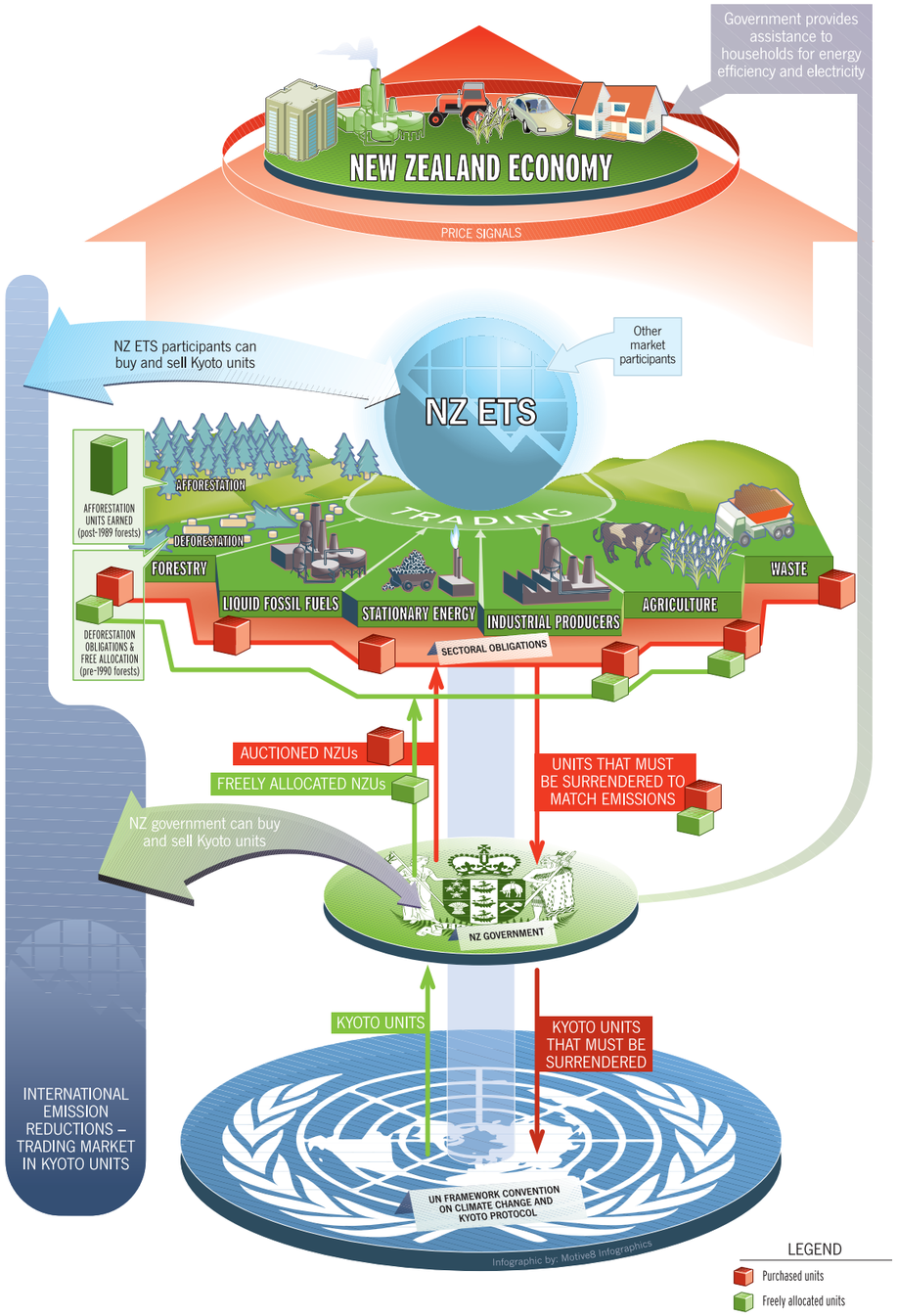
The Framework for a New Zealand

Emissions Trading Scheme

New Zealand Government

sustainability


Government provides assistance to households for energy efficiency and electricity
NEW ZEALAND ECONOMY
PRICE SIGNALS
NZ ETS participants can buy and sell Kyoto units
Other market participants
NZ ETS
AFFORESTATION
AFFORESTATION UNITS EARNED (post-1989 forests)
DEFORESTATION
DEFORESTATION OBLIGATIONS & FREE ALLOCATION (pre-1990 forests)
TRADING
FORESTRY
LIQUID FOSSIL FUELS
STATIONARY ENERGY
INDUSTRIAL PRODUCERS
AGRICULTURE
WASTE
SECTORAL OBLIGATIONS
AUCTIONED NZUs
FREELY ALLOCATED NZUs
UNITS THAT MUST BE SURRENDERED TO MATCH EMISSIONS
NZ government can buy and sell Kyoto units
NZ GOVERNMENT
KYOTO UNITS
KYOTO UNITS THAT MUST BE SURRENDERED
INTERNATIONAL EMISSION REDUCTIONS – TRADING MARKET IN KYOTO UNITS
UN FRAMEWORK CONVENTION ON CLIMATE CHANGE AND KYOTO PROTOCOL
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LEGEND
Purchased units
Freely allocated units

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Ministerial Foreword

Climate change is an unprecedented challenge – for the global community, for the world environment, for the world economy, and therefore for New Zealand as well. Without global action to reduce and stabilise greenhouse gas emissions, the world is projected to experience a rise in temperature, increasing sea levels, more frequent extreme weather events and a change in rainfall patterns.

New Zealand will not be immune from these effects. Climatic changes may have a severe impact on our native ecosystems, industries, infrastructure, health, biosecurity and economy. If greenhouse gas emissions are not reduced significantly over the coming decades, the damage to our environment and quality of life could be significant and irreparable.

Just as we are not immune from the effects, we cannot be aloof from the response. While New Zealand contributes only a tiny proportion of the world's emissions, our per capita emissions are high by international standards. So although reducing our emissions will not, by itself, make a major contribution to the global problem of climate change, all countries need to do their bit. In addition, as a small trading nation we need to recognise the shift in attitudes in our key overseas markets, where climate change issues are having a growing impact on the thinking of governments and consumers.

Addressing climate change and becoming more sustainable are crucial to New Zealand's economic transformation to a high-value, high-wage, export-led economy. For one thing, this will open up opportunities for New Zealand businesses which already include within their numbers world leaders in technology in important areas such as agriculture, forestry and biotechnology. There will be significant new economic opportunities for these sectors if they can position themselves at the forefront of the development of new carbon-friendly technologies.

Many of the things we do in the name of climate change achieve other commonsense objectives. Warm, energy-efficient homes are healthy homes. Fuel and energy efficiency saves money. Forestry reduces erosion and improves water quality. Becoming a leader in new sustainable technologies and smarter ways of doing things gives us the chance to transform the economy and improve our quality of life, as well as protect the environment.

From December 2006 through March 2007 the government consulted broadly on possible policy directions for climate change and sustainability through the release of five discussion documents. These documents identified a wide range of potential policy options to achieve New Zealand's overall climate change objectives. The options included emissions trading, a narrowly based carbon tax, incentives, subsidies, direct regulatory measures, and voluntary approaches. The feedback showed broad – although not universal – support for the use of emissions trading as the preferred approach for reducing emissions in the long term.

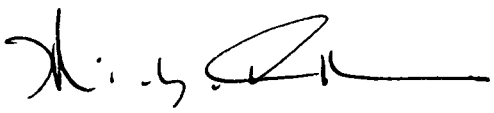
In response to this consultation, the government has decided in principle that New Zealand will adopt an emissions trading scheme (ETS), rather than an emissions tax, as its core price-based measure for mitigating climate change, alongside other policies and measures to reduce overall domestic emissions. It is a sensible and efficient approach. We are one of a number of countries developing such schemes, and economic modelling shows the impact on growth is expected to be minimal.

The government's intent is that the various sectors of the New Zealand economy will be brought into the ETS in a staged transition with the aim of having all the major sectors covered by the Kyoto Protocol included in the ETS by the start of 2013. Emissions trading will mean an increase in the costs of products such as petrol and electricity, however, the scheme will be introduced gradually, allowing for smooth adjustments across the economy, and transitional assistance will be provided to households and industry. Although the ETS is primarily a long-term measure, in the shorter term it will provide a major boost to the forestry sector through the devolution of emission units to landowners. We also expect the ETS to immediately influence long-term investment decisions in renewable energy and energy efficiency.

The ETS will be designed so that it can be adapted to future changes to New Zealand's obligations under the international climate change policy framework post-2012, and can endure if there is a gap between the end of the first commitment period of the Kyoto Protocol and the implementation of a successor agreement.

The government has asked officials from the Emissions Trading Group and government departments to actively engage with stakeholders, Māori and the general public on the details of the emissions trading scheme they have designed, prior to Ministers taking final decisions on the scheme. Legislation to enact the New Zealand Emissions Trading Scheme (NZ ETS) will be introduced and passed during the life of the current Parliament. Consideration of that legislation will include a full select committee hearing process and public submissions.

The engagement process will continue for a number of years as the scheme is further developed, particularly with respect to later entrants into the scheme. We encourage all interested members of the public to engage with the government to help design a scheme to meet the important challenge of climate change.



The Hon Dr Michael Cullen
Minister of Finance

The Hon David Parker
Minister Responsible for Climate Change Issues

Executive Summary

Climate change is a major problem for New Zealand and the world

The Earth's climate is changing at an increasingly rapid rate, largely due to ongoing high rates of greenhouse gas emissions caused by human activity. Even with concerted global effort to reduce greenhouse gas emissions there are likely to be changes in temperature and rainfall patterns, increases in the number of significant wind and storm events, and an increased risk of flooding and coastal erosion. These impacts have flow-on effects for air and water quality, the retention of nutrients in soils, and preserving biodiversity.

Like most countries, New Zealand could suffer severe adverse effects to our economy, our infrastructure and our way of life.

Climate change, sustainability and economic transformation

Reducing greenhouse gas emissions is therefore imperative, for both environmental and economic reasons. The New Zealand government is committed to creating an economy and a way of life that are environmentally sustainable. Indeed, economic transformation and environmental sustainability can be seen as two sides of the same coin. For example:

- improved efficiency in the use of energy and natural resources is central to improving productivity and increasing the value of our exports, and will help to conserve valuable non-renewable resources for use by future generations
- developing renewable domestic energy sources will improve New Zealand's energy security
- there is a growing market for products and services which involve low greenhouse gas emissions, as has already been recognised by sectors such as tourism, agriculture and viticulture
- the move towards a "knowledge economy" involves shifting the production balance towards value-added activities that draw upon information technology, the creation of intellectual property, and the development of new technologies in areas such as biotechnology, all of which tend to be less emissions intensive
- conversely, failure to control greenhouse gas emissions could have trade risks, both at a political level (because countries that do not take the issue seriously may find it hard to improve access to markets and may face trade barriers) and at a global consumer level (since New Zealand's clean, green image is part of the international brand that underpins the premium prices we seek for our products and services)
- the impetus towards sustainability creates new incentives to develop efficient technologies and improve management practices across all sectors of the economy.

In fact, many of the things we do in the name of climate change achieve other commonsense objectives. Warm, energy-efficient homes are healthy homes, and are known to reduce the incidence of chronic conditions such as asthma. Energy efficiency frees up resources for households and improves business profitability. Planting or maintaining forests reduces erosion and improves water quality.

Countries that are proactive in responding to the challenge of reducing emissions will position themselves to achieve a smoother transition to emission constraints and are more likely to benefit from the new market opportunities that will emerge.

The background to the government's climate change and sustainability agenda is presented in more detail in the document *New Zealand's Climate Change Solutions*, available at www.climatechange.govt.nz.

New Zealand's challenge

There are four main climate change challenges for New Zealand. We need to:

- control our own greenhouse gas emissions and reduce them relative to the current growth trend
- support international initiatives for multilateral action on greenhouse gas emissions, principally through maintaining momentum on the implementation of the Kyoto Protocol and ensuring this momentum is carried through into whatever agreements emerge for the period after 2012
- prepare for, and adapt to, the impacts of changes in our physical environment, by responding to the risks and taking advantage of the opportunities they present
- realise the above objectives at the lowest achievable long-term cost.

Why we need a broad, price-based measure

New Zealand's total greenhouse gas emissions are small from a global perspective – around 0.2 to 0.3 per cent of global emissions, in line with our small population. Nevertheless, we have the 12th highest per-capita emissions in the developed world. This is because, despite our small population, we rely heavily on private transport, and because the main drivers of our economic growth, our primary export industries, are emissions intensive.

Moreover, New Zealand's emissions level is forecast to grow as our population and economy grow. Unless prompt action is taken it will become increasingly difficult (and increasingly disruptive in economic terms) to bring our emissions growth under control. We need to act within the next few years to get robust measures in place and fully operative in order to influence the long-term investment decisions that will drive our emissions performance in the coming decades.

New Zealand has an unusual greenhouse gas emissions profile. Nearly 49 per cent of New Zealand's greenhouse gas emissions result from agriculture[1] (excluding agricultural energy use), contrasting with an average of 12 per cent in other developed countries. New Zealand also has significant emissions from the deforestation of forests planted before 1990, while emissions from the future harvesting of land afforested since that date are forecast to rise sharply during the decade from 2020 to 2030. On the other hand, New Zealand's energy sector contributes 43 per cent of total emissions, which is low relative to other developed countries. This is because approximately 69 per cent of our electricity is generated from renewable sources, such as hydro, geothermal, wind, solar, biogas and wood. However, energy emissions from transport, which currently account for 19 per cent of total emissions and 45 per cent of energy emissions, are forecast to increase steadily.

New Zealand has already introduced a range of measures to reduce emissions. These include:

- financial incentives (such as the Permanent Forest Sink Initiative and incentives to promote solar hot water heating and better home insulation)
- improved standards and codes (such as energy efficiency standards for new homes and household products)
- direct regulation of major emission sources (such as the biofuels sales obligation)
- public education (such as Energy Star efficiency labelling and Fuelsaver information on vehicle fuel efficiency)
- joint investment in research for mitigation of agricultural greenhouse gases.

Although significant, these measures are not sufficient to achieve the long-term emission reductions that will be integral to New Zealand's sustainable development pathway, particularly given that by 2020 our gross emissions (excluding the land use, land-use change and forestry sector) are estimated to be roughly 48 per cent above our 1990 levels.[2] In the shorter term, New Zealand has assumed an obligation under the Kyoto Protocol to take responsibility for emissions over 1990 levels from 2008 to 2012, which is the first commitment period. Under a "most likely" emission scenario, which reflects policies in place as of April 2007, New Zealand's net position is projected to be a deficit of 45.5[3] million units[4] over the first commitment period of the Kyoto Protocol.[5]

New Zealand's emissions are the product of a broad range of economic activities, and we need a correspondingly broad-based economic measure, based on prices, to bring about the behavioural changes needed to implement our greenhouse gas reduction strategy.

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1 In this document, the term agriculture means pastoral and arable farming as well as horticulture.

2 Ministry for the Environment 2006, *New Zealand's Fourth National Communication under the United Nations Framework Convention on Climate Change*, Ministry for the Environment: Wellington. www.mfe.govt.nz. This assumes policy settings in place as of December 2005.

3 This assumes a scenario with deforestation emissions of 21 million tonnes of carbon dioxide equivalent emissions (Mt CO_2-e) from 2008 to 2012. If an upper deforestation scenario of 41.0 Mt CO_2-e is used in determining the deficit on the Crown's accounts, the deficit will be 65.5 million units.

4 Under the Kyoto Protocol one emission unit equals one metric tonne of carbon dioxide equivalent (CO_2-e) emissions.

5 Ministry for the Environment 2007, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, Ministry for the Environment: Wellington. www.mfe.govt.nz.

A price-based measure has a number of significant advantages in this respect.

- It can provide a strong incentive (depending on the price it uses) for those making decisions about emissions to reduce them to a level that reflects the total cost to society, including the environmental cost.
- It harnesses the market dynamic by providing automatic incentives for firms to invest in reducing emissions and to shift to lower-emissions products and services.
- It provides flexibility for firms and fosters innovation and the seeking out of least-cost emission reduction strategies.
- It can be linked into international efforts to reduce emissions.

To best achieve the objectives outlined above, it is important that a price-based measure for New Zealand covers all greenhouse gases and all sectors of the economy. For practical reasons, this objective may be best achieved over a number of years via a staged implementation.

Price-based options: emissions tax or emissions trading?

The two options for a price-based measure are:

- an emissions tax levied on all economic activity that involves emissions
- the trading of a limited number of emission units, whose price would be determined by supply and demand.

The government has decided against proceeding with an emissions tax because it is a blunt instrument that would require regular alteration to ensure its effectiveness and to keep it in line with international emissions prices. An emissions trading regime would be preferable because:

- provides the government with relative certainty about the volume of emissions, and hence the environmental objectives, whereas a tax simply imposes a price on each unit of emissions and does not limit emissions *per se*
- is easily linked into the international emissions price and global emission reduction efforts, which minimises the risk to the New Zealand taxpayer of overshooting or undershooting our Kyoto Protocol and future international commitments
- provides New Zealand firms with maximum flexibility through enabling them to reduce or offset their emissions (including managing credits and liabilities over time) by accessing emission reduction opportunities at the lowest cost
- has wide support, being preferred as the primary means of managing New Zealand's emissions in the long term by many submitters on the five discussion documents released in December 2006
- allows New Zealand to devolve forest credits and liabilities to landowners as part of a broader economic instrument
- is emerging as the favoured measure among developed countries, and early adoption by New Zealand would bring significant benefits.

The government's decision on an emissions trading scheme

The government has decided in principle that New Zealand will use an emissions trading scheme as its core price-based measure for reducing greenhouse gas emissions and enhancing forest carbon sinks. The New Zealand Emissions Trading Scheme (NZ ETS) will operate alongside other policies and measures to reduce domestic emissions and achieve New Zealand's broader sustainability objectives.

Objective and core design features

The government has made a further series of in-principle decisions regarding the objective and the core design of the scheme. In this context, "in principle" means the government would need compelling reasons to adopt a different policy approach. These decisions will be confirmed subject to engagement with stakeholders and Māori, and prior to the introduction of legislation. Regarding other aspects of the NZ ETS design, the government has identified one or more preferred options, but is actively seeking to engage with stakeholders and Māori, and to consider any options they may put forward.

The government has decided in principle that the objective of the NZ ETS will be:

> *That a New Zealand Emissions Trading Scheme support and encourage global efforts to reduce greenhouse gas emissions by:*
>
> - *reducing New Zealand's net emissions below business-as-usual levels; and*
> - *complying with our international obligations, including our Kyoto Protocol obligations;*
>
> *while maintaining economic flexibility, equity, and environmental integrity at least cost in the long term.*

In-principle decisions have been made regarding the following core design features of the ETS:

- The NZ ETS will involve an obligation on participants to hold emission units that match the emissions levels for which they are responsible. A limited number of New Zealand emission units will be issued each year, and the scheme will operate within the global cap on emissions set by the Kyoto Protocol.
- The NZ ETS will, over time, include all major sectors (ie, forestry, transport, stationary energy, industrial processes (non-energy), agriculture and waste) and the six greenhouse gases specified in the Kyoto Protocol.[6]
- The NZ ETS will involve the devolution to landowners of both the credits for forestry activities that lead to a removal of carbon dioxide from the atmosphere, and the liabilities for the subsequent release of carbon dioxide into the atmosphere (by harvesting or deforestation).

[6] The Kyoto Protocol includes the following greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6).

- The NZ ETS will be introduced across the economy through a staged process that will allow gradual adjustment such that, by the start of 2013 all major sectors of the New Zealand economy will be exposed at the margin to the international price of emissions at the margin for all operations.[7]
- The NZ ETS will include three types of participants: those with obligations to surrender emission units to cover their direct emissions or the emissions associated with their products; those that receive freely allocated emission units, or receive emission units for eligible afforestation, or hold other emission units that can be traded to other parties; and those that engage in trading activities to take advantage of market opportunities.
- The core obligation will be for participants with unit obligations to surrender to the government one emission unit to cover each metric tonne of eligible emissions in a compliance period (usually a calendar year).[8] This is an absolute, rather than an intensity-based, obligation.
- A New Zealand Unit (NZU) will be the primary domestic unit of trade. For the first commitment period, NZUs will be fully comparable to, and backed by, Kyoto units by the end of the period for determining compliance (known as the true-up period).
- The NZ ETS will allow both sales to, and purchases from, international trading markets. This is essential for a small market like New Zealand, since it will aid liquidity in the market and act as a safety valve on price.
- Participants will face binding consequences for non-compliance with their obligations, including penalties and make-good provisions.
- The NZ ETS could potentially be augmented by an offsets mechanism, which would allow people without ETS obligations to earn emission credits for activities resulting in a reduction of total greenhouse gases being released into the atmosphere.
- The NZ ETS will be adaptable to future changes to New Zealand's obligations under the international climate change policy framework post-2012, and will continue to function even if there is a hiatus between the end of the first commitment period of the Kyoto Protocol and the implementation of a successor international agreement.

Importantly, the government will implement the NZ ETS through a transitional pathway that provides for a gradual adjustment to emissions pricing across the economy. The transitional provisions will vary by sector and will include the staged entry of different sectors, free allocation of emission units and/or the use of progressively increasing obligations to surrender emission units.

---

[7] This objective will be modified if progressive unit obligations are applied in some sectors. This means a participant is required to surrender units for some percentage of the full obligation during a transitional period. For example, under a 50 per cent obligation, a participant would surrender one emission unit for every two tonnes of emissions. As a result, progressive unit obligations would reduce the marginal price signal during a transitional period.

[8] As a starting point, obligations on participants would be based on Kyoto Protocol (and subsequent relevant international agreement) definitions.

Parallel to the NZ ETS, the government will introduce measures that:

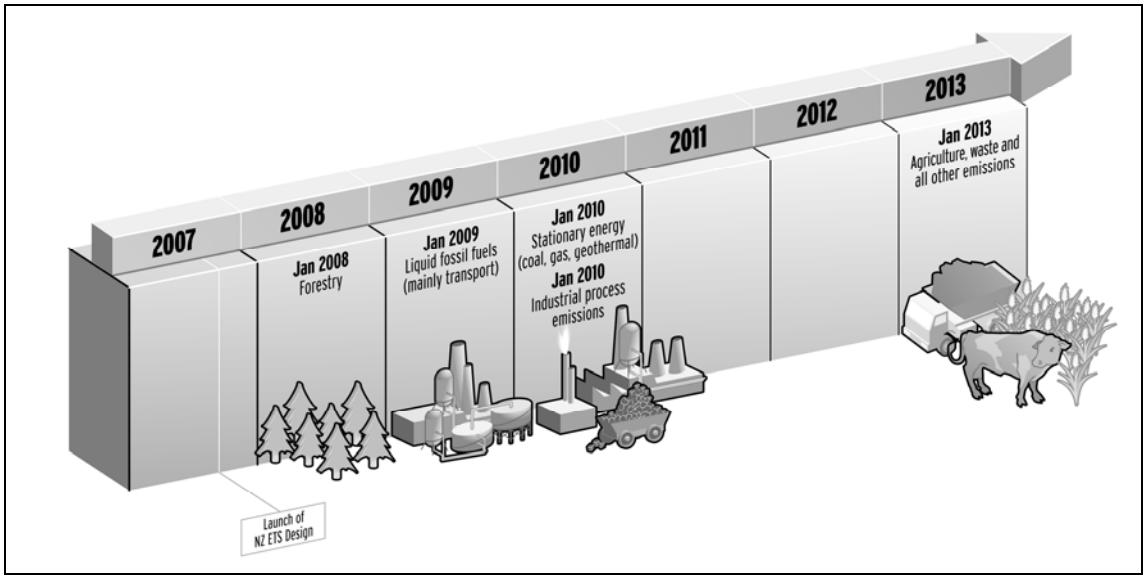
- assist people to respond effectively to an emissions price signal through improved skills and access to technology
- address non-price barriers (eg, the lack of easily accessible information comparing the options for managing energy use) that inhibit the uptake of low- or zero-emissions technologies and practices
- ensure that adjustment support is provided to households through energy efficiency measures
- additional measures to reduce the financial impacts of higher electricity prices so that low- and modest-income households are not disadvantaged, while still ensuring that incentives for efficient energy use remain.

