to the UNFCCC secretariat, internal review is undertaken by staff within the Ministry for the Environment who have not been involved with the inventory compilation process.

The UNFCCC annual inventory review

New Zealand's inventory was reviewed in 2001 and 2002 as part of a pilot study of the technical review process. The inventory was subjected to detailed in-country, centralised and desk review procedures. The inventories submitted for the years 2001 and 2003 were reviewed in a centralised review process. The 2004 inventory was reviewed as part of the Kyoto Protocol initial review; this was an in-country review held from 19–24 February 2007. The 2007 and 2008 inventory submissions were reviewed during a centralised review in September 2008. In all cases the reviews were conducted by an international team of experts nominated by parties to the UNFCCC. Review reports are available from the UNFCCC website (<http://www.unfccc.int>).

New Zealand has consistently met the inventory reporting requirements under the UNFCCC and the Kyoto Protocol. The submission of the inventory to the UNFCCC secretariat has consistently met the required deadline under decision 15/CMP.1. The national system for the greenhouse gas inventory, the national registry and the 1990 (base year) inventory were reviewed by an international expert review team in February 2007. The expert review report concluded that:

- “New Zealand's greenhouse gas inventory is consistent with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance, and adheres to the reporting guidelines under Article 7 of the Kyoto Protocol.
- New Zealand's national system is prepared in accordance with the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol and reported in accordance with the guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol.
- New Zealand's national registry is fully compliant with the registry requirements as defined by decisions 13/CMP.1 and 5/CMP.1.”

¹³⁵ <http://www.mfe.govt.nz/publications/climate/greenhouse-gas-inventory-2009/index.html>.

New Zealand's consistency in meeting the reporting requirements allowed it to be one of the first four Parties to be eligible to participate in the Kyoto Protocol mechanisms. New Zealand's registry (described in the next section), the official transactions and balance of New Zealand's Kyoto units were operational on 1 January 2008.

Procedures for the official consideration and approval of the inventory

The finalised inventory submission is signed off by the manager responsible for the team compiling the inventory within the Ministry for the Environment. The final approval is by the director who is the designated management sign-off individual for the Chief Executive Officer at the Ministry for the Environment.

Further information on New Zealand's national system can be found in the initial report under the Kyoto Protocol: http://unfccc.int/files/national_reports/application/pdf/new_zealands_initial_report_under_the_kyoto_protocol.pdf and the latest national greenhouse gas inventory report: <http://www.mfe.govt.nz/issues/climate/greenhouse-gas-emissions/index.html>.

National registry

The reporting period covered is up to 31 December 2008.

Registry administrator

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Consolidated registry with other parties

New Zealand does not maintain a consolidated registry with any other parties.

Database structure

The registry uses a relational database, which runs on SQL server 2005. The database comprises one schema to store application or program data (including all data pertaining to the user transactions through the Web) and also the data that manages the content of the web application, the business rules and other backend processing data. The hardware supporting SQL server in production meets Microsoft's recommended server specifications. The production SQL server has a C drive of 34 GB and an E drive SAN attached of 30 GB.

Data exchange

The New Zealand registry was initialised in 2007. During May 2009 the New Zealand registry was successfully re-certified. This has demonstrated that the New Zealand registry performs as per Data Exchange Standards.

Minimising discrepancies

The New Zealand Registry has a multitude of checks in place to ensure discrepancies in transactions are minimised. For example, the web application interface prevents users from selecting the wrong units to fulfil a notification (where the unit blocks are specified). For the most part, checks in the New Zealand Registry follow the checks performed by the ITL on a given transaction. The New Zealand Registry also has a robust reconciliation and manual intervention process, which allows ease of correction of reconciliation discrepancies.

Security measures

The Ministry of Economic Development has established a security plan specifically for the New Zealand Emission Unit Register (the Register). The plan has three parts:

- server security, which protects the physical servers and access to the underpinning software and databases
- web application security, which prevents unauthorised access to Register information
- session security, which protects Register data as it is transmitted over the internet.

The server security plan restricts physical and remote access to the servers hosting the Register. Only authorised personnel have access to the data centre where the servers are located. The Ministry of Economic Development must authorise any access to the servers, and photo identification is required. Remote access to the servers is controlled by a firewall and a virtual private network.