Many details of the scheme's design remain to be decided, especially in relation to how individual sectors will be brought into the scheme. The government has identified a series of preferred options as a starting point for discussion, and is seeking to engage with stakeholders and Māori prior to finalising these, and introducing legislation enacting the NZ ETS and any measures that will accompany it.

Proposed implementation pathway

Figure ES1 sets out the government's proposed pathway for introducing various sectors into the ETS.

Figure ES1: Timeline for the entry of sectors into the NZ ETS



Upon entry into the scheme, sectors will assume the core obligation to surrender emission units to match emissions, and further obligations with regard to monitoring and reporting. However, the government has decided that in the case of the forestry sector, which is the first sector to enter the ETS, the first compliance period will extend for two years from January 2008 until December 2009. Table ES1 identifies the commencement dates and initial compliance periods for each sector.

Table ES1: Staged entry of sectors into the NZ ETS

Sector	Commencement of obligations	End of initial compliance period
Forestry (includes deforestation of pre-1990 forest land and afforestation post-1989)	1 January 2008	31 December 2009 (first compliance period is two years)
Liquid fossil fuels (mainly transport)	1 January 2009	31 December 2009
Stationary energy (includes coal, natural gas and geothermal)	1 January 2010	31 December 2010
Industrial process (non-energy) emissions[9]	1 January 2010	31 December 2010
Agriculture (includes pastoral and arable farming and horticulture)	1 January 2013	31 December 2013
Waste	1 January 2013	31 December 2013

Allocation of emission units

Allocation refers to the distribution of emission units into an ETS market by either sale or gifting. Deciding on how to allocate units is important for ensuring that the cost burden of an ETS is shared fairly across the different parties involved. At a conceptual level, allocation decisions ensure that an equitable burden is shared between taxpayers, consumers, firms and sectors.

As part of the long-term core design of the NZ ETS, the government has decided in principle that it will allocate NZUs into the market through a combination of sale (eg, auction) and free allocation (gifting). The government has also agreed in principle that the level and duration of free allocation will be considered against the following underlying principles, which also apply more broadly to other forms of transitional assistance.

i. The government will attempt to maintain broad equity of treatment between and within sectors.

ii. The government will seek to avoid long-term regrets in designing and implementing short-run policies.

iii. The government will make the transition more manageable by being relatively generous in the first commitment period (CP1), from 2008 to 2012.

iv. The government will not provide assistance to firms whose profits will be largely unaffected by the introduction of an ETS.

v. The government will favour assistance via gifting units ("free allocation") as opposed to a progressive obligation, but will leave open the possibility of using a progressive obligation in some sectors.

vi. The government will move to zero assistance over time for overall economic efficiency, equity and administrative reasons.

[9] Note that emissions of SF_6 will enter the ETS on 1 January 2013 because of an existing memorandum of understanding between the Crown and users.

The government has also made a number of in-principle decisions regarding the total level of free allocation of emission units as a form of assistance to business.

- In the forestry sector, free allocation will be provided such that the Crown assumes a total liability (taking the cost of the provision of the *de minimus* thresholds into account) for deforestation emissions as follows:
  - from 2008 to 2012, 21 Mt CO_2-e for plantation forest, plus a relatively small allocation set aside for forest weed control (eg, wilding pine)
  - from 2013, an additional 34 Mt CO_2-e for plantation forest.
- The agricultural sector will be provided with a free allocation pool equal to 90 per cent of 2005 emissions when it is brought into the ETS.
- The pool of units for eligible industrial producers will be based on 90 per cent of 2005 emissions from those eligible industrial producers.
- Indirect emissions associated with the consumption of electricity, as well as direct emissions from stationary energy and direct emissions from non-energy industrial processes will be included in the concept of emissions from industrial producers.[10]
- Starting from 2013, when agriculture is brought into the ETS, the free allocation pools for industrial producers and agriculture will decrease on a linear basis so as to phase out assistance completely in 2025.[11]
- New sources that begin emitting during the period of the free allocation will not have any access to the pool of free allocations.
- Firms that cease trading will not retain any free allocation.
- No free allocation will be provided to the upstream points of obligation in the liquid fossil fuel and stationary energy sectors (including electricity generators) and landfill operators.

Allocation of units within the NZ ETS will be an important area for stakeholder engagement. These discussions will need to find a balance between the competing objectives of efficiency, equity and administrative ease. It is a complex area of design and all approaches pose challenges.

The proposed allocation package is relatively simple at the high level. It has a strong focus on inter-sector equity and is generous at first (for firms that cannot pass through costs) at first, both for equity reasons and to reduce the chance of long-term regrets. While generous at first, it ensures that some contribution is made by all sectors, reflecting the importance of equity between producers and consumers.

A key element of the allocation package is to put in place robust price signals to reduce emissions. For that reason, over time, the government will ensure a (well-signalled) phase-out of free allocation in the interests of economic efficiency and administrative ease.

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[10] The basis for allocation for electricity consumption will be one that compensates firms for the cost impact. It therefore needs to be based on the emissions from marginal generation rather than average generation.

[11] For industry, this would mean receiving the same level of assistance in the years 2010, 2011, 2012 and 2013. Following this, the level of assistance provided would decline every year. The planned review of the ETS provides an opportunity to adjust this decision somewhat once the "shape" of future international agreements becomes clear.

Impacts of the NZ ETS

The desired impact of the NZ ETS will be to change investment and consumption behaviours by integrating a price for emissions into decision-making by producers and consumers. The result will be a progressive shift in our economy and lifestyle towards consuming, using and investing in goods and services with lower greenhouse gas emissions.

Introducing an emissions price will increase the cost of transport fuels and other non-renewable energy (such as coal and natural gas), and will cause relative price increases in other sectors that involve emissions, such as industrial processing and agriculture. Conversely, it will reduce the relative price of low-emission goods and services and increase the relative returns on investment in low-emissions technologies (eg, making it more cost-effective for electricity generators to invest in renewable energy such as wind and solar power). It will also increase the profitability and cash flow for afforestation activities through the devolution of credits (with associated liabilities) for forest sinks to landowners.

These impacts will not be dramatic in the near term, and most New Zealanders will not be aware of the specific impact of the ETS on their consumption and investment decisions. However, the ETS will create significant shifts over time, as businesses renew their assets and households make major spending decisions about personal transport, housing and home appliances. A multitude of small decisions will make an important cumulative contribution towards reducing New Zealand's emissions and assisting the move towards sustainability across our economy. This will, in turn, help New Zealand's compliance with its Kyoto Protocol obligations, and position New Zealand to advocate for effective international action to reduce emissions.

The ETS will take effect through carefully staged implementation to permit a gradual adjustment to emissions pricing across the economy. Transitional assistance will be provided in a number of forms, including some free allocation of units in the early years, systems to reduce the impact on low-income households, and government initiatives to assist households to be more energy efficient.

The macroeconomic impact of the ETS on New Zealand will largely be driven by the nature and stringency of international agreements. For the first commitment period of the Kyoto Protocol (2008–2012), the macroeconomic impacts will be negligible. Modelling indicates that meeting New Zealand's commitments under the Kyoto Protocol with a linkage to international trading markets will have a negligible overall impact on New Zealand's macroeconomy. This impact is forecast to be less than 0.1 per cent of gross domestic product (GDP) in 2010[12] compared with underlying growth forecasts in the order of 2 percentage points per year. In other words, ongoing GDP growth in 2010 will far outpace the impacts of an ETS. In the longer term, however, a greater reduction in emissions against the current growth trend will be essential, both to reduce the cost of New Zealand's obligations under international emissions control agreements (the Kyoto Protocol and whatever agreements follow it) and to support New Zealand's broader sustainable development and economic transformation agenda.

[12] Ministry for the Environment 2005, *Review of Climate Change Policies*. Ministry for the Environment: Wellington. www.mfe.govt.nz.

Because of its staged implementation, the ETS will not fully distribute the cost of New Zealand's Kyoto Protocol obligations to emitters during the first commitment period (2008–2012), and some ongoing taxpayer support may continue beyond that date. It is the government's intention that, over time, the responsibility for managing New Zealand's greenhouse gas emissions will be shifted as much as possible to those that make the investment and consumption decisions that cause those emissions, provided they have the opportunity and the tools to manage them.

Emissions trading: issues for Māori

Māori are inextricably linked to – and involved with – the use and management of natural resources. For many centuries, practices based on an understanding of the environment have supported Māori efforts to maintain and sustain their families and communities. Climate change is a global issue that will affect the relationship Māori have with the environment and Māori use of natural resources, especially in coastal communities.

The NZ ETS is one mechanism the government can use to address the concerns of Māori as Treaty partners, and the wider New Zealand public, about the challenge of climate change. It has the potential to influence every business and every consumer in New Zealand, including Māori interests. Of particular importance to Māori will be the potential impacts of the NZ ETS on Māori involvement in the primary sectors of forestry, agriculture and fishing, because these sectors dominate Māori economic development.

The government is conducting an analysis of the costs and benefits to Māori of the options for emissions trading. Part of this analysis will include the impact and potential benefits of any policy proposals on Māori land under different tenure arrangements, such as under Te Ture Whenua Māori Act 1993. The government is resourcing a Māori/iwi working group to assist in the development of this economic and socioeconomic analysis.

Hui with Māori are scheduled for October this year to discuss the government's proposal for a NZ ETS and the potential opportunities and issues relating to the scheme for Māori.

Next steps: process for engagement and final decisions

The government is seeking to engage with the public, stakeholders and Māori on the proposal for a NZ ETS. A leadership forum is also being set up to provide government with feedback on scheme design. The first stage of this engagement will lead up to the introduction of legislation into Parliament, but engagement will continue throughout the process of refining and implementing the system, as set out in the table below.

Table ES2: Stages of public engagement and government decisions on the NZ ETS

Stage	Explanation	Timing
Stage 1: In-principle decisions	• Government makes in-principle decisions on the core design, as outlined in this document	2007
Stage 2: Engagement and final decisions on the core design, and on detailed design features and implementation for forestry and liquid fossil fuels (primarily transport) sectors	• Release of *The Framework for a New Zealand Emissions Trading Scheme* • Engagement with stakeholders and Māori on the core design of the scheme • Targeted engagement with forestry and liquid fossil fuels sectors and Māori • Feedback received from the leadership forum • Government makes final decisions and introduces a bill into Parliament	2007/2008
Stage 3: Select committee process and passage of core legislation by Parliament	• Select committee calls for public submissions on a bill for the NZ ETS • Select committee considers submissions and holds hearings on the emissions trading scheme bill • Select committee deliberates on the emissions trading scheme bill • Select committee reports back to Parliament • Parliament passes legislation for the emissions trading scheme	2008
Stage 4: Engagement and final decisions on detailed design features and implementation for the later sectors to enter the scheme	• Targeted engagement on detailed design features for stationary energy, industrial process emissions, agriculture and waste • Government makes final decisions on detailed design features for stationary energy, industrial process emissions, agriculture and waste • Corresponding changes are made to legislation and regulations • Ongoing engagement with key stakeholders and Māori on subsequent design decisions (including consideration of whether to include indigenous forestry in the ETS or not), regulation and implementation	2008–2012

How to participate in the discussion on the NZ ETS

For more information on public engagement activities and opportunities for you to participate, please see the following website: www.climatechange.govt.nz.

Following feedback from stakeholders and Māori on the core design elements of an ETS and engagement with stakeholders and Māori in the forestry and liquid fossil fuels (primarily transport) sectors, the government will make final decisions about the core design features and the detail for these two sectors proposed for entry to the NZ ETS (in 2008 and 2009 respectively). These decisions will be the basis of a bill (legislation) introduced to Parliament that will lay down the framework for emissions trading, and will include provisions relating to forestry and liquid fossil fuels. It may also contain provisions to guide the entrance of subsequent sectors to the scheme.

Following its first reading in Parliament, the bill will be referred to a select committee that will call for public submissions and hold hearings on the bill. This is an important opportunity for the public to register support for, or express concerns regarding, the ETS. The following website has a series of fact sheets that provide more information on the legislative and/or select committee process: http://www.parliament.nz/en-NZ/PubRes/About/FactSheets/.

For information on current select committees, including calls for submissions, visit the following website: http://www.parliament.nz/en-NZ/SC/.

If the bill is passed into law, the government will continue to work with stakeholders and Māori to resolve any remaining issues around design and implementation, particularly for sectors that are later entrants to the scheme. Final decisions on the detailed design features for later entrants (stationary energy, industrial process emissions, agriculture and waste) will be made after in-depth discussions with those sectors. The government will also continue to work with key stakeholders and Māori in relation to the future evolution of the NZ ETS in response to changes in the international climate change policy framework after 2012.

1 Introduction: The Government's Decision on Emissions Trading

1.1 Commitment to an emissions trading scheme

The government has decided in principle that New Zealand will use an emissions trading scheme as its core price-based measure for reducing greenhouse gas emissions and enhancing forest carbon sinks. The New Zealand Emissions Trading Scheme (NZ ETS) will operate alongside other policies and measures to reduce domestic emissions and achieve New Zealand's broader sustainability objectives.

1.2 Objective of the NZ ETS

The NZ ETS is one of a suite of policy measures that the government is implementing to meet its climate change and sustainability objectives. Several other measures have already been implemented to encourage reductions in greenhouse gas emissions, and it is likely that further measures will be required to work alongside the NZ ETS. However, the government envisages that the NZ ETS will be New Zealand's primary price-based measure to reduce greenhouse gas emissions.

The overall objective of the NZ ETS has been decided in principle by the government as follows:

> *That a New Zealand Emissions Trading Scheme support and encourage global efforts to reduce greenhouse gas emissions by:*
>
> - *reducing New Zealand's net emissions below business-as-usual levels; and*
> - *complying with our international obligations, including our Kyoto Protocol obligations;*
>
> *while maintaining economic flexibility, equity, and environmental integrity at least cost in the long term.*

The objective ensures that the NZ ETS focuses on the following factors.

- *Supporting global efforts by reducing New Zealand's net greenhouse gas emissions below business-as-usual levels*. New Zealand is reliant on effective international action, and the best way of supporting it is a credible programme of action to manage domestic emissions downwards at least cost. The reference to net emissions reflects the inclusion of both sources of emissions and removal by forest carbon sinks in the NZ ETS.
- *Maintaining economic flexibility, equity and environmental integrity.* Economic flexibility suggests a trading mechanism that enables participants to reduce their own emissions or to fund emission reductions by other parties. It also suggests that the scheme be adaptable to changes in future international climate change agreements, and that, as a general rule, domestic policy settings be reflective of international policy settings. Equity includes considerations of the ability of consumers to pay, fair burden sharing between and within sectors, and fair burden sharing between taxpayers and the private sector. The concept of environmental integrity suggests the use of an absolute

rather than an intensity-based core obligation, the linkage of the scheme to international Kyoto markets, and the use of binding non-compliance measures.

- *Producing desired outcomes at least cost in the long term.* A least-cost approach suggests there be no mandated preference for domestic emission reductions over international ones within the NZ ETS. This is desirable on economic efficiency grounds, and supports the emissions trading principles in the Kyoto Protocol. However, the government's overall climate change package will be designed to produce domestic emission reductions below business as usual. The objective also guides the design of transitional assistance measures that seek to produce desired long-term outcomes.

1.3 Staged implementation and assistance to businesses and households

The government has agreed that a transitional pathway will be used to introduce different sectors into the NZ ETS over time. The scheme will be introduced in stages, beginning with the forestry sector in 2008 and then liquid fossil fuels (primarily transport) in 2009. The stationary energy and industrial processes sectors will enter in 2010, and the agriculture and waste sectors in 2013. By 2013, all sectors and all greenhouse gases will be covered by the scheme, so that all major sectors of the New Zealand economy will, from that date, be exposed to the international price of emissions, at the margin, for all operations.[13]

In order to avoid imposing rapid change on the economy, the scheme will feature a range of measures aimed at smoothing the transition faced by some business sectors; for example, by free allocation of emission units for an initial period. Starting from 2013, that assistance will decrease on a linear basis until it is completely phased out in 2025.

Parallel to these, there will be a number of measures to support the ability of New Zealanders to respond effectively to the NZ ETS price signal, to address non-price barriers to the uptake of low- or zero-emissions technologies and practices, and to ensure that adjustment support is provided to households through energy efficiency measures and measures to assist low-income households.

1.4 In-principle decisions on core design features of the NZ ETS

The government has made a set of in-principle decisions on the core design features of a NZ ETS, and on several more detailed design features that will apply to the forestry and liquid fossil fuels (primarily transport) sectors, which will be the first entrants into the NZ ETS. "In principle" means that the government would need relatively compelling reasons to adopt a different policy approach. These decisions will be confirmed subject to engagement with stakeholders and Māori before legislation is introduced.

[13] This objective will be modified if progressive unit obligations are applied in some sectors. Under a progressive obligation, a participant would surrender units for a percentage of the full unit obligation during a transitional period. For example, under a 50 per cent obligation, a participant would surrender one emission unit for every two tonnes of emissions. As a result, progressive unit obligations would reduce the marginal price signal during a transitional period. A progressive obligation would be very likely to increase over time until it became a full obligation to surrender one unit for each tonne of emissions.

For the remaining areas of the NZ ETS design, particularly those relating to how it will apply to other sectors, the government has identified one or more preferred options. These indicate the government's initial preference, but we are actively seeking further discussion with stakeholders and Māori, and have an open mind on different options they may put forward.

Legislation to enact the core elements of a NZ ETS will be introduced and passed during the life of the current Parliament. This legislation will also include specific rules for the first sectors to enter the NZ ETS. Provisions to guide the entrance of subsequent sectors may also be included. But engagement with those sectors will continue over the coming years on sector-specific design details.

1.5 This framework document

This framework document explains the design of the NZ ETS and the reasoning behind the government's in-principle decisions. It sets out the *rationale, implications and proposed form* that emissions trading will take in New Zealand. The document also forms the basis for the next stage of engagement with the New Zealand public, stakeholders and Māori, which will help the government to finalise the details of the ETS.

After this introduction, the document is divided into the following chapters:

- The Context for New Zealand's Emissions Trading Framework
- The Rationale for Emissions Trading
- Core Design Features
- How Emission Units are Allocated
- Design Features for Individual Sectors
- The Impacts of the Emissions Trading Scheme
- Emissions Trading: Issues for Māori
- Approach to Legislation for the Emissions Trading Scheme.

The background to the government's decisions on an ETS is presented in more detail in *New Zealand's Climate Change Solutions*, which discusses the problem of climate change (both in terms of the scientific evidence and the challenge to global governance), provides an overview of the government's policy response to climate change, and links this response to the government's goals in relation to moving New Zealand towards sustainability in environmental, economic and social terms. This document is available at: www.climatechange.govt.nz.

2 The Context for New Zealand's Emissions Trading Framework

This chapter covers:

- **the importance of a credible response by New Zealand to the global challenge of climate change**
- **the importance of measures that address the economic drivers of greenhouse gas emissions**
- **the overall objectives of New Zealand's response to the problem of global emissions.**

The government's decision to proceed with an ETS is driven by considerations central to its agendas for sustainability and economic transformation, including:

1. the imperative to contribute to global efforts to reduce climate change
2. the fact that greenhouse gas emissions are currently embedded in our economic system as an unwelcome by-product of economic activity (which normal market mechanisms have failed to control)
3. the need to assess New Zealand's options to address the problem of climate change with a view to:
   - effectively reducing our own emissions levels below business as usual
   - assisting the international effort to agree on effective climate change policies
   - ensuring that solutions impose the least cost on our economy and way of life.

2.1 The climate change imperative

Over the last century the Earth's climate has been changing at an increasingly rapid rate. It is largely recognised that human activity is the reason for this unprecedented rate of global warming, in particular the increasing volume of emissions of greenhouse gases in our atmosphere. The effects of this are already visible, and the changes ahead of us are likely to be much larger and to happen more quickly than any recent natural climate variations.

Climate change is a global phenomenon, which could affect almost every aspect of the future quality of life of the Earth's inhabitants. The scientific consensus is that, even with a concerted global effort to reduce greenhouse gas emissions, there are likely to be changes in temperature and rainfall patterns, increases in the number of significant wind and storm events, and an increased risk of flooding and coastal erosion.

The potential impacts of climate change in New Zealand are substantial. The volume of the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report entitled *Climate Change 2007: Impacts, Adaptation and Vulnerability*[14] confirms that the effects of climate change are already being felt in New Zealand. Since 1950 there has been 0.3–0.7˚C warming across the Australia–New Zealand region as a whole, with more heat waves, fewer frosts, more rain in southwest New Zealand, less rain in north-eastern New Zealand, a rise in sea level of about 70 mm, reduced seasonal snow cover and ongoing glacial shrinkage. The IPCC report suggests that the most vulnerable sectors for New Zealand are natural ecosystems (affecting our forest and agricultural sectors), water security and coastal communities. Climate change could also have socioeconomic impacts, influencing migration and economic development.

Our best hope is for the international community to move collectively to reduce greenhouse gas emissions, and for individual nations to invest in measures to mitigate the impacts of climate change on their own populations. One of the world's pre-eminent scholars of the economics of climate change, Professor William Nordhaus of Yale University, recently said:

> *Global warming is a serious problem that will not solve itself. Countries should take co-operative steps to slow global warming. There is no case for delay. The most fruitful and effective approach is for countries to put a harmonised price, perhaps a steep price, on greenhouse gas emissions, primarily those of carbon dioxide resulting from the combustion of fossils fuels.*[15]

2.2 Greenhouse gas emissions and the economy

Climate change is happening because of increasing levels of emissions of greenhouse gases. But why are levels of emissions increasing? And what is the best practical method of reducing them?

At the simplest level, emissions are increasing because of increasing levels of the human activities that cause them: more electricity is being produced from coal- and gas-fired stations, more factories are emitting gases directly and more cars are being driven. Greenhouse gas emissions are a by-product of things that are valuable. The economic challenge of climate change is not to eliminate emissions, for to do so would also eliminate many things that we value. Rather, the challenge is to find ways to decouple growth in emissions from growth in economic activity, and thereby reverse the trend of increasing concentrations of greenhouse gases and reduce the risk of serious climate change impacts.

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[14] Intergovernmental Panel on Climate Change 2007, *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press: Cambridge.

[15] Nordhaus W, 2007, *The Challenge of Global Warming: Economic Models and Environmental Policy*. http://nordhaus.econ.yale.edu/dice_mss_072407_all.pdf. Professor Nordhaus is a strong advocate of a harmonised international carbon tax. While this proposal can be justified in some models of climate change economics, it is not without its critics. There is currently no proposal for a harmonised tax on the agenda in international climate change forums.

One of the basic principles of economics is that people will undertake activities up to the point where the additional benefits of one more unit of the activity just equal the additional cost. In many cases, all the costs and benefits of an activity accrue to the person doing the activity, be it buying an apple, investing in a factory or saving for a rainy day. When either a cost or a benefit accrues to someone other than the individual doing the activity, an "externality" is said to arise, because some party external to the decision-making is affected by the decision. The decision-makers will still seek to equalise the costs and benefits they face, but they will generally not take into account the costs and benefits to others. This leads to a disconnection between private costs and benefits and social costs and benefits, where "social" means the sum of all private costs or benefits.