The web application security component ensures that access to the Register has been appropriately authorised. Users must log in to the web application using a unique username and password to gain access. There are several security groups that users are assigned to, with different levels of permissions and data access.

Session security ensures the Register data is not intercepted when it is transmitted over the internet. Data transmitted between the Register and users is encrypted using server gated cryptography, regardless of operating system or browser type. An authenticated user session will be automatically terminated (logged out) after 15 minutes of inactivity.

Information availability

The following information is available via the publically accessible user interface to the Register:

- a list of emission unit holdings and transactions
- a list of transactions between the Register and overseas registers
- a list of accounts in the Register
- a list of account holders in the Register and their legal addresses
- a list of New Zealand projects eligible for emission units.

Internet address

The internet address for the Register is: <http://www.eur.govt.nz>.

Integrity of data storage

To cover Register data security and data recovery in the event of disaster, the system is backed up daily. There is a data recovery site in Auckland, and there is log shipping every 5 minutes to the Auckland data recovery centre, along with a complete copy every night.

Results of test procedures

There were no significant changes during the 2008 year. The original initialisation occurred in 2007 and information on these procedures was provided in New Zealand's initial report.

Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17

In the net position report produced in May 2009, New Zealand's net emissions of greenhouse gases over the first commitment period were projected to be 293.2 Mt CO₂-e.¹³⁶ A total of 6.8 million Kyoto units have been promised to projects under the Projects to Reduce Emissions programme, so the Government's projected liability is 300 million units, 3 per cent under New Zealand's assigned amount (309.6 million units). This includes 85 million tonnes of projected removal units from forests, mostly planted in the mid- to late 1990s. As a result, New Zealand will not need to use the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol to meet its emissions reduction target.

Policies and measures in accordance with Article 2

Sustainable development

All of New Zealand's climate change policies promote sustainable development (please refer to chapter 4: Policies and measures).

Aviation and marine bunker fuels

New Zealand's geographical remoteness, coupled with international tourism being a significant economic earner, makes addressing international aviation emissions a key concern. Airways New Zealand (New Zealand's air navigation service provider) is working together with other countries' air navigation service providers to improve efficiencies on international or long-haul routes through the Asia-Pacific Initiative to Reduce Emissions (ASPIRE). This includes demonstrating the capabilities of advanced Air Navigation Services and Airline fuel optimisation initiatives in current operations (eg, improved air traffic management, continuous climb departures, user preferred routes). The New Zealand Government has also facilitated the bio-fuel trials conducted by Air New Zealand. In terms of estimates of emission from

¹³⁶ <http://www.mfe.govt.nz/publications/climate/net-position-report-2009/index.html>.

international aviation, New Zealand revised the allocation between domestic and international aviation emissions in 2008.

The Government plays an active role within the International Maritime Organization's Maritime Environment Protection Committee, where international greenhouse gas emissions are considered. International maritime transport is critical for New Zealand's primary products, which make up two-thirds of exports. A joint inter-departmental project is investigating methods for calculating greenhouse gas emissions from international shipping, and the results of this will contribute to primary sector carbon footprinting analysis.

Minimising adverse effects

New Zealand's Cabinet and legislative processes to establish and implement climate change response measures include consultation with the Ministry of Foreign Affairs and Trade and with the public. The Ministry provides advice on international aspects of proposed policies, and during the public consultation phase, concerns and issues about the proposed measure can be raised by any person or organisation.

Through the Government's regular trade, economic and political consultations with other governments, including some developing countries, there are opportunities for those who may be concerned about the possible or actual impacts of New Zealand policies to raise concerns and have them resolved within the bilateral relationship. To date there have been no specific concerns raised about any negative impact of New Zealand's climate change response policies.

The New Zealand Government, through NZAID, has regular Official Development Assistance programming talks with partner country governments at which partners have the opportunity to raise concerns about any impacts and to ask for or prioritise assistance to deal with those impacts. NZAID also works with partner developing countries to strengthen governance and enabling environments, which improve their ability to respond to changing circumstances. As a member of the Pacific Islands Forum, New Zealand works closely with developing countries in the Pacific in a wide range of technical, economic and political fields, addressing concerns that are raised in the regional context.

New Zealand maintains a liberalised and open trading environment, consistent with the principles of free trade and investment, ensuring that both developed and developing countries can maximise opportunities in New Zealand's market regardless of the response measures undertaken.

Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures

The Climate Change Response Act 2002 put in place the legal framework that allowed New Zealand to ratify the Kyoto Protocol and to meet its obligations under the UNFCCC. The Act includes powers for the Minister of Finance to manage New Zealand's holdings of units, which represent New Zealand's target allocation for greenhouse gas emissions under the Protocol. It enables the Minister to trade those units on the international market and establishes a register to record holdings and transfers of units. The Act also establishes a national inventory agency to record and report information relating to greenhouse gas emissions in accordance with international requirements.

The Climate Change Response (Emissions Trading) Amendment Act 2008 established the New Zealand Emissions Trading Scheme. The Act describes the legal details of the scheme. Regulations relating to the emissions trading scheme have also been made under the Climate Change Response Act. The New Zealand Emissions Trading Scheme is described in more detail in Chapter 4.

Information under Article 10

Activities undertaken by New Zealand in fulfilment of commitments under Article 10 of the Kyoto Protocol are reported on in chapters 4, 6, 7, 8 and 9. The steps taken by New Zealand to promote, finance and facilitate the transfer of technology to developing countries are reported on in chapter 7.

Financial resources

The steps taken for New Zealand to meet its obligations under Article 11 of the Kyoto Protocol are outlined in Chapter 7: Financial resources and technology transfer.

Annex C: Summary of policies and measures

Table C.1: Summary of policies and measures by sector

Name of policy or measures	Objective and/or activity affected	GHG affected	Type of instrument	Status	Implementing entity or entities	Estimated mitigation in:		
						2009 (Gg CO ₂ -e per year)	2020 (Gg CO ₂ -e per year)	2040 (Gg CO ₂ -e per year)
New Zealand Emissions Trading Scheme	The scheme will cover all sectors and all gases, and will reduce emissions by making emitters pay for any emissions covered under the Kyoto Protocol.	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ .	Economic, regulatory	Implemented	The Ministry of Economic Development, the Ministry of Agriculture and Forestry, and the Ministry for the Environment		10,000	
Marine Energy and Distributed Generation Funds	Providing financial assistance and support for research into, and deployment of, marine and small-scale electricity generating activities.	CO ₂ , N ₂ O	Fiscal and information	Implemented	Energy Efficiency and Conservation Authority		70	
Efficient Products Programme	This programme develops energy efficiency measures for a range of residential, commercial and industrial products, and allows both New Zealand and Australia to set consistent standards and measures for energy efficiency.	CO ₂	Regulatory, voluntary, information	Implemented	Energy Efficiency and Conservation Authority		1,400	
Business programmes	Provides information on new technologies and energy management, grants for energy audits and demonstrations of new technology, and one-on-one support for energy-intensive businesses. Grant funding is available for new or under-utilised technology improvements.	CO ₂	Voluntary, information, fiscal	Implemented	Energy Efficiency and Conservation Authority		32	

Name of policy or measures	Objective and/or activity affected	GHG affected	Type of instrument	Status	Implementing entity or entities	Estimated mitigation in:		
						2009 (Gg CO2-e per year)	2020 (Gg CO2-e per year)	2040 (Gg CO2-e per year)
ENERGYWISE homes	Aims to increase energy efficiency in homes by providing information and grants for energy efficiency measures. Also provides information on the funding available to reduce energy consumption, including clean space heating options and solar hot water.	CO ₂	Information, fiscal	Implemented	Energy Efficiency and Conservation Authority		20	
Electricity efficiency programme	Provides subsidies for efficient electrical products such as light bulbs and electric motors. Subsidies are also available for projects to improve efficient use of electricity in commercial buildings.	CO ₂	Fiscal, information	Implemented	Electricity Commission	89		
Energy efficiency in government	Supports central and local government entities to implement energy efficiency initiatives within their own operations. Provides information and forums to improve awareness of energy efficiency in the community. Also provides grant funding for energy audits.	CO ₂	Fiscal, information	Implemented	Energy Efficiency and Conservation Authority		NE	
Vehicle fuel economy labelling	Allows consumers to make a more informed choice when purchasing a vehicle and to place an appropriate value on fuel economy.	CO ₂	Regulatory	Implemented	New Zealand Transport Agency and the Energy Efficiency and Conservation Authority		43	