Externalities are one example of "market failures": cases where the operation of free markets does not lead to the highest attainable welfare. The Stern Review[16] called climate change the greatest example of market failure we have ever seen. There are many ways to correct market failures, and in responding to climate change we can draw on our extensive experience of assessing which of these ways works best and in what circumstances.

Three common methods used by governments to address climate change market failures are regulations, taxes and emissions trading. Regulations involve placing legal restrictions on activities that cause greenhouse gas emissions. They are often costly to comply with and to administer, and they are not always very effective because it is difficult to design regulations that achieve the right balance of costs and benefits, and hence result in the right level of emissions.

Taxes and emissions trading are two priced-based measures for reducing emissions. They work by increasing the cost of activities – including production and consumption – that result in greenhouse gas emissions. Taxes increase prices directly by imposing an additional charge on activities that cause emissions. Emissions trading works by restricting the quantity of emissions, and allowing markets to set a corresponding price for those emissions and associated offset emissions (eg, forest sinks).

2.3 Reducing emissions below business as usual

It is the view of the New Zealand government that any future that is sustainable must involve broader and more stringent greenhouse gas emission reductions by all of the major emitting countries. This poses a unique challenge to global governance. Just as we have collectively inherited the achievements of previous generations in terms of economic growth, we have also collectively inherited a global environmental problem that has been a by-product of that growth. Our actions over the coming decades will determine the inheritance that we will pass on to generations to come. Failure to act could result in major disruption to economic and social activity, which the Stern Review suggests could be "on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century"[17]. Nevertheless, that action will require some significant adjustments over time, as to how businesses operate and invest, and how New Zealanders live.

There are four main climate change challenges for New Zealand. We need to:

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[16] Stern N, 2006, *Stern Review*: *The Economics of Climate Change*, Cabinet Office, HM Treasury. http://www.hm-treasury.gov.uk./independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm.

[17] Stern, *Stern Review: The Economics of Climate Change, pg vi*

- control our own greenhouse gas emissions and reduce them relative to the current growth trend
- support international initiatives for multilateral action on greenhouse gas emissions, principally through maintaining momentum on the implementation of the Kyoto Protocol and ensuring this momentum is carried through into whatever agreements emerge for the period after 2012
- prepare for and adapt to the impacts of changes in our physical environment, by responding to the risks and taking advantage of the opportunities they present
- achieve the above objectives at the lowest achievable long-term cost.

The full scope of the government's response to these four challenges within the broader context of sustainability is detailed in the document *New Zealand's Climate Change Solutions* (available at www.climatechange.govt.nz). The remainder of this chapter addresses particular aspects of these challenges that are relevant to the government's decision in principle to implement an ETS.

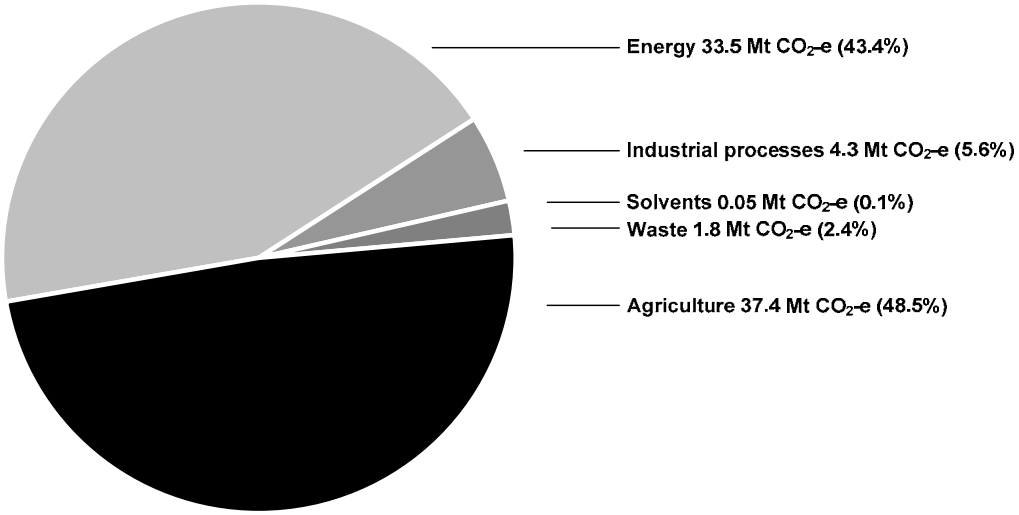
2.3.1 Reducing New Zealand's own greenhouse gas emissions below business as usual

The first part of the challenge is to reduce our own emissions below business as usual. New Zealand's total greenhouse gas emissions are small from a global perspective at around 0.2 to 0.3 per cent of global emissions. This is due largely to our small population. Nevertheless, on a per capita basis we are a high emitter by international standards. This is because the current drivers of our economic growth and our quality of life are emissions intensive. We are heavy users of personal motor vehicles compared with many developed countries, and our major primary production industries (particularly agriculture and forestry) are emissions intensive. As a result, we have the 12th highest per capita emissions in the developed world. Moreover, New Zealand's greenhouse gas emissions are continuing to grow, with emissions across all sectors (excluding forest carbon sinks) for 2005 being 25 per cent higher than the 1990 level.

New Zealand has an unusual greenhouse gas emissions profile, in that nearly 49 per cent of New Zealand's greenhouse gas emissions result from agriculture (excluding agricultural energy use). This contrasts with other developed countries where, on average, 12 per cent of emissions are from agriculture. Meanwhile, our energy sector contributes 43 per cent of emissions, which is a smaller percentage than other developed countries, due in large part to the fact that approximately 69 per cent of our electricity is generated from low- or zero-emitting renewable sources, such as hydro, geothermal, wind, solar, biogas and wood. Approximately 19 per cent of total emissions, and 45 per cent of energy emissions, come from transport.

Figure 2.1 sets out the various sources of New Zealand's emissions (excluding emissions and sinks from forestry).

Figure 2.1: New Zealand's greenhouse gas emissions, by sector, 2005

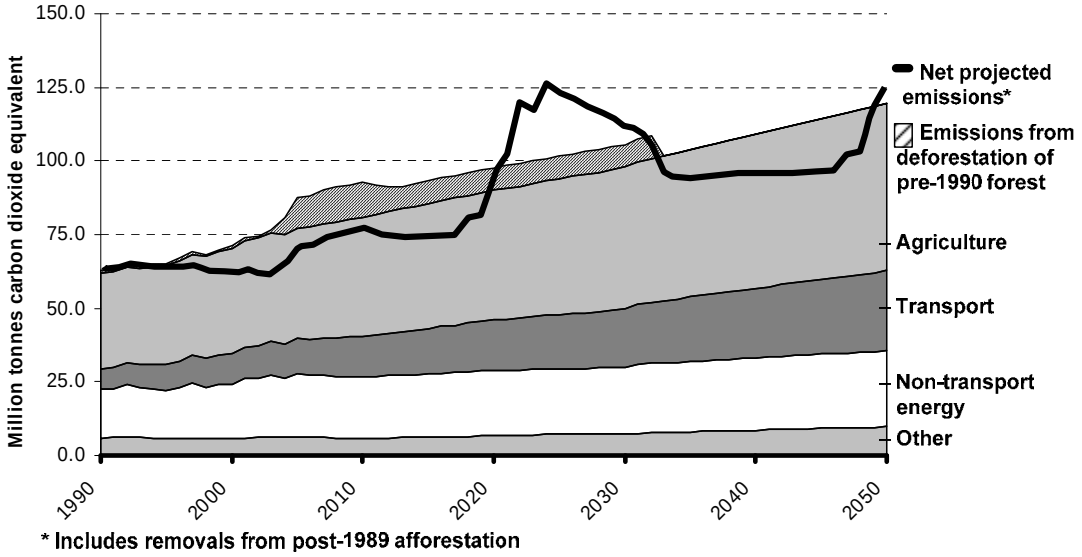


Source: Ministry for the Environment, 2007, *New Zealand's Greenhouse Gas Inventory 1990–2005.* Ministry for the Environment: Wellington.

The magnitude of the challenge can be seen if we examine the business-as-usual projections of our emissions levels and compare these against our commitments under the Kyoto Protocol and realistic scenarios for New Zealand's commitments under successor international agreements.

Figure 2.2 shows forecast emissions to the year 2050, broken down into the various emission sources. Under business-as-usual activity reflecting policy settings in April 2007, emissions sources are projected to grow steadily, with emissions from harvesting or deforestation of post-1989 forest causing a significant peak during the period from 2020 to 2030.

Figure 2.2: New Zealand's projected emissions through 2050



Note: The dark line depicts net projected emissions (ie, emissions by sources minus removals by forest sinks). This figure uses forest definitions applied under the Kyoto Protocol, and assumes policy settings in April 2007. Projections of deforestation emissions have not been forecast past 2030. An analysis of forest land suitable and available for conversion indicates there are about 280,000 hectares. At the rate of deforestation assumed in this figure, all of this land would be deforested by 2033. Source: Analysis by the Emissions Trading Group based on projections supplied by the Ministry of Economic Development, Ministry of Agriculture and Forestry and Ministry for the Environment.

Figure 2.3 compares the net projected emissions profile in Figure 2.2 to the level of New Zealand's free allocation of emission units under the Kyoto Protocol (which applies to the period from 2008 to 2012). New Zealand must take responsibility for emissions above this level. The dotted lines with arrows illustrate the hypothetical impact of successor international agreements, which may result in New Zealand's emission unit allocation remaining static, but could also involve a declining allocation in line with agreements to impose stricter constraints on global emissions.

Figure 2.3: New Zealand's projected emissions through 2050 in the context of possible international agreements

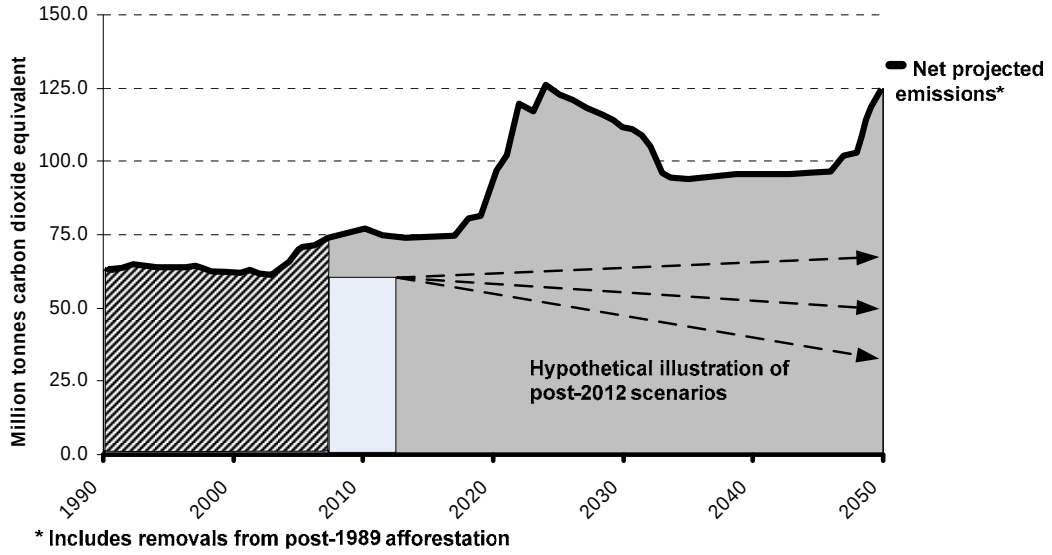


Figure 2.3 illustrates the fact that, while the projected gap between New Zealand's Kyoto allocation and expected emissions (under policy settings as of April 2007) is not great in the first Kyoto commitment period, that gap is likely to broaden significantly as emissions continue to rise and (potentially) New Zealand's emission unit allocation under international agreements falls. The exact cost to the economy of bridging this gap will of course be determined by the future price of emissions, the rate of new technology development, and the extent of emission reduction commitments by other countries.

What these graphs demonstrate is that New Zealand, like many other countries, needs to engineer a major shift in its economy towards lower emissions or it will face very significant obligations in decades to come. For this reason, it is important to create the infrastructure of an ETS and implement it fully over the next five years. An early start will mean we are well positioned to gain traction on our long-term emission levels. Because New Zealand has an unusual greenhouse gas emissions profile, the design features of the NZ ETS will need to be tailored suit our national circumstances.

We have already taken the first steps to reduce our emissions below business-as-usual levels, including:

- financial incentives (such as the Permanent Forest Sink Initiative and incentives to promote solar hot-water heating and better home insulation)
- improved standards and codes (such as energy efficiency standards for new homes and household products)
- direct regulation of major emission sources (such as the biofuels sales obligation)

- public education (such as Energy Star efficiency labelling and Fuelsaver information on vehicle fuel efficiency)
- joint investment in research for mitigation of agricultural greenhouse gases.

The government has also sought to lead by example and has committed itself to a goal of setting all 34 core public service departments on a path to carbon neutrality by 2012. Through the Govt[3] Programme, the government is moving toward low-emissions options for its vehicle fleet, and most recently it has adopted a minimum Five-Star Green Star New Zealand rating for all new A-grade central business district office buildings and a Four-Star Green Star New Zealand rating for all other grades of offices being constructed to house government staff.

However, these emission reduction measures need to be underpinned by a significant and broad-based measure for incorporating the cost of greenhouse gas emissions into New Zealand's economic system. Such a measure would harness the power of markets to shift investment patterns and consumer behaviour away from products and processes with higher greenhouse gas emissions towards lower-emission alternatives.

2.3.2 Maintaining international momentum on reducing greenhouse gas emissions

The second part of our challenge is to support multilateral progress towards reducing global greenhouse gas emissions. Acting alone New Zealand cannot solve the problem of climate change: our emissions only make up a tiny part of global levels. But that is not a reason for doing nothing. The successful implementation of a NZ ETS will contribute to global initiatives to reduce greenhouse gas emissions by:

- strengthening New Zealand's reputation as a nation that has upheld its commitments under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol to help reduce global emissions
- making New Zealand a reference site for other countries considering emissions trading
- helping to support the development of international emissions trading markets
- providing a working example of emissions trading in the forestry and agricultural sectors that could be of particular interest to both developed and developing countries, and could help to inform the international climate change negotiations.

2.3.3 Minimising the long-term cost of emission reductions

The final aspect of our challenge is to achieve emission reductions at the lowest long-term economic cost. For that reason, New Zealand's framework for emissions pricing needs to be carefully designed:

- to provide certainty to investors, policy makers and taxpayers, while remaining flexible enough to be adapted over time
- to focus on changing behaviour, so as to reduce emissions and enhance removals by forest carbon sinks, rather than merely transferring wealth from one portion of the economy to another, or from New Zealand to other countries
- to facilitate innovation and the uptake of new technologies
- to align New Zealand with progressive global leaders in reducing emissions, but not expose the country to a premature stringency of emissions pricing that threatens our economic competitiveness.

3 The Rationale for Emissions Trading

This chapter covers:

- **why price-based measures can play an important role in reducing New Zealand's greenhouse gas emissions**
- **a general explanation of emissions trading and how it fosters least-cost emission reduction activities**
- **the comparative merits of emissions trading and emissions taxes as price-based measures.**

As noted above, the government has already developed a range of initiatives to bring about reductions in New Zealand's emissions relative to the business-as-usual projections. However, significant progress is not likely until our economic system reflects the costs of emissions. It is important that we add a broad price-based measure to the current set of measures to help shape long-term investment decisions that affect our emissions. The question then is what form of price-based measure is most likely to be effective in:

- bringing about a reduction in our greenhouse gas emissions
- providing firms with flexibility as to how they manage their emissions obligations
- supporting our international stance on climate change
- avoiding harm to our economy during the transition period.

To answer this question it is important first to remind ourselves of what we need a price-based measure to achieve.

3.1 The role of price-based measures in reducing emissions

Under the Kyoto Protocol, starting from January 2008 New Zealand will become liable for the emissions above its quota. As noted, some major sources of emissions are being targeted by other types of intervention. However, the most effective way of influencing a wide range of firms and consumers is via a price-based measure. An effective price-based measure should:

- redirect resources by creating new market incentives to reduce emissions at least cost, wherever those reductions can be found across the spectrum of economic activity
- improve the financial return on good environmental practices
- motivate emitters to invest in their own operations, improve their efficiency and reduce their own emissions as much as possible before looking elsewhere for emission reductions.

There is a risk that a poorly designed price-based measure may have the effect merely of engineering wealth transfers from emitters to taxpayers, from taxpayers to emitters, or from New Zealand to other countries. For that reason it is important to identify the option that can best drive behavioural change across the economy without imposing complex compliance costs or encouraging avoidance behaviour.

3.2 Options for price-based measures: emissions tax or emissions trading?

There are essentially two options for a price-based measure: an emissions tax or an emissions trading scheme. They share a number of fundamental design features:

- both need to determine "points of obligation"; that is, who is required to pay the tax or to surrender tradable emission units
- both require systems for measuring, monitoring and verifying emissions levels.

However, they also differ in key respects that have policy significance.

3.2.1 What is emissions trading?

The most common form of emissions trading is the "cap and trade" model. A cap is placed on emissions within the scheme by requiring all emissions to be reported and matched by a tradable emission unit, whose supply is limited. International agreements or national governments determine how many emission units are allocated into the market. Participants that emit greenhouse gases (or supply products that create emissions when used by consumers) either receive the emission units free or purchase them (often via an auction). If their emissions overshoot their allocation of units, they must purchase units from other participants. If they have spare units because they reduce their emissions below their allocation of units, they can sell those to other participants. This is the trading activity.

The Kyoto Protocol is itself built around an ETS, with participating countries having allocations of units (based on their base-year emissions, such as 1990) and being obliged to stay within that allocation or purchase units from other countries.

In an ETS the market sets the price on emission units. This price is passed down the supply chain and flows through the economy, creating an incentive for producers to reduce their emissions and for consumers to reduce their demand for emission-intensive products. For example, the price signal could encourage a business or a homeowner to invest in energy-efficient technology, prompt a landowner to plant trees, or encourage a dairy farmer to capture methane from dairy effluent or make more efficient use of fertiliser.

An effective ETS in the New Zealand context would ideally have the following key characteristics:

- *comprehensiveness*: coverage of all major emitting sectors and greenhouse gases over time to promote equity and economic efficiency (this is particularly important in the context of New Zealand's emissions profile)
- *tradability*: international linkages to ensure a liquid market, and to provide a ceiling on the cost of meeting our obligations by enabling New Zealand firms to take advantage of more cost-effective emission reduction opportunities in other countries (rather than requiring all emission units surrendered to relate to reductions that occur domestically)

- *assurance*: a high degree of credibility through high standards of monitoring, reporting and verification
- *compliance*: a credible penalty regime for non-compliance, including financial penalties, together with make-good provisions that ensure environmental integrity
- *flexibility*: adaptability to future changes to New Zealand's obligations under the international climate change policy framework post-2012.

Maintaining a diverse and plentiful supply of emission reduction opportunities will help to ensure least-cost pricing of emission units in the market. The ETS will also require durable commitment and active engagement by major emitters, the general public, policy makers and political leaders.

3.2.2 How is emissions trading different from an emissions tax?

There are many conceptual and practical similarities between a greenhouse gas emissions trading scheme and a greenhouse gas emissions tax. Both are price-based measures that apply to specified activities that lead to greenhouse gas emissions. Both work by creating financial incentives for individual firms and consumers to reduce emissions. Both provide flexibility by allowing parties that can reduce their emissions more cost effectively to do so more heavily than those that face higher costs. Lastly, both require similar administrative and legislative powers and procedures.

The key conceptual difference between an emissions trading scheme and an emissions tax is that:

- a tax sets the *price* emitters have to pay per unit of emissions, and leaves individuals and firms to decide how much to reduce their emissions
- a trading scheme sets the *quantity* of emissions, and leaves the market to determine the price of emission units, and therefore the cost per unit of emissions that firms and individuals will face.

In assessing the relative merits of the two types of scheme, the key factors to be taken into account are:

- the way that uncertainty around key variables within the system affects firms, consumers and the government
- their ability to fit with the approach taken by other countries and international agreements
- the ease with which more stringent emissions-reduction targets can be implemented over time
- the general flexibility created by the measure, both for emitters and for government
- their acceptability to New Zealand stakeholders and Māori.

3.2.2.1 Uncertainty

In a world where the government knew exactly how firms' emissions would respond to changes in the price of emissions, the two approaches would lead to identical outcomes. The government could stipulate the overall level of emissions it wanted to occur through the introduction of an ETS, or set an emissions tax at the level that it knew would lead to that desired level of emissions.

In practice, of course, no one knows exactly how a country's emissions will respond to changes in the price of emissions. Under a tax, there would be uncertainty over the level of emissions that would result in any one year or commitment period. Conversely, an ETS would provide more certainty over the environmental outcome at a global level, but there would be uncertainty over the price of emissions, especially during the initial period when the trading system and the international agreements on emissions levels are evolving.

3.2.2.2 Compatibility with international mechanisms

In the short term, the approach taken in New Zealand needs to be firmly driven by the nature of our international obligations. Any price-based domestic policy measure that does not reflect international emissions prices will result in the government – and ultimately taxpayers – facing the liabilities associated with changes in emission levels and international prices. This is a key advantage of emissions trading schemes (cap and trade, in particular), and is a major reason why, internationally, such schemes are becoming the norm as a primary policy tool to address greenhouse gas emissions.[18]

Automatic adjustment to the international price is a key reason why the government currently supports the use of an ETS. A tax would provide greater emissions price certainty to emitters, at least in the short term, but it would subject the government and taxpayers to potentially very large fiscal costs if the tax was set too low. Similarly, if the tax was set too high, the economy would face increased costs from having to adjust more quickly than necessary.

Generally, the government sees considerable strategic and economic benefit in taking the same broad approach to reducing emissions as our key trading partners. A New Zealand emissions tax scheme, for example, could not easily be linked with the emissions trading schemes put in place by other countries. In addition, an ETS could create new business opportunities for New Zealand, such as the development of trading infrastructure and new mechanisms for engaging with foreign markets, as well as more generally building New Zealand's branding as an environmentally responsible nation.

3.2.2.3 Flexibility

An ETS also allows greater flexibility than a tax in a number of ways.

- Prices adjust automatically in an ETS as international emission prices adjust, whereas tax-based systems tend to be "sticky" in that they can only be increased by an explicit government decision. As noted above, there is also a risk under a tax-based system that the price of emissions in New Zealand would not reflect the international price of emissions, which would increase the cost New Zealand incurs to meet its international obligations.
- An ETS enables emitters to choose between investing in their own operations and investing in emission reductions elsewhere within New Zealand and internationally.
- An ETS enables emitters more flexibility in managing credits and liabilities over time (this is particularly important in terms of forest sink credits and liabilities where participants' strategies for management of future liabilities when forests are harvested will be important).
- An ETS promotes more equitable access to least-cost emission-reduction opportunities across sectors.

[18] This is evidenced by the Kyoto Protocol, the European Union Emissions Trading Scheme and emissions trading proposals in Australia and in some US states. Emissions trading is also identified as an important tool post-2012 in international discussions.

- An ETS offers design options for addressing equity issues; for example, by adjusting the transitional assistance targeted to each sector according to its circumstances.
- An ETS provides more flexibility to adapt to changing international and domestic circumstances.

3.2.2.4 Public acceptability

Lastly, consultative feedback from the recent climate change and energy consultation process demonstrated wide – although not universal – support for the introduction of an ETS as the primary means of managing New Zealand's greenhouse gas emissions responsibilities. From December 2006 through March 2007 the government consulted broadly on a series of climate change and energy policy proposals contained in five discussion papers.[19] These included design options for price-based measures to reduce emissions in different sectors. Consultation showed a high level of public, stakeholder and Māori interest in emissions trading, particularly as a long-term instrument for reducing emissions.

3.2.2.5 Conclusion

On the basis of a careful assessment of these factors, and the consultation with stakeholders and Māori on the suite of discussion documents issued in late 2006, the government has concluded that it is in the national interest to implement a broad-based emissions trading scheme as the preferred instrument for emissions pricing.

It is worth noting that if in future there were to be an international shift away from emissions trading schemes, and the New Zealand scheme were to become anomalous, the administrative systems being put in place as part of the NZ ETS could be relatively easily transformed into a tax-based system at a later date.

[19] The consultation process included approximately 50 public or multi-sector meetings, workshops and hui, and approximately 100 focused stakeholder meetings. The consultation events took place throughout the country, with over 4,000 people attending. Over 3,000 written submissions were received.

4 Core Design Features

This chapter covers the essential design features of the emissions trading scheme, including:

- **the sectors and greenhouse gases that are covered**
- **when each sector will be brought into the scheme**
- **which parties will have obligations under the ETS**
- **how the obligation is defined**
- **the unit of trade**
- **international linkage**
- **the quantity of New Zealand emission units to be issued**
- **the possible inclusion of offsets**
- **the design of the emissions trading market**
- **establishing an emissions unit register**
- **compliance, enforcement and the administering agency**
- **future evolution.**

4.1 Introduction

Emissions trading schemes share three generic features in that they all:

- set the quantity of emissions and allow the market to set the price
- place an obligation on entities to monitor and report their emissions, and surrender some form of instrument (often called a permit, allowance or emission unit) to cover their emissions
- allow trading of the units.

That leaves a large number of design features to be determined, including:

- which sectors and greenhouse gases are included in the scheme
- the timing of entry for various sectors
- which parties will have obligations to participate under the scheme
- how the core obligation is defined
- the unit of trade
- international linkage
- the quantity of emission units to be issued
- whether offsets are allowed and under what rules
- the design of the emissions trading market
- establishing an emission unit registry
- compliance and enforcement measures (including the role of an administering agency)
- the process for future evolution and modification.

This chapter examines each of these in order, and identifies the in-principle decisions that have been made by the government and the priority areas for engagement. The chapter includes a series of text boxes. These are used to provide background on specific issues that are pertinent to emissions trading, and to explain in some detail the reasoning behind particularly important parts of the policy design and the government's preferred options.

Another important design feature is the mechanism for the allocation of emission units into the market. This design feature is addressed at a broad level in chapter 5, and at a sectoral level in chapter 6.

4.2 Which sectors and gases the NZ ETS will cover

During the recent consultation on the government's *Discussion Paper on Measures to Reduce Greenhouse Gas Emissions in New Zealand Post-2012*, many submitters responded to a question on which sectors could and should be included in a NZ ETS. Virtually all submitters emphasised the need to include as many sectors as possible to encourage liquidity in the market. However, perceptions of what is possible varied widely. Several submissions simply suggested that a NZ ETS should be as broad as possible, but did not specify any further details.

In the government's view, equity, environmental integrity and economic efficiency suggest that an ETS should have the broadest possible coverage, for the following reasons.

- There is little justification on equity grounds for any sector to be excluded, and hence subsidised by other sectors and by the taxpayer.
- Environmental integrity suggests that an emissions price should be applied to all emissions above a *de minimus* level.
- An emissions trading scheme operates most efficiently when there are a sufficient number of participants and many units available for trade.
- A broader emissions trading scheme creates greater opportunities to realise least-cost options for reducing emissions.

Another question in the discussion document asked whether the same price of emissions should apply across all sectors of the economy in the long term. The majority of submissions responding to this question felt that it should.

The government has made an in-principle decision that the NZ ETS will include all major sectors and all greenhouse gases specified in the Kyoto Protocol *over time*. Minor exceptions will be allowed for emission sources below a *de minimus* threshold. This decision aligns with the overall objective of the NZ ETS by ensuring economic efficiency, equity and environmental integrity.

4.3 Timing of entry for various sectors

Although the government recognises that it is desirable to include as many sectors and gases as possible in a NZ ETS, it also recognises that some sectors will be ready to participate earlier than others due to technical and administrative capabilities. There is therefore a need for a phased approach for sectoral entry into the NZ ETS.

Internationally, most emissions trading schemes have adopted a phased approach. The first phase of the European Union Emissions Trading Scheme (EU ETS) began in 2005 and included carbon dioxide (CO_2) emissions from large emitters in the stationary energy and industrial

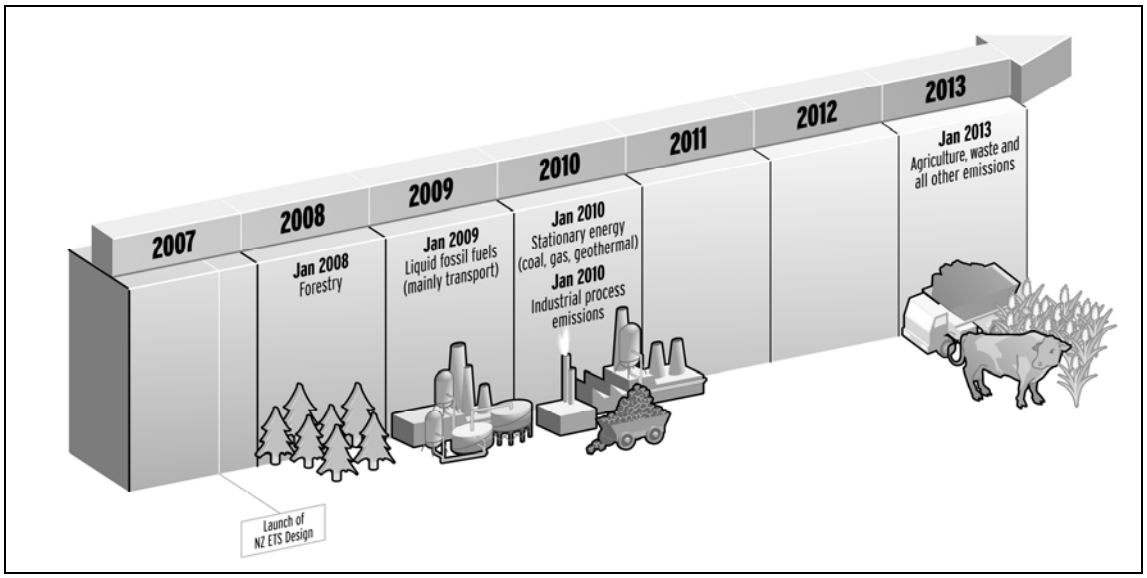
processes sectors. This included approximately 12,000 installations with obligations, representing approximately 45 per cent of CO_2 emissions in the European Union. The European Commission has indicated that it intends to expand the scheme during its second commitment period (2008 to 2012) to include domestic aviation emissions. The Commission has also indicated that beyond 2012 it intends to include more sectors and other gases in the EU ETS.

New Zealand presents a unique context for phasing the introduction of an ETS. Our stationary energy sector contributes approximately 23 per cent of total greenhouse gas emissions and the industrial processes (non-energy) sector contributes approximately 5.6 per cent. The ETS would directly involve about 80 major firms in these sectors. In contrast to the EU and other developed nations, approximately 49 per cent of New Zealand's emissions derive from agriculture, while forestry offsets the equivalent of approximately 32 per cent[20] of our total emissions. Given the significant contribution of the non-energy sectors to New Zealand's emissions balance, and to avoid distortions in the economy, it is important that they be included in the scheme as early as possible.

4.3.1 Introduction of all sectors through a staged approach

The government has decided in principle that individual sectors will enter into the NZ ETS through a staged process based on sectors' preparedness for trading, administrative feasibility and consideration of price effects through the economy. This document proposes dates that the government believes are achievable. Consistent with the interim objective, all sectors will have entered the scheme no later than 1 January 2013. Figure 4.1 and Table 4.1 present the approach for introducing sectors into the NZ ETS.

Figure 4.1: Timeline for the entry of sectors into the NZ ETS



The **forestry** sector – including emissions from deforestation (defined under the Kyoto Protocol as conversions of forested land to other uses) and eligible removals from afforestation – will be the first to enter the NZ ETS. A price signal is needed in this sector as early as possible due to forest owners having a degree of flexibility to bring forward deforestation if there are incentives

[20] This figure reflects the total net removals by forest sinks as reported in *New Zealand's Greenhouse Gas Inventory 1990-2005*, and does not reflect the more restrictive definitions of forest sinks eligible for credits under the Kyoto Protocol.

to do so. Reduction of deforestation is likely to be one of the lower-cost options for reducing New Zealand's greenhouse gas emissions in the first commitment period of the Kyoto Protocol. It is important that this substantial carbon sink is managed. Extensive consultation has already taken place with the forestry sector, and many stakeholders and Māori have expressed a desire for the government to devolve credits (and liabilities) for afforestation as soon as possible.

The government has decided in principle that landowners' liability for deforestation emissions, and the option for landowners to receive emission units (with liabilities) for eligible afforestation, will commence on 1 January 2008. Because the NZ ETS legislation will be enacted after this date, the forestry sector will have an initial compliance period of two years and will not have to surrender emission units until the end of 2009, once other participants have entered the scheme and the ETS infrastructure is in place. The government will release a more detailed technical document for engaging with the forestry sector so that landowners will clearly understand their obligations under the scheme.

The **liquid fossil fuels** sector (primarily transport) will be the next entrant because the administrative requirements for trading in this sector are relatively simple, measurement of emissions is straightforward, there will be few participants with unit obligations, and costs can be easily passed through to consumers. Pairing the forestry and transport sectors together by the end of the first compliance period will facilitate cross-sectoral trading.

The next stage of the NZ ETS will bring in **stationary energy** (eg, coal, natural gas and geothermal energy) and the **industrial processes** sector. Medium-to-large emitters in these sectors generally have good emissions data and have been involved in preparations for the previously proposed carbon tax. The potential number of participants with unit obligations in these sectors would be few. The characteristics of emitters in this sector would be more varied compared with the liquid fossil fuels sector, however, justifying a later entry date. However, the government has decided in principle that emissions of SF_6 will enter the ETS on 1 January 2013 because of an existing memorandum of understanding between the Crown and major users.

The **agriculture**[21] sector will be a later entrant into the NZ ETS. This sector includes nitrous oxide from fertiliser use, and both methane and nitrous oxide from agricultural livestock. This sector faces technical difficulties associated with measuring emissions. Given the substantial proportion of greenhouse gases emitted by the agricultural sector, however, it is critical that it is included into the NZ ETS. The government recognises that there is a case for including agriculture into the ETS prior to 2013 and options (albeit with weaknesses) are technically available. The government intends having discussions with the agricultural sector as to whether there are opportunities to reduce emissions in the sector prior to 2013, acknowledging the existing investment in research to reduce emissions through the Pastoral Greenhouse Gas Research Consortium.

The **waste** sector will also be a later entrant into the NZ ETS. This is largely because Parliament is currently considering the introduction of a waste levy via the Waste Minimisation (Solids) Bill, and this levy would create similar (but not identical) incentives to the inclusion of waste into a NZ ETS. The government will engage with the waste sector on the interaction between the levy and the NZ ETS. Finally, emissions from the waste sector are small in comparison with emissions from other sectors and are decreasing over time.

Table 4.1 summarises the staged entry of sectors into the NZ ETS.

[21] In the context of this document the agriculture sector includes pastoral and arable farming and horticulture.

Table 4.1: Staged entry of sectors into the NZ ETS

Sectors	Commencement of obligations	End of initial compliance period
Forestry (includes deforestation of pre-1990 forest land and afforestation post-1989)	1 January 2008	31 December 2009 (first compliance period is 2 years)
Liquid fossil fuels (mainly transport)	1 January 2009	31 December 2009
Stationary energy (includes coal, natural gas and geothermal)	1 January 2010	31 December 2010
Industrial process (non-energy) emissions	1 January 2010	31 December 2010
Agriculture (includes pastoral and arable farming and horticulture)	1 January 2013	31 December 2013
Waste	1 January 2013	31 December 2013
Other sectors	1 January 2013	31 December 2013

Where feasible, participants with unit obligations will commence reporting for a period of time (eg, six or 12 months) before assuming unit obligations under the NZ ETS.[22] The aim is to build capacity and ensure effective administrative arrangements during a period in which there will be no penalties for non-compliance.

The government intends to engage extensively with sectors to assess their preparedness to enter into the NZ ETS according to the timeframe outlined above. The government holds particularly strong views on the importance of early introduction of the forestry and liquid fossil fuel sectors, as noted above, and seeks further input on how to stage the introduction of other sectors for the most effective operation of the NZ ETS as a whole.

4.4 Parties with unit obligations under the NZ ETS

4.4.1 Context

There will be three types of participants in the NZ ETS:

1. participants with obligations to surrender units to the government to cover their direct emissions or the emissions associated with their products
2. participants that receive freely allocated emission units, that receive emission units for eligible afforestation, or that hold other emission units that can be traded to other parties (such as participants in Projects to Reduce Emissions)
3. other participants that engage in trading activities to take advantage of market opportunities.

This discussion focuses on participants with unit obligations (type 1). These participants will be obliged to monitor and report emissions and obtain and retire emission units to match their emissions. They are often referred to as "points of obligation".

It is not necessary to place the point of obligation on the entity that emits greenhouse gases. This is because the price signal from the ETS will flow across the market supply chain, influencing decisions by the producers or consumers, regardless of whether they actually

[22] For example, if a sector assumed unit obligations on 1 January 2009, it would submit a report in March 2009 covering emissions from 1 July 2008 to 31 December 2008.

surrender emission units themselves. Consequently, the government can choose different points of obligation while still meeting the objectives of an ETS.

There are four main criteria for determining the most suitable points of obligation for each sector.

- **Costs:** are the costs of administering the system, and the costs of compliance for participants, kept to low levels?
- **Coverage:** does a proposed point of obligation capture as many of the sector's emissions as practicable?
- **Feasibility:** is it feasible to monitor and verify the emissions at each point of obligation?
- **Incentives:** does placement of the point of obligation create appropriate incentives to reduce emissions while not unduly deterring worthwhile economic activity and investment?

Some in the United Kingdom and in New Zealand have suggested that the point of obligation be placed on individual consumers. While there are many variants of this concept, the basic idea is that individuals would be granted a quantity of emission units and would be charged for the emissions in the goods and services they consume. This scheme has some attractions from the point of view of making the environmental effects of individual decisions more transparent. However, it would involve considerable compliance costs and the government does not consider this to be a desirable option.

4.4.2 Minimising the number of participants with unit obligations

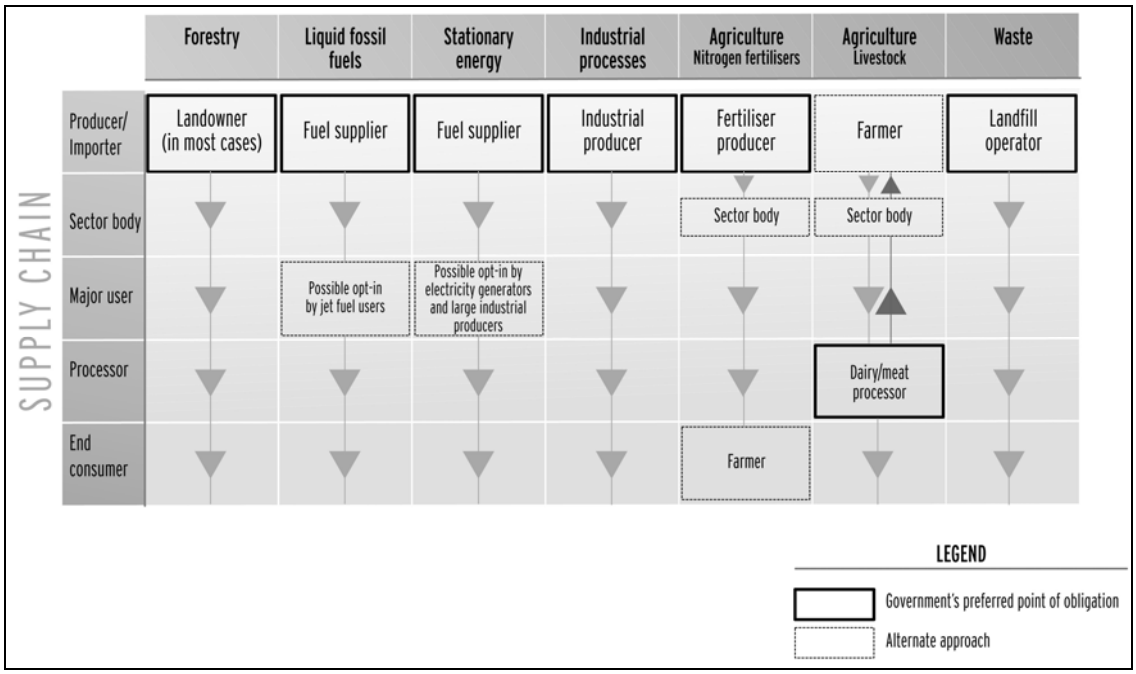
In accordance with the criteria outlined above (costs, coverage, feasibility and incentives), the government prefers to place the point of obligation so as to limit the number of participants, facilitate scheme administration, and provide appropriate incentives to change behaviour and reduce emissions. Figure 4.2 presents an overview of where the government prefers to place the point of obligation in the market supply chain for each sector.

In the **energy** sector (including **liquid fossil fuels** and **stationary energy**), this will generally mean that participants with unit obligations will be located at the point of fuel supply, production or import. In this case, the participants with unit obligations will be expected to consist of five firms in the liquid fossil fuels sector and approximately 45 firms in the stationary energy sector (including coal, natural gas and geothermal). However, the government is open to engaging with these sectors on the possibility of a hybrid approach, whereby the primary point of obligation would remain at the top of the fuel supply chain, but large energy users (such as electricity generators or major industrial producers) could also opt in as direct points of obligation. This would entail "carving out" these firms' emissions from the emissions attributed to the upstream points of obligation. This approach would be more complex to administer, but may be of interest to some large energy users.

In the **industrial processes** sector (which consists of non-energy emissions from industrial production) the appropriate point of obligation would be the industrial producers themselves, which are the direct source of process emissions. This would involve approximately 35 firms in the industrial processes sector.

In the **forestry** sector the appropriate point of obligation for emissions from deforestation of pre-1990 forest land would be the landowners. However, it may also be appropriate for this obligation to be transferred if the landowner can prove that control over land-use decisions had been delegated to a third party when the deforestation occurred. In the case of post-1989 afforestation, emission units (with associated liabilities) would be awarded to landowners or to the forestry right holders, as appropriate, if they opted to receive them.

Figure 4.2: Points of obligation to surrender units in each sector



At least 1,000 owners of pre-1990 exotic forest land will have potential obligations if they deforest their land.[23] Any number of participants may choose to take on credits and obligations for post-1989 forests, and to report at key points such as when claiming emission units for sequestration, harvesting, or selling land. The number of these participants could be anywhere in the range of 2,000 to 9,000 by the middle of 2009 (assuming owners of existing post-1989 forests would be the first to opt in). However, most forestry participants would have infrequent reporting and compliance obligations.

In the **agricultural sector** the options present greater complexities. In the case of nitrogen fertilisers, selecting an upstream point of obligation at the level of fertiliser producers would be consistent with the criteria identified above. This could involve approximately 10 firms. In the case of livestock emissions, options for the point of obligation include farmers (the upstream point), sector bodies (a midstream point) and meat/dairy processors (a different midstream point). Placing the point of obligation at the processor level would reduce administrative complexity, resulting in approximately 25 firms holding obligations. Placing the point of obligation at the farmer level would increase the number of ETS participants dramatically. The government wishes to engage with the agricultural sector to assess the administrative and technical feasibility of placing the point of obligation at different points of the agricultural supply chain, and the impact of this decision on the effectiveness of incentives to reduce emissions.

In the **solid waste** sector the appropriate point of obligation would be landfill operators, which are located at the point of emission. This would involve approximately 60 participants.

[23] The government will be issuing further detailed guidance on definitions and thresholds for the inclusion of forest land in the NZ ETS.

Without counting the forestry sector, and using a processor-level obligation in the agricultural sector, there would be approximately 170 firms serving as the points of obligation in the NZ ETS. This means that the majority of firms in New Zealand would not need to participate directly in the scheme. Nonetheless, the goods and services they purchase would include the cost of emissions at the margin. In other words, the price signal would be transmitted throughout the market, influencing the decisions that drive emissions. Table 4.2 summarises the proposed points of obligation by sector.

Table 4.2: Participants with unit obligations under the NZ ETS

Sector	Participants with unit obligations
Forestry (includes deforestation of pre-1990 forest land and afforestation post-1989)	Landowner in most instances
Liquid fossil fuels (mainly transport)	Preferred: oil companies Alternative: as above, with an option for the users of jet fuel for domestic purposes (ie, airlines) to voluntarily opt in to become participants with unit obligations.
Stationary energy (includes coal, natural gas and geothermal)	There are a range of options for discussion; for example: *Upstream points of obligation:* • coal importer; coal miner (coal-mining licence and coal-mining permit holder) • gas importer; gas producer (petroleum permit or licence holder); gas processor • geothermal electricity generator or direct user for industrial heat • industrial producer that obtains used oil for the purpose of combustion *Upstream and midstream points of obligation:* • a combination of upstream and midstream points of obligation, such as major users of coal and gas
Industrial process (non-energy) emissions	Material transformation: producers of steel, aluminium, cement, burnt lime, glass, gold and paper (note that production of urea, hydrogen, ammonia and methanol is covered in the stationary energy sector) Lime fertiliser: producer Loss of inert synthetic gases: electricity and refrigeration industry entities that import relevant synthetic gases
Agriculture (includes pastoral and arable farming and horticulture)	Synthetic fertiliser use: (a) preferred: importers and producers of nitrogenous fertiliser (b) alternative: farmer (c) alternative: sector bodies Enteric fermentation and manure management: (a) preferred: processor/company (b) alternative: farmer (c) alternative: sector bodies
Waste	Landfill operator
Other sectors	To be determined

4.5 How the core obligation will be defined

4.5.1 Context

Within an ETS the term "core obligation" refers to the fundamental requirement to surrender tradable units to cover emissions, and to monitor, report and keep records of emissions.

The Kyoto Protocol is an international ETS. Under the Kyoto Protocol, New Zealand's core obligation is to surrender one unit for each tonne of greenhouse gas (measured in CO_2 equivalents) emitted during the commitment period. This is an example of an absolute-based obligation (ie, one unit for every tonne of CO_2-e).

In defining the core obligation for a domestic ETS, the government has considered two sets of design features:

- The choice between a core obligation defined on an absolute basis versus an intensity basis.
- As a transitional measure, whether to apply a full obligation to surrender units versus a progressive obligation to surrender units (ie, a partial obligation that increases over time).

4.5.2 Absolute versus intensity-based obligations

Under an absolute obligation, a participant must surrender one emission unit for every tonne of CO_2-e emitted. An alternative approach is an intensity-based obligation. Under this approach, emissions are surrendered on an intensity basis (ie, one unit for every tonne of CO_2-e *per unit of activity*).

The intensity approach bases the surrender obligation on how a firm's emissions per unit of production compare to a sector- or firm-specific benchmark. The basis for defining benchmarks typically includes best practice, best available technology, or some level of improvement over current practice. Under this approach, participants carry no obligation for emissions up to the benchmark level. They have to surrender units if their production intensity is worse than the agreed intensity benchmark. Therefore, as their production increases, their entitlement to emit also increases. This approach rewards participants for improving their efficiency, but places the liability for growth-related emission increases on the taxpayer (or other sectors of the economy) rather than on participants.

The Negotiated Greenhouse Agreement (NGA) model developed during the lead-up to the previously proposed carbon tax was an example of an intensity-based obligation that used a world's best practice assessment as the basis for benchmarking.