Name of policy or measures	Objective and/or activity affected	GHG affected	Type of instrument	Status	Implementing entity or entities	Estimated mitigation in:		
						2009 (Gg CO ₂ -e per year)	2020 (Gg CO ₂ -e per year)	2040 (Gg CO ₂ -e per year)
Renewable transport fuels including biofuels	To encourage greater production of biofuels` and to ensure equal incentives for different types of biofuels between now and 2012, the Government has agreed to provide a grant to biodiesel producers.	CO ₂	Fiscal	Implemented	Energy Efficiency and Conservation Authority		NE	
Electric vehicles	Promote uptake of electric vehicles in New Zealand, by exempting them from road-user charges.	CO ₂	Fiscal	Implemented	Energy Efficiency and Conservation Authority		NE	
Other transport measures	These include research and driver training to promote more efficient driving practices, and funding to improve and promote the use of public transport in New Zealand.	CO ₂	Education and fiscal	Implemented	Ministry of Transport and other agencies across government		NE	
Global Alliance on agricultural emissions	A worldwide virtual network set up for climate change research into agriculture and food production.	CH ₄ , NO	Research	Planned			NE	
Primary Growth Partnership (PGP)	Provides investment in significant programmes of research and innovation to boost the economic growth and sustainability of New Zealand's primary, forestry and food sectors.	CH ₄ , NO, CO ₂	Research, information	Implemented	Foundation for Research, Science and Technology		NE	
Pastoral Greenhouse Gas Research Consortium (PGGRC)	A partnership between the Government and the dairy and fertiliser industries which provides livestock farmers with the information and means to mitigate their greenhouse gas emissions.	CH ₄ , NO	Research, information, education	Implemented	Ministry of Agriculture and Forestry and the Foundation for Research Science and Technology		NE	

Name of policy or measures	Objective and/or activity affected	GHG affected	Type of instrument	Status	Implementing entity or entities	Estimated mitigation in:		
						2009 (Gg CO2-e per year)	2020 (Gg CO2-e per year)	2040 (Gg CO2-e per year)
Sustainable Land Management and Climate Change Plan of Action	Initiatives and programmes in the agricultural and forestry sectors that focus on adaptation to climate change, reducing emissions and enhancing sinks, and new business opportunities.	CH ₄ , NO	Research, information, education	Implemented	Ministry of Agriculture and Forestry		NE	
East Coast Forestry Project	The main purpose of this project is to reduce erosion by encouraging tree planting on erosion-prone land. The project also enhances the sequestration of carbon in forest sinks.	CO ₂	Voluntary agreement	Implemented	Ministry of Agriculture and Forestry			399
Afforestation Grant Scheme	Aims to increase the area of Kyoto-compliant forest in New Zealand by offering a simpler alternative to the NZ ETS for landowners with small tracts of forest.	CO ₂	Fiscal, voluntary agreement	Implemented	Ministry of Agriculture and Forestry			154
Permanent Forest Sinks Initiative	Promotes the establishment of permanent forests on previously unforested land by offering the opportunity to earn assigned amount units for carbon sequestered in permanent forests established after 1 January 1990.	CO ₂	Voluntary agreement	Implemented	Ministry of Agriculture and Forestry			84
Increasing the use of wood as a construction material	A range of initiatives designed to increase the use of wood as a construction material, such as: funding full life-cycle analysis research, professorship positions, and funding demonstration buildings.	CO ₂	Research, information, education	Implemented	Ministry of Agriculture and Forestry		NE	

Name of policy or measures	Objective and/or activity affected	GHG affected	Type of instrument	Status	Implementing entity or entities	Estimated mitigation in:		
						2009 (Gg CO2-e per year)	2020 (Gg CO2-e per year)	2040 (Gg CO2-e per year)
Waste Minimisation Act 2008	Aims to lower the social costs and risks from waste, reduce the damage to the environment from waste generation and disposal, and increase economic benefits by encouraging more efficient use of materials. It will also contribute to reducing greenhouse gas emissions from the waste sector.	CH ₄	Regulatory	Implemented	Ministry for the Environment		NE	
National Environmental Standard for Landfill Methane.	Requires landfill sites with a design capacity greater than 1 million tonnes of refuse to collect and destroy methane emissions.	CH ₄ , CO ₂	Regulatory	Implemented	Ministry for the Environment		NE	

NE: Not estimated