An absolute-based obligation has three key advantages over an intensity-based obligation. First, it provides greater certainty as to the (global) environmental outcome because all emissions are covered by an obligation to surrender units. Second, it is relatively simple to understand and implement. Third, all participants face the same cost at the margin for emissions growth.

An intensity-based approach can be administratively complex. Benchmarking data are not readily available for many sectors and can be commercially sensitive. Developing a benchmark can be technically challenging for sectors with diverse inputs, outputs and operating conditions, raising difficulties around normalising factors to permit comparison of performance by different firms. The government's experience with the NGAs suggests that determining an appropriate benchmark – or world's best practice line – broadly across the economy would be time-consuming, costly and problematic. Furthermore, and importantly, intensity-based approaches

provide insufficient incentives for firms to reduce aggregate emissions.[24] As such, they are inconsistent with New Zealand's obligations under the Kyoto Protocol and with the proposed objective of the NZ ETS.[25]

For these reasons, the government has decided in principle not to use an intensity-based approach to defining the core obligation. If international climate change agreements in the future were to include intensity-based approaches (eg, through so-called sectoral agreements in sectors such as steel, cement and aluminium), then it may well be appropriate to use an intensity-based approach in New Zealand for those sectors.

4.5.3 Definition of the core obligation

The government has decided in principle that the long-term core obligation under the NZ ETS will be a full obligation: participants with unit obligations will be required to surrender to the government one emission unit to cover each metric tonne of eligible emissions in a compliance period. However, the government recognises that progressive unit obligations may have merits in some circumstances.

Under a full obligation, one emission unit must be surrendered for each unit of emissions, and therefore each new marginal unit of production incurs the full cost of the associated emissions. New Zealand's obligation under the Kyoto Protocol (as described above) is an example of a full obligation. Under a progressive obligation, participants initially are only required to surrender units for some percentage of their full obligation. For example, under a 50 per cent obligation, participants would be required to surrender one unit for every two tonnes of emissions. This approach is distinct from the intensity-based approach discussed above, under which unit obligations are indexed to the emissions intensity of specific products, rather than the amount of emissions. A progressive obligation may be increased with time, leading eventually to a full obligation.

Under progressive obligations, production increases would not face the full cost of emissions. This means that progressive obligations could be used as a transitional measure to provide for a more gradual adjustment to emission pricing. If progressive obligations are set to become full obligations over time, they can have the same influence on long-term investment decisions as a full obligation while reducing the short-term impact of emissions pricing. Progressive obligations may be particularly suited as transitional measures in the stationary energy, industrial processes and (possibly) agriculture sectors.

The downside of progressive obligations is that they would also drive less short-term behaviour change at the margin. As discussed in chapter 5, free allocation of emission units can be used to provide for a more gradual adjustment to emissions pricing by protecting firms' profits while maintaining a full emissions price signal to influence marginal production decisions in the short term. For this reason, in cases where a gradual transition is considered desirable, the government generally favours the use of a full core obligation coupled with free allocation of emission units instead of progressive obligations. However, this is an important area for engagement with the various sectors.

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[24] Under an intensity-based approach, it is possible for firms to grow their output, grow their emissions, and receive units from the government, all at the same time.

[25] New Zealand's Kyoto Protocol commitments are expressed in terms of aggregate volumes of emissions, not how efficiently we produce those emissions. This reflects the climate change challenge: it is the aggregate volume of emissions that is important from an environmental viewpoint, not the efficiency of their production.

The government wishes to engage with these sectors to explore the use of progressive obligations. Key considerations include the impact of progressive obligations on short-term emission reductions, long-term investment decisions, and the nature of the pass-through to consumers. This engagement will also relate closely to engagement on methods for the free allocation of emission units, discussed further below.

4.6 Unit of trade

4.6.1 Context

4.6.1.1 Units of trade under the Kyoto Protocol

Box 1: The United Nations Framework Convention on Climate Change and its Kyoto Protocol

The United Nations Framework Convention on Climate Change (UNFCCC) was launched at the Rio de Janeiro Earth Summit on Environment and Development in 1992. The Convention provides the basis for concerted international action to mitigate climate change and to adapt to its impacts. Its provisions were far-sighted, innovative and firmly embedded in the concept of sustainable development. The UNFCCC incorporated non-binding targets for industrialised countries to reduce greenhouse gas emissions to 1990 levels by the year 2000.

In response to the need for more urgent action, parties to the UNFCCC developed the Kyoto Protocol, which was finalised in 1997. The Kyoto Protocol sets individual, legally binding commitments for most developed countries (called Annex B parties) to curb emissions of carbon dioxide and other greenhouse gases.

New Zealand's commitment under the Kyoto Protocol is to reduce greenhouse gas emissions to 1990 levels on average over the first commitment period from 2008 to 2012, or take responsibility for excess emissions by using the "flexibility mechanisms" such as emissions trading.

Through three "flexibility mechanisms", Annex B parties can reduce the cost of meeting their commitments by funding lower-cost emission reductions in other countries. The three flexibility mechanisms are international emissions trading, the Clean Development Mechanism (CDM), and joint implementation (JI). Through the establishment of binding emission reduction commitments for Annex B parties and the flexibility mechanisms, the Kyoto Protocol created the foundation of an international emissions trading market in Kyoto emission units.

The Annex B (developed country) Parties to the Kyoto Protocol must retire Kyoto emission units to cover each tonne of their greenhouse gas emissions from 2008 to 2012. Some Kyoto emission units are allocated to Annex B countries for free, and others can be acquired by Annex B countries through the three Kyoto "flexibility mechanisms". Each Kyoto emission unit has a value of one metric tonne of CO_2 equivalent. Each of the Kyoto emission units is discussed below.

- **Assigned amount units (AAUs)** are the units freely allocated to Annex B countries to match the level of their emission reduction or limitation commitment. These units can be bought and sold by Annex B countries using the international emissions trading mechanism.

- **Certified emission reductions (CERs)** are generated by Clean Development Mechanism (CDM) projects that support sustainable development and reduce emissions or create forest carbon sinks in developing countries. Forestry CDM projects use special units reflecting the impermanence of forest sinks: **temporary CERs (tCERs)** and **long-term CERs (lCERs)**.
- **Emission reduction units (ERUs)** are generated by joint implementation (JI) projects that reduce emissions or create forest sinks in Annex B countries.
- **Removal units (RMUs)** are awarded to Annex B countries on the basis of net removals by sinks in the land use, land-use change and forestry sector.

All of the Kyoto emission units can be used interchangeably by Annex B countries to meet their commitments from 2008 to 2012. Much of the Kyoto unit trading to date has focused on CERs, since the remainder of the Kyoto units (AAUs, RMUs and ERUs) will not be issued until the first commitment period begins in 2008. However, trading of these units on a futures basis is underway.

4.6.1.2 The primary domestic unit of trade

In a NZ ETS, the primary unit of trade would authorise the holder to emit one tonne of carbon dioxide equivalent (CO_2-e). For the first commitment period (2008–2012), the government has two primary options for the unit(s) of trade in the NZ ETS:

- devolving Kyoto units assigned to New Zealand
- creating units defined specifically for the NZ ETS.

Using Kyoto units as the primary unit of trade would provide a clear and immediate linkage between the domestic New Zealand and international Kyoto trading markets. The definitions of Kyoto units are widely understood and are directly applicable to New Zealand's Kyoto obligations. However, there would be drawbacks. For one thing, there are issuance and banking restrictions on Kyoto units during the first commitment period, particularly for the forestry sector (as discussed below). Another drawback is that the status of Kyoto units after 2012 is uncertain and depends on future international negotiations.

Creating a New Zealand Unit (NZU) specifically for the NZ ETS, which is backed by Kyoto units (either fully or partially), would enable the New Zealand market to be linked and aligned with the market for Kyoto units. This would give the government some flexibility to differentiate between trading rules for the domestic and international markets. This option is used in the EU ETS, and may be particularly important for the forestry sector because of complications associated with the Kyoto Protocol accounting rules for this sector.

4.6.1.3 The forestry unit of trade

Within the Kyoto Protocol, parties receive RMUs on the basis of net removals by sinks in the land use, land-use change and forestry sector (eg, afforestation removals minus deforestation emissions). These net removals are measured as stock changes on eligible land during the commitment period. RMUs cannot be banked (ie, carried forward) for use in the second commitment period. However, they can be exchanged with other Kyoto units, which can be banked. Parties must cancel Kyoto units (such as AAUs) held in their registry to cover net emissions from deforestation.

New Zealand has elected to receive RMUs after the conclusion of the first commitment period instead of annually. This means that New Zealand will be awarded RMUs on the basis of its 2014 submission covering the first commitment period, and cannot issue RMUs until the

beginning of the true-up period expected to start in 2014.[26] New Zealand will receive fewer RMUs than the actual (gross) afforestation removals during the first commitment period, because RMUs are awarded net of deforestation emissions. Since parties cannot bank RMUs, New Zealand will have the true-up period of 100 days to either retire the RMUs for compliance (thereby freeing up other Kyoto units that could be banked) or sell them to other parties wishing to retire them immediately for compliance.

In the case of the Permanent Forest Sink Initiative, the government has decided to award Kyoto units to eligible afforestation activities. The most appropriate unit for this purpose is the AAU, because it can be issued before the true-up period and can be banked.

With regard to the unit of trade for crediting afforestation activities outside of the Permanent Forest Sink Initiative and devolving deforestation liabilities to landowners, the government has three options:

- create a domestic unit specific to forestry activities
- award RMUs for afforestation and devolve deforestation liabilities using Kyoto issuance rules
- award NZUs for afforestation and devolve deforestation liabilities using domestic issuance rules.

The first approach would create a further domestic unit with differential market value. This may have the affect of clouding the transparency of emissions pricing in the domestic market and consequently would impact on market liquidity.

The second approach would not be desirable if landowners wished to sell their afforestation units for profit pre-2012, or bank them post-2012 to cover future deforestation liabilities or for speculative purposes. This is because Kyoto issuance rules would restrict their ability to sell the units pre-2012 (except via futures contracts for 2014 delivery) and to bank the units post-2012 (except via immediate exchange with AAUs in 2014). Because there would not be enough RMUs to cover the Kyoto-eligible afforestation, decisions would also be needed on which landowners received RMUs versus other Kyoto units. These practices would raise questions of equity, both within the forestry sector and between the forestry and other sectors.

As indicated below, the government is pursuing the third option.

4.6.2 Creation of a New Zealand Unit (NZU)

The government has decided in principle that the primary unit of trade in the NZ ETS will be an New Zealand Unit issued by the Crown. Any person/entity will be able to hold and trade NZUs. Participants will be able to carry over (ie, bank) NZUs for use in future compliance periods, but will not be able to borrow from future compliance periods.

For the first Kyoto commitment period, each NZU will be fully comparable to a Kyoto unit and will be backed by a Kyoto unit in the New Zealand Emission Unit Registry by the end of the true-up period. This enables participants in the NZ ETS to exchange NZUs for Kyoto units through the registry and sell them offshore.

[26] Note that New Zealand will not be able to issue RMUs if an inventory adjustment exceeds a specified threshold for a single activity in a single year.

NZUs will be allocated as the unit of trade for the forestry sector. Landowners liable for deforestation units will be able to surrender both NZUs and Kyoto units to fulfil their obligations. All NZUs issued into the NZ ETS for forestry activities will be backed by Kyoto units by the end of the true-up period for the first Kyoto commitment period.

The specific legal characteristics of the NZU must give holders sufficient certainty to trade and otherwise deal with the NZUs they hold. This involves a number of considerations, including the treatment of NZUs under the tax system. The government wishes to engage with stakeholders and Māori on the proposed legal characteristics of the units to ensure that they provide maximum certainty.

4.7 International linkage

4.7.1 Context

Linking to either another country's trading regime and/or to the global market in Kyoto units is desirable for a number of reasons. An ETS in New Zealand would be a relatively small market with a limited number of participants with unit obligations. Linking internationally ensures much-needed liquidity in the domestic market. It also helps ensure that prices on the domestic market are aligned with international prices.

These factors help to ensure that the NZ ETS aligns with the objective of meeting our Kyoto Protocol and future international obligations *at least cost in the long term*. Linking also guarantees that the NZ ETS is aligned with global actions to mitigate climate change.

4.7.1.1 Linking internationally

Having ratified the Kyoto Protocol, New Zealand has a number of options available for linking internationally. One option is to allow participants in a NZ ETS to surrender Kyoto units for compliance. Another option is to establish bilateral agreements with other countries to enable respective units of trade to be surrendered in each scheme for compliance. There are also a number of intermediate options between these two ends of the spectrum.

Options for bilateral linking

Direct bilateral linking with an ETS in another country or region implies that the unit of trade in the two different schemes is fully fungible (ie, valid for compliance in each scheme). Bilateral linking requires some degree of conformity between the design features of the respective trading schemes. In effect, both parties have to have confidence in the legitimacy of the other party's trading unit. Key design issues to enable linking are the core obligation (ie, cap and trade or intensity-based models), sectoral coverage, the unit of trade, the existence of price caps or safety valves, and rules and penalties for non-compliance.

The potential for a direct bilateral agreement between New Zealand and another country or region prior to 2012 is limited. At present, the only existing mandatory regional ETS is the EU ETS. Certain differences in the design between the EU and New Zealand schemes are likely to make direct bilateral linking challenging in the short term. However, officials are working with their counterparts in the EU to assess options in this area.

Australia has also announced plans to introduce a national emissions trading scheme. This is of major interest to New Zealand for linkage given the close economic relationship between the two countries. One impediment to linking is that Australia is not a party to the Kyoto Protocol. This means that trade would not be in Kyoto units, possibly increasing New Zealand's Kyoto

liability if linking were to occur in the first commitment period. This is not an insurmountable barrier, however, because there are options for partial linking between non-Kyoto and Kyoto parties.[27]

If Australia were to join the Kyoto Protocol, New Zealand might be able to accelerate indirect linkage through the Kyoto mechanisms. However, Australia's domestic ETS is unlikely to be fully operational before 2012, limiting direct linking opportunities before then. In any event, design features will remain key to whether linking can occur.

Generally speaking, the design features of the NZ ETS will be broadly in line with other existing and proposed emissions trading schemes so as not to restrict future linking opportunities.

Given the limitations on linking bilaterally prior to 2012, it is important to be able to link the NZ ETS to the Kyoto Protocol's flexibility mechanisms (emissions trading, Joint Implementation and Clean Development Mechanism). Through this linking, the various kinds of Kyoto units[28] can be surrendered for compliance by a participant in the NZ ETS in the same way as an NZU.

Potential restrictions on surrendering Kyoto units for compliance

In designing international linkages, there are several technical decisions that the government needs to consider. In particular, the government needs to assess whether to restrict the type or volume of Kyoto units that can be purchased into the NZ ETS. For example, the EU places limits on the number of units that can enter the EU ETS.[29] The EU ETS also has restrictions on purchasing units from certain types of projects. Kyoto units (CERs and ERUs) generated from nuclear facilities, for example, are prohibited, as are credits from forestry activities. The EU ETS also has specific guidelines for credits generated from hydro-electric power production projects.

In deciding whether to restrict the type or volume of Kyoto units that can enter a NZ ETS, the government has weighed up issues such as compliance costs (including long-term costs), economic efficiency and flexibility, environmental integrity, equity and the international acceptability of the NZ ETS.

Restricting the *volume* of Kyoto units may help to encourage domestic abatement relative to international abatement. However, restrictions on volume will increase the costs for participants and for the economy as a whole. Some restrictions on the volume of Kyoto units that can be sold on the international market will occur as a result of restrictions on the Commitment Period Reserve (as discussed in the next section).

Restrictions on the *type* of Kyoto units may affect the environmental integrity of the scheme. For example, some people have raised concerns about allowing AAUs into the NZ ETS (the EU ETS, for example, specifically excludes trade in AAUs). Arguments against including AAUs are based on concerns about "hot air", which generally refers to AAUs that were allocated to

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[27] The key task when linking an ETS between non-Kyoto and Kyoto parties is to prevent any net selling of units from the non-Kyoto to the Kyoto party. The EU is actively looking at such a mechanism as part of its proposal to bring emissions from international aviation (not covered by the Kyoto Protocol) into the EU ETS.

[28] See section 4.6.

[29] Each member state is permitted to decide on the limit for use of CERS and ERUs, which are in turn converted into limits for each installation.

countries whose emissions at the time were less than in 1990, for example as a result of economic recession during the 1990s and the corresponding sharp decline in their emissions.

Arguments for accepting AAUs are based on lowering compliance costs (linked to the core objective of the NZ ETS) and the argument that AAUs are legitimate units, covered by the Kyoto cap, and therefore should be fully tradable. Countries signing the Kyoto Protocol did so in full knowledge of the implications of these allocation decisions. Removing an AAU reduces the ability of others to emit, and it can also be argued that, to some extent, there is hot air in the inventories of many developed countries.

Units generated by the Kyoto Protocol's project-based mechanisms – namely the Clean Development Mechanism, which generates CERs, and Joint Implementation, which generates ERUs – are arguably less controversial internationally. However, there are still concerns about the environmental integrity of some of these units associated with different types of projects, in particular:

- units that are generated by emissions removals from afforestation and reforestation CDM projects (tCERS and lCERs) carry a risk of future liability to the Crown, which does not exist with other units[30]
- units generated from HFC-23 projects[31] involve significant issues. These issues are currently before the United Nations Framework Convention on Climate Change (UNFCCC) and Montreal Protocol bodies for resolution. If such issues remain outstanding, New Zealand would need to consider excluding them from our Kyoto registry.

4.7.1.2 Managing the Commitment Period Reserve

The Commitment Period Reserve (CPR) is a rule within the Kyoto Protocol designed to prevent parties from overselling in relation to their Kyoto targets. The CPR requires each party with binding targets to hold a minimum number of Kyoto units in its national registry. In New Zealand's case this means that Kyoto units covering 90 per cent of our assigned amount (under the Kyoto Protocol) must be held in the registry at any point in time throughout the first commitment period (2008–2012). If this limit is reached, the registry would effectively close to outgoing international transfers until more Kyoto units (AAUs, CERs, ERUs or RMUs) were transferred into the registry.

Closure of the registry because of breaching the CPR would self-correct when more units entered the registry. Temporary closure of the registry as a result of breaching the CPR could constrain the ability of participants in Projects to Reduce Emissions, those in Negotiated Greenhouse Agreements and the Permanent Forest Sink Initiative to sell their Kyoto units internationally. These parties can be protected by maintaining a purpose-built buffer within the

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[30] A Kyoto party may only retire tCERs and lCERs for compliance with its obligations within the period in which the unit was issued. If a party retires tCERs or lCERs in order to comply with its Kyoto obligations, the units must be replaced by another type of unit in a subsequent commitment period, which is then permanently cancelled (annulled). This replacement requirement arises because of the Kyoto rules for CDM forestry projects (based on concerns about the non-permanence of carbon stored in forest sinks). lCERs must also be replaced if the project for which they were issued fails to meet its requirements (eg, the forest burns down, causing the lCER to be "reversed").

[31] HFC-23 is an extremely potent greenhouse gas. One of the concerns with HFC-23 projects is that they create perverse incentives to increase HFC-22 production (a substitute for HFC-23), which is an ozone-depleting substance regulated under the Montreal Protocol.

CPR, and closing the registry to other trades in advance of breaching the actual CPR. This issue is being considered further.

4.7.1.3 Price safeguard mechanisms in the domestic market

Arguments for and against safeguard mechanisms such as 'price caps' or 'price floors' in ETS design revolve around concerns about the volatility of emission prices and absolute price levels. If the international emissions market were to prove to be particularly volatile, the use of either a price cap or price floor could assist in building confidence in a NZ ETS.

A price cap would limit the emission unit costs faced by New Zealand firms. Different mechanisms could be used to provide a price cap. For example, the government could buy international emission units and sell them to New Zealand firms at the level of the price cap to meet demand. The government would then absorb the cost differential between the international price and the domestic price cap.
A price floor, on the other hand, could be used to help avoid the risk of an unexpected drop in emission unit prices, thereby affecting the viability of investments that were based on higher forecasted emission unit prices. A sudden drop in the price of emission units could occur if there was an oversupply of units in the international market relative to projected demand. One potential mechanism for providing a price floor would be for the government to block further international acquisitions of emission units if the international price fell below the level of the price floor.

Price caps and floors do come with downsides from a policy angle. In particular, the use of price caps and/or price floors:

- could significantly impede the ability to link the NZ ETS bilaterally to other trading schemes that do not use such mechanisms
- would require limits on the use of banking provisions (this is particularly important in terms of forestry companies where credits and liabilities occur over a significant period of time, and banking of at least some NZUs is likely to be a serious financial management option for forestry companies)
- may affect the development of a full range of emissions-related financial products
- (in the case of a price cap) may act as an impediment to investment in emission-reducing activities.

In the long run, the goal of the NZ ETS is to expose the New Zealand economy to the price of emissions. As such, neither a price cap nor a price floor is desirable as a long-run policy instrument, assuming that the international emissions market continues to operate effectively.

Box 2: Drivers of price in a NZ ETS

The primary determinant of the emission unit price in the New Zealand market will be the nature of the international linkages with the NZ ETS. This means the price of NZUs is likely to be heavily influenced by international price trends. Nevertheless, an element of home bias in the New Zealand market is very possible in light of potential high transaction costs in accessing the international emissions trading market.

Most current trades in Kyoto units are in CERs under the Clean Development Mechanism. There are uncertainties applying on both the supply and demand sides internationally, and these uncertainties seem likely to remain for some time.

The market in the EU ETS is likely to have a higher price (possibly significantly) than prices in a New Zealand market. This is due to EU rules that limit the quantity of Kyoto units that can enter the EU ETS. Given this, while prices in the EU ETS will be one factor in determining the price of CER units, it is not at all clear that Kyoto unit prices will follow the patterns in the EU ETS.

Although it is difficult to predict the price in the NZ ETS market, there is some information available that might be of guidance. The *World Bank State and Trends of the Carbon Market 2007* had a wide range of CER prices (USD$6.80–$24.75) with an average price of slightly less than USD$12.00. ERUs were cheaper.

During the first commitment period, the drivers of the international emission unit price will include the availability of project-based units such as CERs and ERUs, the extent to which AAUs enter the market, and the extent to which individual countries choose to meet their Kyoto commitments through the purchasing of Kyoto units.

In the long run, it is hard to predict the directions in which the emissions market may evolve. Prices will depend on the exact nature of future international climate change agreements, and very importantly, the stringency of any future international climate change agreements.

4.7.2 Decisions on international linkage of the NZ ETS

The government has decided in principle that for the first commitment period (2008–2012), the ETS will be linked to the international Kyoto market. Subject to certain restrictions, NZUs will be interchangeable with Kyoto units, and participants will be able to surrender both NZUs and Kyoto units for ETS compliance purposes.

Participants will be able to exchange NZUs for Kyoto units to sell them offshore; however, offshore sales will be subject to constraints imposed by the Kyoto Protocol's Commitment Period Reserve (CPR). When managing the CPR, preference will be given to participants in Projects to Reduce Emissions, Negotiated Greenhouse Agreements and the Permanent Forest Sink Initiative in order to enable them to sell units internationally.

For the first commitment period, the government will place no restrictions on the type of AAUs that can enter the NZ ETS. However, the ETS will include a power for the government to place restrictions on the type of CERs and ERUs that can be brought into the NZ ETS. The government has already decided to exclude CERs and ERUs relating to nuclear projects from the New Zealand Emission Unit Register, and to prevent individuals from holding lCERs in the Register. The government has also excluded individuals from retiring tCERs for compliance under the Kyoto Protocol. As a result, these units will be unable to be used for NZ ETS compliance purposes. Similarly, if issues around HFC-23 projects remain outstanding, New Zealand would need to consider excluding associated units from its Kyoto registry and therefore the ETS.

In the short term, linkages between the NZ ETS and the emissions trading schemes of other countries will occur indirectly via the international market in Kyoto units, rather than through direct bilateral linkages.

The government has not identified the need to include a price cap or a price floor in the core design of the NZ ETS for the foreseeable future. The ongoing commitment to the Kyoto Protocol of key developed countries, the operation of the EU ETS, and the projected supply of

Certified Emission Reductions (CERs)[32] are expected to help provide the foundation for a sufficiently stable international market in the Kyoto Protocol's first commitment period (2008–2012). However, specific work has been commissioned to more fully inform government of possible carbon market developments.

If there were not to be an international agreement after 2012 then the supply of emission units from the international market may well be reduced. In such circumstances, a price cap could potentially be used to create an incentive for emission reductions to occur in New Zealand while not placing excessive cost on the New Zealand economy. Therefore, it is recommended that the legislation include a power to introduce a price cap that could be used if, for example, there is a gap between the Kyoto Protocol first commitment period and later international agreements.

4.8 The quantity of emission units to be issued

4.8.1 Context

The environmental integrity and stringency of a cap and trade scheme depend on the definition of the cap. New Zealand is already part of a global cap-and-trade scheme established under the Kyoto Protocol. For the period from 2008 to 2012, New Zealand will be allocated a fixed number of emission units, and will be able to trade emission units with other countries in the scheme. For this reason, a NZ ETS does not require a separate cap on domestic emissions in addition to the Kyoto cap. The Kyoto cap can be the basis for determining the stringency of the scheme. The approach used under the Kyoto Protocol recognises that all emission reductions have a global benefit, no matter where they occur.

An important distinction in terminology needs to be made between the cap on emissions in a domestic scheme, and limits on the allocation of emission units by the government into the domestic market. If participants in a domestic trading scheme can purchase emission units within an international cap, then there is no hard limit placed on the emissions that occur within the country. However, participants will still face a cost constraint on their emissions if the government limits the number of domestic units that it allocates by gifting.

This approach works as long as there is an international agreement in place with a clear cap. Refer to section 4.13 for discussion about the evolution of the NZ ETS in the context of future international agreements.

4.8.2 Definition of the cap for the NZ ETS

The government has decided in principle that the NZ ETS will operate within the cap on emissions established by the Kyoto Protocol (for the first commitment period) and within whatever cap is established under international agreements post-2012. No further limit will be placed on the emissions that occur within the geographic boundaries of New Zealand. Domestic emissions that exceed New Zealand's allocation under the Kyoto Protocol (including units issued for removals by forest carbon sinks) must be matched by emission units purchased internationally from within the Kyoto cap on emissions.

The government will limit the number of New Zealand units it allocates for free under the NZ ETS. This will place a cost constraint on emitters and consumers. However, because the

[32] It is important to note that, although there was significant volatility in the first phase of the EU ETS, the CER market has not been anywhere near as volatile.

NZ ETS will be linked internationally (as described above), thereby allowing the import of additional emission units, there will be no absolute constraint on the emissions that occur domestically in New Zealand.

Box 3: Is the NZ ETS a true cap and trade scheme?

There are different ways to design an emissions trading scheme but all trading schemes require some form of constraint around the total level of emission units available; that is what gives them value and leads to trading.

The classic type of emissions trading scheme is a cap-and-trade arrangement, such as that used for SO_X and NO_X emissions in the United States. Under this sort of scheme, a government sets a binding, absolute limit on the total level of emissions that can occur in that country (or sometimes state, etc). This binding limit is called the cap.

New Zealand's ETS is different from this classic type of cap-and-trade scheme in two key ways:

- First, it operates within an overarching global agreement (the Kyoto Protocol). As the Protocol provides an international cap, an additional cap for the NZ ETS is not required. The global cap will lead to an international price of emissions that will set the price in the market of a NZ ETS.
- Secondly, under the Kyoto Protocol participants can earn project-based emission units by reducing emissions in developing countries that are signatories but do not have a binding cap. Participants can also earn removal units from eligible land use, land-use change and forestry activities in developed countries. As a result, the cap on emissions for Annex B countries under the Kyoto Protocol does not act as an absolute limit, even at the international level; Annex I countries can collectively emit more than their aggregate cap if they earn units through the Clean Development Mechanism or the use of domestic forest carbon sinks.

4.9 Offsets

4.9.1 Context

An ETS rewards participants for achieving any emission reductions below business as usual. The reward comes in the form of a corresponding reduction in the number of units that the participant is required to surrender at the end of the commitment period, or in a reduction in the emission-related price increases they will face. Participants are also awarded units for removing greenhouse gases from the atmosphere (ie, through new forest plantings). However, an ETS does not incentivise all activities that reduce emissions. For example, the relevant sector may not be covered by the ETS, or the design of the ETS may not be sufficiently detailed to capture the activity.

However, an ETS framework can be augmented by the use of offsets. An offset (ie, a tradable emission unit) could be granted where a person voluntarily undertakes some action that leads to either a reduction of greenhouse gases emitted into the atmosphere, or the removal of greenhouse gases from the atmosphere. In the context of a NZ ETS, an offset mechanism would create an incentive for emission reductions not covered by the ETS. Typically, there

would not be a corresponding liability associated with the emission reduction.[33] Participants would be awarded NZUs, which they could sell for a profit.

There are two areas where the concept of offsets may be useful:

- in sectors of the economy not covered by the NZ ETS
- in sectors inside the NZ ETS where the relevant emission factor system cannot be adapted to provide all of the desirable incentives to reduce emissions.

In relation to the first point, offsets may be a useful transitional measure to consider prior to a sector entering the NZ ETS. They may also be a useful ongoing measure for entities not subject to the scheme (eg, those entities whose emissions are under a *de minimus* threshold).

In relation to the second point, it is possible that there will be some crudeness of the emission factors that are applied in some sectors. This may particularly be the case for the agricultural sector, where it is likely that participants in the scheme would be at the processor level. In this case, some form of offset could be a useful tool to provide incentives for farmers to take actions to reduce emissions that might not be recognised otherwise.

The second point also relates to the long-term issue of breakthrough technologies that may lead to substantial reductions in emissions (an example is carbon capture and storage, whereby emissions are captured and buried underground or beneath the ocean). While such technologies may be many years away, an ETS should be designed to incorporate their use.

Incorporating offsets in an ETS presents some pitfalls. There is often a complex administration system for offsets, and determining "additionality" can be problematic.[34] Furthermore, any reductions leading to the issuance of domestic offsets must also be reflected in New Zealand's national inventory of greenhouse gas emissions under the UNFCCC to ensure New Zealand gains credit for the reduction at the national level.

The government will engage with stakeholders and Māori on the possibility of including the use of offsets in the NZ ETS. Areas of focus might include which activities could be suitable for offsets, how long an offsets mechanism should operate, and how to minimise the technical and administrative challenges of operating an offsets mechanism.

4.10 Design of the market for NZUs

4.10.1 Context

An effective emissions trading market is fundamental to the scheme's ability to deliver least-cost emission reductions. Markets rely on competition to perform efficiently, and competition is fostered in markets where:

- the **unit of trade** is well defined and enforceable
- the market is **liquid**
- the regulatory environment is **transparent**

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[33] Forest sinks included in the NZ ETS are not included in this definition of offsets and are not covered by the discussion above.

[34] "Additionality" refers to determining whether a project or initiative would or would not have occurred in the absence of the offset mechanism. A project is considered additional if it would not have occurred in the absence of the allocation of the units involved.

- participants have good **price information**
- **transaction costs** are low.

4.10.2 Support for the market

There is a role for government to ensure the regulatory environment supports a market with attributes that foster competition.

An emissions trading scheme with strong international linkages can deliver greater liquidity, better price information and lower transaction costs. In the short term, the NZ ETS will be indirectly linked to offshore emissions trading schemes through participants' use of Kyoto units alongside NZUs to meet compliance obligations (refer to 4.6.2 regarding the exchange of NZUs for Kyoto units for sale offshore).

New Zealand will be a small player relative to others in the international carbon market, and we therefore expect that New Zealand's participation in emissions trading will have little influence over the price of emissions in international markets.

The sudden fall in the price of emissions in the EU ETS in April 2006 has highlighted that poor-quality or asymmetrical information can have a negative impact on the price of emission units. High levels of information disclosure support well-functioning markets. The government will engage with stakeholders and Māori on the possibility of emission reporting on a quarterly rather than annual basis, with an appropriate level of disclosure, to assist the level of information in the market for emission units.

We expect that over time New Zealand participants will be able to access financial instruments for hedging against price volatility.

It is likely that a large number of trades, particularly initially, will be conducted on a bilateral basis. The government does not intend to prescribe the means by which the market trades emission units. The government is considering the need for amendments to the Securities Markets Act 1988 to enable the operation of registered emissions trading platforms.

The government will engage with stakeholders and Māori on whether the ETS design generally provides a sufficient framework for participants to trade effectively, and what (if any) assistance government could provide to help participants understand and comply with their obligations and build their trading capability.

4.11 NZ ETS registry

4.11.1 Context

Central to the operation of an emissions trading scheme is an electronic register, which can be likened to online banking, and will record NZU holdings, transactions, emissions reporting, and the surrender of units for compliance. NZUs are intangible and cannot exist outside the register, which will create each NZU as a serial number in the registry system.

4.11.2 The New Zealand Emission Unit Register

The New Zealand government has already developed a Kyoto-compliant emission unit register, known as the NZEUR. The government expects to make the NZEUR available to the public in the second half of 2007, but it is restricted to transactions and holdings of Kyoto units only.

The NZEUR was developed in accordance with the Kyoto Protocol, which requires New Zealand to develop an electronic emission unit register accessible via the internet. The NZEUR conforms to technical standards adopted under the Kyoto Protocol to exchange data between national registries and the International Transaction Log (ITL) maintained by the UNFCCC Secretariat. The NZEUR and was established under the Climate Change Response Act 2002 (CCRA). For more information, go to http://www.nzeur.govt.nz/.

4.11.3 Establishing a NZ ETS registry

The government plans to develop a register for the ETS that will provide additional functions not available through the NZEUR (eg, the ability to receive emissions reports and to register NZUs).

The NZ ETS register is not yet under development, but is expected to draw on the design of the NZEUR as far as possible. The two systems will need to be compatible and well linked, and may even operate as one register to reflect the needs of users.

The NZ ETS register will give holders certainty for trading and will facilitate compliance. The government will engage with stakeholders and Māori on what the government can do to facilitate use of the NZ ETS register by participants in the NZ ETS.

4.12 Compliance, enforcement and the administering agency

4.12.1 Context

Compliance and enforcement refer to what is required of participants under an ETS and what happens if participants fail to meet their obligations. These matters are critical for the environmental integrity of an ETS.

The long-term core obligation under the NZ ETS would be that each participant must surrender to the Crown one emission unit for each metric tonne of eligible emissions generated in each compliance period. In order to meet the core obligation, participants will also be required to calculate emissions, retain sufficient records to allow verification of emission calculations, report on emissions resulting from specified activities, and comply with any directions of the administering agency.

4.12.1.1 Self-assessment

The government's preferred approach to compliance is a "self-assessment" methodology, similar to that used in the New Zealand tax system. The operation of a self-assessment scheme means that participants take actions to meet their obligations under their own volition, and the administering agency verifies participants' compliance with their obligations via an audit process. The actions taken by participants will be assumed to be in compliance unless subsequently challenged by the administering agency.

While virtually all domestic and international enforcement systems for trading schemes involve self-reporting, different approaches are used to manage the accuracy and truthfulness of reported information. Creating layers of checks should strengthen the integrity of the NZ ETS, but too many layers will increase compliance and enforcement costs.

A strict self-assessment approach is one end of the spectrum; the other end is represented by a scheme, such as used by the EU ETS, which requires participants to register before they are able to engage in emitting activities. Under self-assessment there is only a requirement to report after engaging in the activities during the compliance period.

Other ways of minimising risks of inaccurate or fraudulent reporting include requirements on participants to:

- have emission reports verified by an independent third party before they are submitted to the administering agency
- monitor and report their emissions at more regular intervals
- make emissions information publicly available
- provide more details in annual reports (or more frequent equivalent reports)
- have the administering agency (ie, not participants) issue an assessment to participants that accepts emissions as reported during a compliance period.

International examples of approaches generally involve at least some of these requirements. In considering an appropriate compliance and enforcement regime for New Zealand, there is a tension between keeping compliance and administration costs low and ensuring the scheme is acceptable internationally (ie, to enable possible linking with other schemes). The government's initial preference is to follow a self-assessment approach, but in order to ensure there is comfort with the integrity of the system in the New Zealand market as well as the wider international community, some of the options noted above are being considered further.

The administering agency will need a range of enforcement powers, such as to access land and premises to obtain documents and information. These enforcement powers may only be exercised in relation to matters that relate to a participant's compliance with their obligations under the NZ ETS.

The administering agency will need to determine the nature and frequency of its verification procedures. One approach would be for it to verify the compliance of every participant over a series of compliance periods. An alternative would be for the administering agency to undertake risk-based targeting. Under this approach, verification would be more frequent for participants at greater risk of non-compliance. The administering agency would also identify verification triggers, such as the submission of an annual report that shows radical and unexpected differences in the level of emissions from previous reports.

4.12.1.2 Compliance monitoring

High-quality emissions monitoring and reporting are essential to assure effective compliance and trading. It is important to consider the costs of compliance to participants and the administration costs of the scheme to the administering agency. Methodologies for monitoring and calculating emissions can be organised into two groups: those that are generic to all participants and those that are specific to participant types (eg, by sector or sub-sector).

To the extent possible, without challenging the integrity of the scheme, monitoring and reporting requirements should take advantage of existing information flow and documentation.

Where relevant, the NZ ETS should be consistent with the UNFCCC national inventory reporting guidelines, and with the Kyoto Protocol accounting guidelines. The regime should also refer to and take advantage of relevant and appropriate domestic and international standards and international best practice regarding the calculation of emissions that result from different activities (especially in specialised industries).

In the long term, it is desirable that, where practical and where it does not challenge the integrity of the scheme, there be harmonisation of monitoring and reporting with other emissions trading schemes.

4.12.1.3 Compliance reporting

Compliance with the core obligation should be determined on the basis of reporting of prescribed information such as activities, emission factors, emissions and emission units surrendered. Reporting will need to be at least annual, although there are good reasons for more frequent reporting. In particular, more frequent reporting promotes capability as participants undertake the necessary reporting requirements more often. There are also market efficiency reasons for more frequent reporting: greater information disclosure may support price discovery, leading to a more stable market. Mandatory quarterly reporting is a possibility, and participants could have the option of reporting monthly.

4.12.1.4 Penalties

Participants should face consequences for non-compliance with their obligations. These can include financial penalties, make-good provisions, public disclosure of non-compliance, and criminal sanctions.

Some participants, either due to error or deliberate actions, may fail to comply with their obligations. Non-compliance is unfair to those who do comply and can threaten the environmental integrity of the scheme, so a system of penalties for non-compliance is appropriate. The aim in setting the rate of the penalty for non-compliance is to make the cost of non-compliance higher than the costs of compliance, and to be stringent enough to facilitate international linkages.

The most common options used in trading schemes are a financial penalty or a make-good penalty, or both. The financial penalty could be a fixed dollar amount per tonne, or a multiplier of the price of emission units. The price of emission units may be difficult to identify, especially early in the period, although in time a spot price may become identifiable.

4.12.1.5 Banking and borrowing

Banking allows those participants in an ETS that have emissions below their unit holdings to save surplus emission units for use during a later compliance period. Borrowing is the opposite of this, allowing the use of emission units from a future period for compliance during the current period. Both banking and borrowing provide participants with compliance flexibility and can help smooth out volatility in emission unit prices. However, borrowing may have negative environmental impacts by bringing emissions forward in time, and creates a greater risk of future non-compliance.

4.12.2 Compliance and enforcement under the NZ ETS

The government has made the following in-principle decisions on mechanisms for compliance and enforcement, and the roles of the administrative agency.

4.12.2.1 Participant obligations

In addition to the core obligation to surrender emission units to match emissions in each compliance period, participants will also have an obligation to:

- calculate their level of emissions using approved methodologies
- retain sufficient records to allow verification of emission calculations
- report their level of emissions, and emission units surrendered at the end of each compliance period, to the administering agency
- comply with any directions of the administering agency.

Participants will be required to calculate their emissions for each compliance period (1 January to 31 December each year), submit an annual report detailing their emissions activities by 31 March of the following year, and surrender the emissions at the date they submit their annual reports.

Where feasible, participants will be required to commence reporting six or 12 months prior to assuming surrender obligations in order to build capacity before incurring binding penalties; failure to comply will not incur penalties. Participants will also be required to monitor their activities in accordance with methodologies specified in law.

The compliance system will be based on the "self-assessment" model like that used in the New Zealand tax system.

4.12.2.2 Administering agency

The role of the administering agency will be to verify compliance, and it will take a risk-based approach to verification. The administering agency will be given the following powers to carry out its functions (subject to change as the compliance regime is refined):

- access land and premises to obtain documents or information, but not to enter a private dwelling without a warrant issued by a judicial officer
- remove and copy documents
- remove and retain documents for inspection
- require any person to provide information pertaining to participants' compliance with NZ ETS obligations, either electronically or in writing
- require any person to attest to the truthfulness of the information furnished by requiring them to sign a statutory declaration, give evidence before the administering agency under oath, and possibly give evidence before a court
- prescribe forms necessary for the administration of the scheme
- require the verification of some or all information pertaining to the NZ ETS by an independent third party
- demand special returns, and make special (including default) determinations of emissions (potentially with the support of technical experts).

The administering agency will not be able to challenge the actions of participants after a certain period. Stakeholder views are sought on an appropriate limitation period.

4.12.2.3 Penalties

A penalties regime will be included in the NZ ETS, involving civil liability for any failure by a participant to meet its obligations, and criminal liability where a participant does so knowingly. Any failure by a participant to meet the core obligation (referred to as a "surrender shortfall") will result in:

- a requirement to make up the surrender shortfall within 90 days of a determination by the administering agency that a participant is in breach, at a ratio of 1:1
- a financial penalty of NZ$30 per tonne of emissions for which emission units have not been surrendered (ie, the surrender shortfall)
- the publication of the participant's identity and the nature of the compliance failure.

Where a participant knowingly fails to meet the core obligation, the unit make-up requirement will increase to a ratio of 1:2, the financial penalty will rise to NZ$60 per tonne of emissions, and participants (or their directors, in the case of companies) will face the possibility of criminal conviction. Participants' failure to meet other obligations will result in a civil penalty of up to $4,000 for the first infringement, $8,000 for the second infringement and $12,000 for the third infringement. Where participants fail to meet these obligations knowingly, they will be subject to criminal penalties, including larger fines, and personal criminal conviction.

A procedure will exist for the administering agency to make a default assessment of the number of emission units that participants must surrender where the participants fail to monitor and/or report their emissions in accordance with their obligations. Where this occurs, participants will be subject to fines for failing to meeting their obligations and liable for the stricter make-up requirements and higher financial penalty. A series of smaller penalties will exist for administrative infringements. Appropriate appeal procedures relating to the decisions of the administering agency will be included in the legislation.

4.12.3 Engagement on verification and reporting

The government will engage with stakeholders and Māori on the following possible checks to help ensure the truthfulness and accuracy of compliance information:

- independent third-party verification of participants' annual reports
- independent third-party verification of information submitted by participants to determine their entitlement to the free allocation of units
- the ability for participants to seek binding rulings from the administrative agency that their proposed actions to meet their obligations will result in compliance
- more frequent reporting by participants of their emissions (eg, monthly or quarterly, instead of annually).

The government also wishes to engage with stakeholders and Māori on whether methodologies determining how participants are to calculate and report their emissions should be set out in primary legislation or regulations. The government's preferred option is to include these methodologies in regulations, because they may need to change as UNFCCC rules are updated. There also needs to be some flexibility for individual participants to seek specific rules that apply to their particular case. Providing for the methodologies in regulations allows for change without Parliament having to pass an amendment to the primary legislation.

4.13 Future evolution

4.13.1 Context

Emissions trading schemes are complex instruments, and the initial operation of any scheme will expose features of the scheme that require refinement. The NZ ETS is no exception and will be an evolving policy instrument. Ongoing refinement of the details of the NZ ETS will be necessary as firms and administrators gain more experience with the scheme. The NZ ETS will also need to evolve to reflect changes in future international arrangements.

To ensure the NZ ETS is operating effectively and is meeting its core objective, it should be reviewed regularly. Any review will need to consider the international setting within which the NZ ETS operates, including the evolution of the UN-based negotiations. The Kyoto Protocol's first commitment period ends on 31 December 2012. Although negotiations are underway to determine parties' obligations under future agreements, the scope and nature of these agreements remain uncertain.

It is intended to design the NZ ETS so that it can be adapted to future changes to New Zealand's obligations under the international climate change policy framework post-2012, and can endure should there be a gap between the end of the first commitment period of the Kyoto Protocol and whatever international agreement is established beyond that point. This is important to help provide some degree of medium- to long-term certainty that there will be a future price of emissions in New Zealand, thus assisting in informing investment decisions.

Should agreement not prove possible in the short term, there is the possibility of a gap between the end of the first commitment period and new international arrangements. This gap could be for a relatively short time, or for a significant period of time. If it appeared that there was unlikely to be an effective international agreement operating for some time post-2012, then pluri-lateral or regional trading schemes may emerge. Under those circumstances, New Zealand may wish to consider developing such trading schemes with, for example, Australia and other countries.

If there was no successor agreement to Kyoto but an international market for emissions continues to operate, the government could continue to issue NZUs at an agreed level and establish domestic rules for the trading of international units meeting sufficient quality standards. Conversely, if there was no successor agreement to Kyoto and no international market for emissions to which New Zealand wishes to link, the government could maintain the ETS by auctioning NZUs, and could use a price cap to mitigate the price risks associated with a domestic-only trading scheme. This would ensure that New Zealand participants in the NZ ETS continued to face a cost of emissions in their business decisions, and to reduce the price uncertainty they faced.

Alternatively, sectoral agreements may emerge for managing emissions (in a way different from that under the Kyoto Protocol) from certain sectors such as cement or aluminium manufacture. These potentially could include the use of intensity-based rather than absolute obligations. Theoretically, the concept of an intensity-based approach could also extend more widely in future international arrangements. If such a scenario were to eventuate, this would be managed under the NZ ETS by changing the nature of the obligation relating to relevant sectors of the economy.

At a more fundamental level, it is possible that the international framework post-2012 could resemble more of a tax than an ETS. If this were the case, and given the objective of meeting New Zealand's international obligations at least cost in the long run, it would be appropriate to consider whether a tax-based system rather than an ETS were more appropriate. As we have

seen, many of the building blocks for developing an ETS are the same as those for developing a tax-based system.

In summary, therefore, it is important (and very possible) to ensure that any NZ ETS is adaptable to future changes in international arrangements.

4.13.2 Regular review

The government has agreed in principle that the legislation for implementing the NZ ETS will include provision for a regular policy review. This review will be concluded no later than nine months before the end of each commitment period (this timing is designed to allow future international agreements to be taken into account). The legislation will also provide for government consultation over the terms of reference for the review.

5 How Emission Units are Allocated

This chapter focuses on how the Crown will allocate emission units into NZ ETS, including:

- **the context and rationale for providing assistance to firms through free allocation**
- **sectoral considerations regarding to whom to give assistance, how much assistance to give, and for how long to give assistance**
- **the government's agreed allocation principles**
- **the government's in principle decisions on which sectors will receive free allocation when they enter the scheme, and at what level**

5.1 Context

Each year the total number of emission units the government makes available must be allocated to the ETS market. The method used to make that allocation is an important factor in ensuring that the market works efficiently, that the cost burden of the ETS is shared fairly across the different parties (taxpayers, consumers, firms and industry sectors), and that the ETS is kept as administratively simple as possible.

The simplest method of allocation is to offer the units for sale by auction. However, if applied for all units from implementation, this would create a significant financial shock to those ETS participants that could not readily pass on the cost of those units to their customers. For this reason, free assistance (often in the form of free allocation)[35] is typically provided to participants to make the adjustment to an emissions trading scheme.

The arguments for continuing free allocation beyond a transition period are less strong. Free allocation involves sometimes difficult value judgements (such as whether to gift units to new start-up businesses as well as to established businesses). In addition, auctioning units generates revenue for the government, which can then be used to offset taxpayer liabilities under international agreements, to support households in making the shift to lower-emission lifestyles or otherwise assist the economy. For these reasons, auctioning is generally the favoured long-term allocation method.

One of the key principles underlying the ETS is that emitters face the full cost of their emissions. When this is achieved, it creates incentives to identify the widest range of emission reductions and to undertake all emission reductions that can be achieved for less than the price of emission units. Firms face this full cost through the obligation to surrender units regardless

[35] Two forms of assistance are identified in this section of the paper – through the provision of free allocation or through a progressive obligation. Unless specified otherwise, this section of the paper is drafted assuming that assistance is provided in the form of free allocation.

of whether they buy them or receive a level of free allocation. Allocation methods can be used to reduce some of the impacts of the introduction of the ETS, without changing the fundamental incentives to limit emissions across all opportunities.

The box below presents the government's rationale for providing some level of free allocation to firms under the NZ ETS as a transitional measure.

Box 4: Why provide assistance to firms?

It appears likely that New Zealand will be operating in a world that is more, rather than less, carbon-constrained in the future. In introducing an ETS, the government is seeking to develop a tool that fully integrates the cost of emissions into the cost-structures of the economy and thereby supports the transformation of the New Zealand economy so that it can operate effectively and efficiently in such a world. New Zealand firms need to prepare for a world in which activities that increase or reduce emissions have a direct financial consequence.

Most New Zealand firms will face some increased costs of production under an ETS due to facing higher energy and fuel prices or (for a smaller number of firms) being required to surrender NZUs to cover their emissions. Many will be able to pass a portion of these costs down the supply chain to their customers (thus providing a demand-side behavioural incentive to reduce emissions). However, some will not be able to pass the bulk of these costs on, resulting in profit impacts for shareholders and (potentially) some loss of competitiveness. The term "stranded assets" is sometimes used in this context.

A further reason for providing assistance to business relates to concepts of competitiveness-at-risk for trade-exposed firms. This relates to the possibility that firms may close or reduce New Zealand production due to the imposition of a price on emissions.

The government considers it unhelpful to frame discussion on assistance issues in terms of competitiveness-at-risk considerations, because the concepts are poorly defined and the impacts often overstated. There are many factors that influence firms' profitability and competitiveness. Emissions pricing would be just one of them, and its impact would be difficult to distinguish from those factors that managers and shareholders must (currently) routinely address. (This issue was discussed at length in the Stern Review, see section 2.2.)

It is in New Zealand's interests to ensure that our business environment encourages growth in areas of the economy that maximise New Zealand's economic advantages and take into account the carbon footprint of specific activities. Having said this, the loss of production would be of concern for three reasons:

(1) The risk of 'regrets'

There could be long-term regrets associated with firms closing or substantially reducing production levels.

A key situation in which regrets might arise is when the countries that New Zealand competes with have not yet joined the international regime, but are expected to join within the next decade or so. It is not likely to be in New Zealand's interests to allow significant loss of production (and, in particular, significant loss of capacity) to occur as a result of competition with firms in such countries if New Zealand firms would be expected to be able to effectively compete with them once they have been brought under the international regime, and that is expected to occur relatively soon. In seeking engagement on this issue, the government wishes to focus particularly on this concept of avoiding long-term regrets, rather than on competitiveness-at-risk issues more generally.

(2) Concentrated job losses

Firm closures or reductions in production are likely to lead to job losses. Although current employment rates are high, and workers would be expected to find work again, the government is concerned about the possibility of significant job losses in some regions that may unduly disrupt regional economies or require significant numbers of people to move to find new jobs. This can have substantial adverse impacts on local communities, and the impacts will be greater than those associated with the same number of job losses distributed widely across the country.

(3) Reputational issues for New Zealand

The rapid introduction of an ETS that affects production costs for emissions-intensive plants can lead to significant reductions in the value of capital stocks, not anticipated at the time of investment. Other countries have sought to protect these values in the transition to an emissions trading regime, and a failure for New Zealand to follow suit could have an adverse impact on investment risk. There is an argument for protecting capital value, at least for some time.

(4) The issue of carbon leakage

One of the challenges from an international climate change viewpoint is the issue of carbon leakage[36].

From an economic viewpoint, New Zealand's climate change challenge is to maximise its economic performance within an ongoing carbon constraint. From an environmental viewpoint, the major way in which New Zealand can contribute to ameliorating the challenge that climate change poses is through encouraging effective international action, not through avoiding carbon leakage.

It is possible that some production that occurs in New Zealand will relocate to other countries as a result of the introduction of the ETS. Although some carbon leakage could result, this would be small from a global viewpoint. It can be argued that it would e unwise for New Zealand to attempt to address leakage concerns through ETS design as this would risk increasing the overall economic cost New Zealand faces to meet its international obligations but fail to secure any significant global environmental gain. Ultimately, the only effective solution to carbon leakage concerns is to improve the design of international agreements.

[36] Leakage arguments relate to the possibility that a reduction in New Zealand's (say) agricultural production may be offset by higher production in other countries where agricultural gases do not incur any emission charge. In this case, it is possible that total global agricultural greenhouse gas emissions would not change.

5.2 Allocation considerations

The primary decisions in designing any assistance package are to whom to give assistance, how much assistance to give, and for how long to give assistance. There is also an important decision to be made about the mechanism through which the assistance is provided. Each of these is addressed below.

5.2.1 To whom?

Different sectors have specific characteristics that determine whether free allocation of some units is justified.

5.2.1.1 Electricity and liquid fossil fuels

Electricity generators and liquid fossil fuel providers are not likely to suffer major (negative) impacts on their profitability through the introduction of an ETS. They are likely to pass on any extra costs imposed by an ETS to consumers down the supply chain, regardless of the level of free allocation. Consequently, there is little justification for these sectors to receive any free allocation.

5.2.1.2 Industrial production

In contrast, some participants in the industrial production sectors may not be able to pass on additional costs imposed by an ETS. Firms that have high emissions levels and that undertake emissions-intensive activities might argue that an ETS jeopardises their competitiveness. Nevertheless, the international literature suggests that competitiveness-at-risk concerns can often be exaggerated.[37] There are a range of factors that influence whether firms relocate their operations, including:

- the importance of location to market access
- the role of sunk capital in location decisions
- the role of a skilled and stable workforce in location decisions
- loyalty to a country (or region).

Despite these reservations, it is likely that a number of emissions-intensive plants located in New Zealand have some vulnerability to an emissions price, and that this justifies some degree of free allocation.

5.2.1.3 Forestry and agriculture

The government believes that for participants in the forestry sector (pre-1990 forests), the additional obligation imposed by an ETS may justify some form of free allocation. The government also believes that some level of free allocation may be appropriate for the agricultural sector. Here, free allocation would need to be directed as far as possible to farmers, who could be affected by the ETS through higher prices for fertiliser inputs, lower prices for outputs and reduced land values. Further detail on the government's proposals for free allocation to individual sectors is addressed in the next chapter.

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[37] There is a significant body of literature in this are, although this tends to be focused on the industrial sector. One source, the Stern Review (*Stern Review, The Economics of Climate Change*) noted that "the empirical evidence on trade and location decisions, however, suggests that only a small number of the worst affected sectors have internationally mobile plant and processes".

Box 5: Allocation decisions in the EU ETS

The European Union's Emissions Trading Scheme (EU ETS) is the cornerstone of the EU's strategy for addressing climate change. When the scheme started in 2005 it was the world's first international trading system for CO_2 emissions. It operates on an absolute-basis as opposed to an intensity-basis and covers over 10,000 installations in the energy and industrial sectors that are collectively responsible for close to half of Europe's emissions of CO_2.

Allocation decisions are made by member states (eg, the United Kingdom, Sweden and Italy) in the form of national allocation plans (NAPs) in line with criteria set by European framework legislation and subject to final approval by the European Commission. The NAPs set out the total quantity of European allowances (EUAs) in each member state for each period. The amount of allowances allocated must be consistent with each member state's Kyoto target. These allocation plans also set out how allowances will be allocated to individual installations. In addition, the extent to which member states plan to purchase Kyoto emission units internationally and the amount of CERs and ERUs that operators can use for compliance purposes must be stated in the NAPs.

The EU ETS was set up to have a number of phases. Phase 1 is from 2005–2007; Phase 2 is from 2008–2012. The allocation process for Phase 1 has been widely acknowledged as being beset by problems such as significant over allocation by several member states (mainly due to poor data) and inconsistencies in treatment of sectors between states. To some extent it was the political intent that Phase 1 would be a learning phase. Nevertheless, the fact that the allocation decisions in Phase 1 allowed emissions from some of these sectors to rise during 2005–2007 has been widely criticised by environmental groups. Prices for EUAs were consequently very volatile in Phase 1 and are close to zero in 2007, the third and final year of Phase 1.

There has also been a lot of debate in the EU about the method of allocation. The EU ETS rules allow for predominantly free allocation (gifting) based on historical emissions, with a provision for member states to a sell up to 5 per cent of allowances in Phase 1 and up to 10 per cent in Phase 2. The initial phase of the EU ETS coincided with high energy prices and widespread public concern about windfall profits accruing to electricity utilities as a result of the free allocation of allowances. Note that the allocation rules do not compensate electricity users for electricity price increases.

National allocation plans for Phase 2 of the EU ETS are now being approved by the European Commission. In general, guidelines for the plans have tightened considerably to ensure greater consistency of treatment by member states and less generous allocation levels. The European Commission's initial guidelines – ahead of the revelation of the significant over-allocation in Phase 1 – sought an overall downward adjustment of emission budgets by approximately 6 per cent compared with the Phase 1 cap.

Now that the majority of national allocation plans for Phase 2 have been assessed by the European Commission, it is estimated that the Phase 2 cap will be reduced by over 12 per cent compared with the Phase 1 cap and that EU ETS sectors will have to reduce their emissions by about 6.5 per cent compared with 2005 emission levels. Gradually, more member states are making use of auctioning.

Two member states with very high emissions levels, Germany and the United Kingdom, have decided to auction up to 8 per cent and 7 per cent, respectively, of the 10 per cent maximum allowed. Greater confidence by market participants in the allocation process and the tightening of allocation levels has led to a relatively stable forward (2008) price for EUAs to date, at approximately $NZ30.

An interesting contrast in the European context is the situation of Norway, which is not a member state. Effectively, Norway is adopting the broad set of EU ETS rules (ie, joining the EU ETS) with the exception of adopting the EU ETS rules that limit the proportion of allowances that can be auctioned.

The Norwegian Government settled on providing allowances equal to 30 per cent of emissions in an historical period (1998–2001 average) and providing no allowances to the oil industry. Relevant also is the Norwegian decision to base allocation on a relatively dated historical period (1998–2001), thus reducing the incentives for firms to position themselves for a relatively generous free allocation.

5.2.2 How much?

There is no easy way to determine how much assistance to provide. Having said this, the government does not propose to protect all firms from facing cost increases, or to protect the economy from the costs of meeting its Kyoto (and future international) obligations. There are financial constraints on the total level of assistance the government can provide under the NZ ETS. Any assistance paid for by government comes at an opportunity cost and implies less revenues available elsewhere in the economy.[38]

In order to maintain the effectiveness of the ETS, a significant number of firms must face the cost of their emissions at the margin. The levels of free allocation should minimise the extent to which the effectiveness of the ETS is undermined, and any broader economic distortions that result.

5.2.3 For how long?

Over time, it is preferable to move the level of free allocation towards zero. This would improve the overall economic efficiency (assuming effective revenue recycling) and administrative simplicity of the scheme, and it provides revenue that can be used for various purposes, including assisting consumers to respond to the impact of an emissions price.[39] Moving towards zero free allocation also diminishes the inequities that can arise between sectors, and between individual firms within sectors (it is not possible to design an allocation approach that avoids all perceptions of inequities). The government's intent is to remove all free allocation progressively between 2013 and 2025.[40]

An issue arises if there were to be a time-gap between successive international agreements during this timeframe. At this stage, the government's preference is to continue the rate of decline (regardless of the lack of an international agreement). This would provide business with some certainty for planning purposes and recognise the importance of an adjustment to an economy that incorporates the full price of emissions.[41]

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[38] There are also equity considerations between consumers and producers that are relevant. In particular, consumers have no ability to pass on costs so, from an equity viewpoint, it can be argued that producers should bear some costs, even if these cannot be passed on.

[39] International evidence suggests that as long as these increased auction revenues are used effectively, the full phasing out of all assistance can provide considerable economic benefit. OECD Information Paper COM/ENV/EPOC/IEA/SLT(2002)5. *Towards International Emissions Trading: Design Implications for Linkages.*

[40] Note that some levels of free allocation could be maintained indefinitely without seriously undermining the efficacy of an ETS.

[41] Such an approach would also be consistent with a one-off approach to allocation.

5.2.4 Firm entry and exit

The government also needs to make decisions on the treatment of firms that enter and exit the New Zealand market.

If firms are gifted units based on historical emission rates, new firms entering the market will not receive units. However, this is not as inequitable as it might appear. Incumbent producers will not receive any increase in allocation if they expand their output, and should not; to do so would subsidise output. This means that new entrants and incumbents will compete on an even footing when looking to grow production.

Potentially, high levels of gifted units create some level of bias against new entrants into a market. This is a complex issue. Assuming that both new and incumbent producers of a product have to fully fund increases in emissions, providing levels of free units does not provide a cash advantage to incumbents. However, there is a balance sheet benefit that is not available to new entrants. In the short run, it is possible that this effect could stifle innovation somewhat (ie, high levels of free allocation could delay more efficient technologies being employed).[42] This is unlikely to be a long-lived effect, especially given the intent to reduce levels of free allocation over time.

For the ETS to be fully effective, it is desirable that firms considering entry and existing firms considering expansion take account of the full costs of their action, including the cost of their greenhouse gas emissions (GHG). The government's initial preference therefore is that no emission units be given to firms entering the New Zealand market in order to ensure they are treated on an equal basis to existing firms looking to grow their levels of output.

The handling of the exit of firms can also be problematic. Firms are less likely to close if doing so will lead them to lose their eligibility to receive units.[43] Economic efficiency suggests that stopping closure is undesirable as plant closure may be an efficient response; it may be the source of low-cost emission reductions. But plant closures can come at the risk of long-term regrets as noted above (there is an interaction between firm closure rules and the way in which assistance is provided – this is discussed below). On balance, the government's preference is to stop assistance where firms cease operation in New Zealand.[44]

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[42] This is only an issue where new entrants are competing with New Zealand firms in a market with limited demand. Free allocation to existing firms does not change the fundamental economics of entry, which are based on costs of production, including an emissions price, versus the value of output.

[43] In some trading schemes, free allocation is maintained after firm exit in order to avoid dis-incentivising plant closure, as that can be part of the least-cost response.

[44] One potential problem with stopping assistance on firm closure is that firms, especially in the industrial sector, may continue to operate a plant at a low level in order to continue to receive units. It is unclear how significant this possibility is. In many cases, industrial processes cannot easily be substantially scaled down from existing levels and remain in operation.

5.2.5 Through what mechanism – free allocation or progressive obligation?

The government has two broad options available for providing assistance to firms within the ETS. The first is to gift emission units to those firms expected to be most heavily affected by the introduction of the scheme. This option is referred to as "free allocation". The number of units given to each firm could be determined, for example, with regard to their emissions in a recent year (such as 2005). To maintain strong incentives to reduce emissions, the level of units given to each firm over time would ideally not be adjusted to reflect changes in their emissions or output levels. The units that are gifted will have considerable value. The firms that receive them (which will not necessarily be those with an obligation to report emissions and surrender units) will be able to sell them, or if they have obligations, use them to help meet those obligations.

The second option is for the government to limit the extent of the obligation on firms to surrender units to cover their emissions. This option is referred to as a "progressive obligation". Under this option, the obligation to surrender NZUs to cover emissions would initially be reduced. Instead of a full obligation to surrender one NZU for every tonne of emissions, businesses would initially only be required to surrender one unit for every, say, five tonnes of emissions. Over time, this obligation would be steadily increased to the full obligation. This progressive obligation approach would directly reduce the costs faced by firms.

There are clear trade-offs between the free allocation and progressive obligation approaches. A free allocation approach would:

- provide a stronger economic signal to reduce emissions (both on the demand and supply sides) because firms are exposed to the full cost of emissions as soon as they enter the scheme
- not be as vulnerable to policy changes in terms of incentives on firms to reduce emissions, given that the full cost signal is in place
- more accurately provide support to firms for whom there may be regrets if closure were to occur
- limit the fiscal exposure for government

However, a free allocation approach would:

- be significantly more complex administratively
- arguably, not deal with new entrants as well as a progressive obligation approach in terms of possible competitiveness risks
- not lead to any assistance (within the ETS) being given to households or businesses that fail to meet whatever eligibility criteria are put in place

Under the progressive obligation approach the advantages and disadvantages are reversed. This approach is most suited to parts of the economy in which defining which firms to target is problematic, and where it is more important to influence long-term investment decisions than short-term decisions. If a progressive obligation were to be used, it would be most suitable in the stationary energy and industrial processes sectors. This is because there is relatively little growth in emissions forecast from stationary energy and industrial processes, and therefore signals to effectively influence long-term investment decisions are critical, while strong signals to reduce emissions in the short term are less important. This approach could also be an option to consider for the agricultural sector.

The strength of this price signal would also depend on the period over which the progressive obligation was set. For example, if a progressive obligation for stationary energy became a full obligation within three years, electricity prices could begin to adjust upward within a short timeframe. If the progressive obligation is applied over a period of 15 years (as the government is proposing if any progressive obligation is to be used), prices could adjust more gradually, but the reward to invest in low-emissions technologies would be less.

5.3 Allocation principles

As part of the long-term core design of the NZ ETS, the government has decided in principle that it will allocate NZUs into the market through a combination of sales (most likely auction) and free allocation (gifting). The government has also agreed in principle that the level and duration of free allocation will be considered against the following underlying principles.

i The government will attempt to maintain broad equity of treatment between and within sectors.

Decisions to give high levels of assistance to particular sectors are likely to come at the expense of reduced levels of generosity elsewhere. While an equitable sharing of the cost of the ETS will not always be straightforward to define, significantly inequitable treatment of particular firms or sectors would undermine the government's broader objectives.

ii The government will seek to avoid long-term regrets in designing and implementing short-run policies.

The transformation of New Zealand to a lower-carbon economy will take a period of time. Short-term decisions that have the potential to undermine this longer-term objective should be avoided.

iii The government will make the transition more manageable by being relatively generous in the first commitment period (CP1), from 2008 to 2012.

The evolution of New Zealand to an increasingly low-carbon economy will take sustained effort. The long-term efficacy and sustainability of the ETS is therefore paramount. Relatively generous initial levels of assistance are recommended in recognition of the fact that businesses will need time to lower their emissions, and that relatively broad support will be needed to implement an effective and high-quality ETS.

iv The government will not provide assistance to firms whose profits will be largely unaffected by the introduction of an ETS.

Many firms, especially those selling their products and services domestically, will be able to pass on a significant portion of the costs they face under the ETS to their customers. The impact on the profits of these firms will be limited. Consequently, there is no strong reason for providing a level of assistance to them.

The practical effect of not providing assistance to firms whose profits will largely be unaffected is that there would be no free allocation provided to fossil fuel providers or to electricity generators. In these areas, it is anticipated that the costs associated with the purchase of emission units are likely to be passed through the supply chain to consumers regardless of any level of free allocation of emissions units.

v The government will favour assistance via gifting units ("free allocation") as opposed to a progressive obligation, but will leave open the possibility of using a progressive obligation in some sectors.

The government has a general preference for using free allocation as the primary assistance tool as this preserves the signal to reduce emissions. Having said this, the use of a progressive obligation for the stationary energy and industrial process sectors, and also in the agriculture sector, is not ruled out and will be subject to the engagement process.

vi The government will move to zero assistance over time for overall economic efficiency, equity and administrative reasons.

The government has considerable flexibility in setting its post-2012 assistance policies. An ultimate move to zero assistance is clearly preferred for efficiency (assuming effective revenue recycling), equity and administrative reasons. Moving to zero levels of assistance also avoids the inequities that can arise between sectors that are, and are not, receiving assistance (eg, agriculture versus fisheries). Also, where the free allocation approach is used, inequities may arise within sectors between those firms that receive units because they were in operation before the scheme started, and those firms that entered the market afterwards.

The government has decided in principle to move toward a zero level of free allocation by 2025, with a linear rate of decline from 2013 to 2025. As this transition occurs, the government would expect to make emission units available to participants in a NZ ETS through regular auctions. This would provide revenue for government (that could be recycled elsewhere into the economy).

Further to this, a series of guiding statements have also been identified to assist decisions on allocation. These are that the government will:

i not pursue strategies for meeting New Zealand's commitments in the first Kyoto commitment period (CP1) of 2008–2012 that will make it harder for the country to meet its obligations in future commitment periods

ii favour approaches that enhance economic efficiency

iii favour approaches that minimise administrative costs and complexities

iv not allocate more units that it has available in the long term.

In terms of transitioning to the inclusion of all sectors being included in the NZ ETS, subject to *de minimus* considerations, the following additional interim objective has been identified.

By the beginning of 2013, all major sectors of the New Zealand economy are exposed to the international price of emissions, at the margin of all operations.

This would be modified if a progressive obligation approach were to be used. Further to this, two guiding statements that cover timing of entry and assistance to business in the 2008–2012 first commitment period (CP1) are that the government will:

i leave open the option of purchasing units internationally (to meet the cost of emissions it remains responsible for or to fund levels of free allocation) so long as the overall fiscal impact of the ETS is kept broadly neutral

ii decide when to introduce sectors into a NZ ETS on the basis of technical readiness, and broader social and economic considerations.

5.3.1 In-principle decision on levels of assistance through free allocation

The government has made a number of in-principle decisions, based on the principles set out above as well as efficiency, equity, and administrative ease objectives, regarding the total level of free allocation of emission units as a form of assistance to business:[45]

- in the forestry sector, free allocation will be provided such that the Crown assumes a total liability (taking the cost of the provision of the *de minimus* thresholds into account) for deforestation emissions as follows:
  - from 2008 to 2012, 21 Mt CO_2-e for plantation forest, plus a relatively small allocation set aside for forest weed control (eg, wilding pines)
  - from 2013, an additional 34 Mt CO_2-e for plantation forest
- the agricultural sector will be provided with a free allocation pool equal to 90 per cent of 2005 emissions when it is brought into the ETS
- the pool of units for eligible industrial producers will be based on 90 per cent of 2005 emissions from those eligible industrial producers
- indirect emissions associated with the consumption of electricity, as well as direct emissions from stationary energy and direct emissions from non-energy industrial processes will be included in the concept of emissions from industrial producers[46]
- starting from 2013, when agriculture is brought into the ETS, the free allocation pools for industrial producers and agriculture will decrease on a linear basis so as to phase out assistance completely in 2025[47]
- new sources that begin emitting during the period of the free allocation will not have any access to the pool of free allocations
- firms that cease trading will not retain any free allocation
- no free allocation will be provided to the upstream points of obligation in the liquid fossil fuel and stationary energy sectors, electricity generators, or landfill operators.

Box 6: How will the proposed assistance policies contribute to the government's objectives?

As noted, the government's assistance policies are motivated by a desire to spread the costs of the ETS equitably, as well as:

- avoiding significant reductions in output, or firm closure, that lead to economic 'regrets'
- avoiding particularly large or concentrated job losses
- avoiding damage to New Zealand's reputation as a good place to do business.

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[45] Discussion of allocation of this assistance within sectors is covered in the next chapter.

[46] The basis for allocation for electricity consumption will be one that compensates firms for the cost impact. It therefore needs to be based on the emissions from marginal generation rather than average generation.

[47] For industry, this would mean receiving the same level of assistance in the years 2010, 2011, 2012 and 2013. Following this, the level of assistance provided would decline every year. The planned review of the ETS provides an opportunity to adjust this decision somewhat once the "shape" of future international agreements becomes clear.

This text box explains how the free allocation of NZUs will help to achieve these objectives.

Economic theory suggests that the free allocation of emission units (as opposed to auctioning) will typically not affect firms' decisions on levels of production. This is because even where NZUs are gifted to firms, they will have considerable value, and as a result, firms that receive NZUs for free would still be expected to take the cost of emissions into account, and to sell their NZUs and reduce output where that is the more profitable option.[48]

On the surface, this would appear to suggest that the free allocation of units may be no better than auctioning at achieving the government's objectives around avoiding economic regrets and large or concentrated job losses. The incentives would be the same under either approach.

However, the government considers that important elements in the design of its allocation proposals mean that its assistance package, while not perfect, will be effective at helping to prevent these outcomes. For example, the intention to stop any free allocation to firms that cease production altogether is particularly important. Firms will be discouraged from stopping production under the proposed package, because doing so would cause them to lose their eligibility to participate in future NZU free allocation rounds.

It should also be noted that disputes exist over how consistent the behaviour of firms is with economic theory on the impact of free allocation. Emerging evidence from the EU ETS suggests that the level of free allocation does have an effect on the levels on production decisions of firms.[49] However, the issues are complex and firms respond both to the impact on production costs (the cost of producing another unit of output which includes an emissions price) and profits (specifically the change in access to or cost of capital in the form of retained earnings or access to debt and equity, and this will differ between free allocation and allocation via sales). There may also be a timing and awareness issue involved in this particular case.

Lastly, the government's analysis of different options for providing assistance to firms concluded that they also involve difficulties.[50] The two major alternatives to free allocation – an "intensity-based" approach to obligations and targeted exemptions – require a move away from a finite quantitative target for emissions (see section 4.5.2 for more information on an intensity-based approach).

Indications are that New Zealand will be operating in a world that is more, rather than less, carbon-constrained in the future even though the exact manner in which international agreements will reflect that carbon constraint is not known. Given this, it is the government's intention to transition the New Zealand economy to a point where emissions are taken into account, alongside other factors such as labour costs, in production decisions. Allowing growth in emissions to occur that does not factor in the cost of emissions is inconsistent with this approach.

At a more practical level, any move away from an approach that provides an effective overall control over emissions would need to be tightly targeted in order to avoid undermining the effectiveness of the scheme as a whole. Robust, objective approaches

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[48] There is an opportunity cost associated with surrendering an allowance. If a plant had not produced the extra unit of output, it could have sold the allowance.

[49] The Carbon Trust argued that firms "having secured compliance without taking any action, they have had no need to think about opportunities for abatement". *Allocation and Competitiveness in the EU Emissions Trading Scheme, Options for Phase II and beyond*, Carbon Trust, June 2006.

[50] Options to address risks around regrets exist outside ETS design. The two most commonly discussed, often in a European context, are the possibility of border tax adjustments, or the possibility of sectoral agreement for particular industries. This paper does not discuss these other than to note the existence of these possible approaches.

for determining to whom to target this assistance are very difficult to develop. As a result, there is a risk that these alternative approaches could lead to boundary issues, with pressures to increase the numbers of firms or sectors receiving special treatment over time.[51]

Once firms are operating under an intensity-based approach – or if firms have an exemption from the ETS entirely – it is also likely to prove difficult to successfully transfer them back to the wider, absolute approach. Depending on the exact nature of the policy arrangement, firms would either have an incentive to grow their emissions in order to receive a higher level of free allocation when they entered the wider, absolute approach, or would face a substantial shift downwards in their level of obligation when they entered the wider, absolute approach.

5.3.8 Inter- and intra-sectoral equity considerations for providing assistance

Considerations of inter- and intra-sector equity have been prominent in the assessment of different models for providing assistance to different sectors of the economy. (Within sector assistance issues are discussed in further detail in the next chapter.)

In terms of inter-sector equity, government has agreed in principle that the same approach should be used to calculate the total level of assistance that is provided to eligible firms in the industrial sector and agriculture (ie, 90 per cent of 2005 emission levels) when they enter the ETS.

Assessing a comparable level of assistance to provide for deforestation is complicated because deforestation emissions are different in nature from agricultural or industrial emissions. The historical average deforestation rate for the 10 years prior to the announcement of the deforestation cap is estimated to have been between 1.9 per cent and 3.8 per cent of the harvested area.

An allocation for deforestation to landowners of 55 million units represents a deforestation rate of slightly over 5 per cent of all pre-1990 exotic forests. As such, an allocation of 55 million units is regarded as generous.

Discussions with European officials have suggested that intra-sector equity can be as important as inter-sector equity. This document has outlined a possible approach to be used to determine assistance at a firm level within the industrial sector that operates within the total envelope of assistance outlined above.[52]

Options for intra-sectoral allocation within the agricultural sector are in the early stages of development, as there are many issues to work through prior to determining the appropriate model for distributing any assistance provided to the agricultural sector.

There are various levels of argument within this space. For example, different agricultural sub-sectors (eg, dairy vis-à-vis sheep) have grown at different rates since 1990. A question that may well arise is around the extent to which differential growth rates in emissions should be reflected in the distribution of assistance within these sub-sectors. Further, it is important not to

[51] It may also require a revisiting of rules around firm entry – from an equity viewpoint.

[52] The government will be engaging with the Negotiated Greenhouse Agreement firms on allocation issues.

lose sight of interactions with other policy goals such as maintaining competitive markets for product supply.

None of these approaches is perfect and there are many different lenses with which to view inter- and intra-sectoral equity issues. It is simply not possible to develop an assistance policy that is viewed as totally "equitable" by all parties.

As an example, while it is proposed that eligible industrial producers be provided with assistance to mitigate electricity price increases (which is not the case in the EU ETS), the government does not propose to provide any assistance for increases in the cost of liquid fossil fuels. Although the price increases for liquid fossil fuels are likely to be less than half that of wholesale electricity on a percentage basis, there are some firms that are more exposed to increases in the price of liquid fossil fuels than others. Such firms may therefore argue that the current design of the assistance package is 'inequitable'.

5.4 Summary

Allocation of units within the NZ ETS will be an important area for stakeholder engagement. These discussions will need to find a balance between the competing objectives of efficiency, equity and administrative ease. It is a complex area of design and all approaches have weaknesses.

The allocation package set out in this section has the advantage of being relatively simple at the high level[53]. It has a strong focus on inter-sector equity and is generous (for firms that cannot pass through costs) at first, both for equity reasons and to reduce the chance of long-term regrets. While generous at first, it ensures that some contribution is made by all sectors reflecting the importance of equity between producers and consumers.

A key element of the allocation package is to put in place robust price signals to reduce emissions. For that reason, over time the government will ensure a (well-signalled) phase-out of free allocation in the interests of economic efficiency and administrative ease.

[53] Although more complex options for determining total allocation levels are available, it is not clear that the benefits of more sophisticated approaches outweigh the costs.

6 Design Features for Individual Sectors

This chapter focuses on the more detailed design features for each major sector to enter the NZ ETS, covering:

- **forestry**
- **liquid fossil fuels (primarily transport)**
- **stationary energy (direct emissions from coal, natural gas and geothermal energy)**
- **industrial process (non-energy) emissions**
- **industrial production (including both direct/indirect emissions from stationary energy and industrial process emissions)**
- **agriculture**
- **waste.**

As noted in the previous chapter, the government has taken some in-principle decisions on sectoral design issues, particularly for those sectors that will be earlier entrants into the NZ ETS, and has identified one or more preferred options as a starting point for discussion with stakeholders and Māori.

6.1 Forestry

6.1.1 Context

The forestry sector makes a major contribution to New Zealand's economy and environment. It is also critical to New Zealand's response to the challenge of climate change. New Zealand exports wood products to more than 30 countries. Total export earnings for the year to June 2006 were $3.2 billion, or 10.4 per cent of New Zealand's merchandise exports. The industry contributes about 3 per cent of New Zealand's GDP and directly employs around 22,500 people. It also has substantial potential for export growth: up to a third more wood than is available now will be ready for harvest over the next few years.

Forestry delivers many environmental benefits, and these can help us both build a more sustainable economy and adapt to climate change. Forests can reduce flood peaks during major storms, and can reduce rates of erosion by up to 90 per cent on hill country land under pasture. In terms of water quality, forests can reduce harmful micro-organisms, sediment, nutrient run-off and high temperatures. Basically, forests can be used to help land managers adapt to climate change.

Forests and forestry also have a major role to play in reducing greenhouse gas emissions. As trees grow, they absorb carbon dioxide (CO_2) from the atmosphere and store it as wood. This

process is recognised under the Kyoto Protocol, which allows new forests planted in or after 1990 (called "post-1989" forests in this document) to earn forest sink credits. Over the first commitment period of the Protocol, New Zealand is projected to generate around 79 million tonnes of forest sink credits[54] from these post-1989 forests. These credits can be used to offset greenhouse gas emissions.

In turn, when trees are removed from a forest through events such as harvesting or fire, the carbon they once stored is released back into the atmosphere.[55] Due to an uneven age-class distribution, these post-1989 forests are forecast to become net emitters of carbon from around 2020[56] to 2033, as growing numbers are harvested and then replanted or deforested.

Globally, about 20 per cent of CO_2 equivalent emissions into the atmosphere come from deforestation – the removal of trees from an area of land – and the introduction of a new land use, such as agriculture. In New Zealand, deforestation of exotic forests has increased rapidly in recent years, and this is expected to continue unless measures are introduced to actively manage the process. A deforestation intentions survey undertaken in 2006 indicated that New Zealand exotic forest owners currently intend to deforest about 50,000 hectares from 2008 to 2012. If this area is deforested, it is estimated that the deforestation emissions could total 41 million tonnes[57] of CO_2 over this time, contributing significantly to New Zealand's projected net position deficit during the first Kyoto commitment period. Over the longer term, the Ministry of Agriculture and Forestry estimates that up to 280,000 hectares of pre-1990 exotic forest is at risk of deforestation[58] if effective controls are not put in place. These estimates are subject to considerable uncertainty.

Deforestation of New Zealand's pre-1990 indigenous forest has been more limited in recent years. Over the past five years, it is estimated that around 1,100 hectares of this land, on average, has been deforested each year. However, over the longer term, much higher deforestation rates are possible if the economic drivers for clearance of indigenous forest change.

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[54] Note that under the Kyoto Protocol, eligible afforestation activities are awarded removal units (RMUs). RMUs are calculated as the difference between afforestation removals and deforestation emissions. Therefore, the number of RMUs actually received by New Zealand will be less than the gross amount of afforestation.

[55] In the case of harvesting, much of the stemwood involved will be processed and turned into wood products. However, the remainder of the forest biomass decays relatively rapidly, releasing carbon back into the atmosphere. Further, much of the carbon stored in wood products will ultimately be released back into the atmosphere at some stage.

[56] Wakelin SJ, Paul T, 2006, *Carbon Inventory of New Zealand's Planted Forests* (calculations revised as at February 2006), report prepared for the Ministry of Agriculture and Forestry.

[57] Deforestation emissions could be significantly greater than this amount if the forestry sector were to bring forward deforestation. This may well occur if there is no effective policy put in place immediately but there is the perception that a deforestation policy is likely to be introduced at a later date. This figure does not include deforestation of indigenous forest or shrub land that meets New Zealand's adopted Kyoto forest definition.

[58] This estimate excludes land in government ownership, subject to a Crown Forest Licence, or in the Lake Taupo catchment.

The concern over deforestation emissions should not obscure the importance of the forestry sector. Not only is it an important export industry for New Zealand, it also produces renewable "climate change-friendly" wood products that can displace more greenhouse gas and energy-intensive alternatives such as concrete, steel and aluminium, particularly in countries that use fossil fuels to generate electricity.

6.1.2 Treatment of indigenous forests

New Zealand has large areas of pre-1990 indigenous forest – over 7.5 million hectares. The bulk of that land – well in excess 5 million hectares – is owned by the Crown, and mostly held in the conservation estate. However, officials' best estimate is that a further 2.4 million hectares are held in private hands – twice as much forest land as the 1.2 million hectare exotic forest estate.

Deforestation of these areas has been limited over the past five years – estimated to be 1,100 hectares, or 0.04 per cent of the overall estate, in total each year. These relatively low levels of deforestation are expected to continue in the near term; however, if it were to be excluded from the ETS, and no other additional controls were put in place that rate of deforestation may increase. Officials estimate that around 3.1 Mt CO_2 emissions from deforestation of indigenous forest might occur over the period 2008–2012. At an emissions price of $15 per tonne of CO_2, this would lead to a cost on the Crown of $46.5 million.

Over the longer term, much higher deforestation rates are possible if the economic drivers for clearance of indigenous forest change. For that reason, the government has expressed an interest in engaging with stakeholders and Māori on whether to include indigenous forest, both Crown-owned and privately-owned, in the ETS.

6.1.3 Sectoral design features

This paper summarises the key ETS design features for the forestry sector. Further detail is provided in the companion document *Forestry in a New Zealand Emissions Trading Scheme.*[59]

Table 6.1: Summary of design features for the forestry sector

Design feature	In-principle decision
Source of emissions/ removals	Pre-1990 forest (land that was forested on 31 December 1989 and remains forested on 1 January 2008). Post-1989 forest that has voluntarily been entered into the ETS.
Greenhouse gas	CO_2
Scope of activities	Deforestation: emissions from the conversion of pre-1990 forest land to a non-forestry use (this does not include forest harvesting, provided the harvested land is replanted or allowed to regenerate). Net carbon stock changes: emissions or removals arising from net changes in the carbon stocks of in-scheme post-1989 forest land. Exemptions: those with total holdings of less than 50 hectares of pre-1990 forest land. Provisions around the deforestation of less than 2 hectares in a commitment period and deforestation for weed control purposes will also be included.

[59] This is available on the website: www.climatechange.govt.nz.

Commencement of unit obligation, monitoring and reporting	1 January 2008
End of initial compliance period	31 December 2009
Participants with unit obligations	Landowner in most instances
Free allocation	Free allocation to landowners of pre-1990 forest
Level of free allocation	From 2008 to 2012 free allocation such that the Crown assumes a total liability (taking the cost of the provision of the *de minimus* threshold into account) for deforestation emissions as follows: • 21 Mt CO_2 from exotic forest • 0.8 Mt CO_2 from weed control. From 2013, additional free allocation of 34 Mt CO_2 for exotic forest.

6.1.3.1 Scope of activities

Under the Kyoto Protocol, parties' obligations are specified with reference to 1990 emission levels. For example, New Zealand's obligation is to reduce its overall emissions to 1990 levels or meet the cost of any excess. For forestry, this reference to 1990 emission levels leads to differences in the treatment of forests established before and after 1 January 1990. The government has chosen to reflect these international rules in its design of the NZ ETS.

Pre-1990 forests: deforestation

The government has decided in principle that owners of pre-1990 forest land will only face obligations under the ETS if they "deforest" – remove the trees and introduce a new land use. Those owners will not face any emission obligations if they temporarily remove the tree cover, such as when the trees are harvested and then replanted, so long as the forest is ultimately re-established.

All deforestation of pre-1990 exotic forest will be covered by the ETS unless exempted under the scheme rules. An in-principle decision has been taken to provide a *de minimus* threshold for owners with total pre-1990 forest holdings of less than 50 hectares. All owners will also be granted a 2-hectare deforestation allowance in the first commitment period and each subsequent phase of the ETS.

Provision will be made for deforestation entailed in forest weed (eg, wilding pines) control programmes (over and above the 21 Mt CO_2), and consideration will be given to whether further provision is necessary to allow for papakainga (housing) on Māori forest land subject to the Te Ture Whenua Act 1993. Further to this, consideration will be given to whether to include indigenous forests in the ETS or not.

The detail of the approach that the government has decided in principle to take on key operational issues – such as determining when deforestation has occurred, how emissions will be calculated, and scheme exemptions – is covered in the companion document *Forestry in a New Zealand Emissions Trading Scheme*.

Post-1989 forests: net carbon stock changes

The government has decided in principle to give owners of all post-1989 forest land the choice to enter the ETS and receive all of the sink credits and future liabilities associated with this land. Owners who enter the scheme will be obliged to take responsibility for the ongoing net changes in the carbon stocks of their forests. They will receive NZUs if those stocks increase as a result

of tree growth, and will be required to surrender NZUs if those stocks decrease as a result of activities or events such as harvesting or fire. The government will retain responsibility for changes in the carbon stocks of post-1989 forests that have not entered the ETS, keeping any credits earned and remaining responsible for any future liabilities.

The government's in-principle decision to allow forests planted between 1990 and 2006 to enter the ETS represents a change from previous announcements that the government was likely to retain all relevant forest sink credits and future liabilities. The government's previous position was developed in the context of it retaining responsibility for a significant level of emissions elsewhere in the economy. There is a stronger rationale for devolving credits and liabilities to the forestry sector in the context of the government devolving liabilities more widely through an ETS. Allowing these forests to enter the ETS will also provide better incentives for their owners to maximise carbon sequestration, such as by extending rotation lengths.

6.1.3.2 Date of entry into the NZ ETS

There will be significant benefits to both the Crown and the New Zealand economy if effective deforestation controls are in place from early 2008. Given this, and the level of consultation that has already occurred with the forestry sector, the government has decided in principle to introduce forestry into the ETS from 1 January 2008 (both pre-1990 and post-1989 forests).

Forest owners have a degree of flexibility over when they cut down their trees so can bring forward deforestation if there are incentives to do so. Officials estimate that for every 12 months that deforestation remains outside the ETS after 1 January 2008, increased emissions of 12 to 24 Mt CO_2-e are possible, resulting in increased costs to the Crown of $180 to $360 million, assuming an emissions price of $15/t CO_2-e.[60] At the same time, the reduction of deforestation is likely to be one of the lower-cost abatement options in the domestic economy in the first commitment period. Analysis suggests that deforestation levels would reduce substantially if the sector were to face the full cost of the emissions involved. Strong economic signals from the start of 2008 are important to ensure that these costs do not materialise – for either the New Zealand economy or the Crown.

An intention to introduce deforestation controls has been clearly signalled to the forestry industry since October 2002, and was spelled out specifically in the consultation document *Sustainable Land Management and Climate Change* (MAF), which was released in December 2006. Further, a subsequent and detailed discussion document on specific design options for an emissions trading regime for deforestation was released in February 2007 as part of a comprehensive consultation process. Finally, the forestry sector has clearly expected such measures to take effect from 1 January 2008, as evidenced by many stakeholders having moved to bring forward their deforestation activities in advance of this date.

Although it is intended to bring the forestry sector into the ETS from 1 January 2008, certain provisions of the legislation covering forestry will not be passed by that date. Participants in the forestry sector will be required to monitor their activities and report their emissions from 1 January 2008, although they would not have to surrender emission units until the end of 2009.

The government will develop and publish practical guidelines on what constitutes a forest, and deforestation, so that the forestry sector is aware of its obligations from 1 January 2008. It will

[60] At an emissions price of $25/t CO_2-e, the increased costs to the Crown could range from $300 million to $600 million.

also publish guidelines on appropriate accounting and tax treatment for firms that have balance dates in 2008 prior to finalisation of the legislation.

6.1.3.3 Participants with unit obligations

In most instances, the unit obligations will be placed on the owners of the land under forest. However, where the landowner does not own the forest, due to the existence of some form of agreement such as a forestry right or lease, the legislation will allow for the unit obligation to be transferred to the forest owner in some instances. Details on when and how the unit obligation can be transferred in this way are discussed in the companion document *Forestry in a New Zealand Emissions Trading Scheme*.

6.1.3.4 Allocation

A one-off allocation of NZUs will be provided to the owners of pre-1990 exotic forest land to offset some of the economic impact of deforestation liabilities they will face under the ETS. As emphasised by the forestry sector during recent consultation, requiring owners to take account of the climate change effects of deforestation will reduce their opportunities to profitably introduce new land uses. Even where forestry is currently the most profitable land use, the scheme is likely to have some impact on land value. For some – particularly larger – landowners, deforestation liabilities will be balanced by the opportunity to gain credits from post-1989 forest. Most, however, will face some economic loss, particularly those who lose the ability to profitably convert from forestry to another land use.

Pre-1990 exotic forests

The government has decided in principle to meet the cost of 21 million tonnes of deforestation emissions from exotic forest from 2008 to 2012, consistent with previous commitments. It will provide this assistance through the free allocation of units to the owners of pre-1990 exotic forest land, and through the introduction of a *de minimus* threshold (as discussed above).

With regard to subsequent commitment periods, the government has decided in principle to limit the total future level of free allocation to a pre-agreed level. This reflects the fact that there is a finite number of hectares of land under exotic pre-1990 forest (approximately 1.2 million hectares). The government's in-principle decision is to provide an overall level of free allocation after 2012 of an additional 34 million tonnes. This would take the total level of assistance for the sector to the equivalent of 55 million tonnes of emissions, equivalent to slightly over 5 per cent of the total pre-1990 forest estate. This is higher than the historical average deforestation rate.

Pre-1990 indigenous forests

The government wishes to explore the possibility of including deforestation emissions from indigenous forest in the ETS. Although this topic was included as a possibility in the discussion document *Sustainable Land Management and Climate Change* (2006), there was very little feedback on this point.

It is likely that, if indigenous forests were to be included in the ETS, there would be provision of a free allocation of units and the introduction of the relevant exemptions, including the *de minimus* threshold. Further information on this possibility is included in the companion document *Forestry in a New Zealand Emissions Trading Scheme*. The issues covered in that paper include how the government could allocate NZUs between owners of forest land and when it intends to allocate units.

6.1.4 Complementary measures

Two existing initiatives already create financial incentives to increase afforestation and avoid deforestation:

- the Permanent Forest Sink Initiative
- the East Coast Forestry Project.

As part of its plan of action on sustainable land management and climate change, the government is also considering introducing an Afforestation Grant Scheme to provide an alternative financial afforestation incentive for parties that choose not to join the ETS.

6.1.4.1 Permanent Forest Sink Initiative (PFSI)

The government has agreed in principle to operate the PFSI alongside the ETS as a complementary measure. The PFSI scheme targets owners of land that will be kept under forest cover indefinitely, rather than clear felled at the end of each rotation. It also devolves Kyoto units (assigned amount units) as opposed to NZUs. As such, the PFSI acts as a useful complement to the ETS. Any owners who have entered the PFSI will be able to move to the ETS, if they choose, within 18 months of the ETS legislation being passed. Further discussion of possible refinements to the PFSI is provided in the companion document *Forestry in a New Zealand Emissions Trading Scheme*.

6.1.4.2 East Coast Forestry Project

Under the existing East Coast Forestry Project, landholders in the region are provided with a cash grant for soil conservation. Participants in the scheme are also eligible to participate in the PFSI. Discussion of the relationship between the East Coast Forestry Project and the ETS is provided in the companion document *Forestry in a New Zealand Emissions Trading Scheme*. That discussion addresses the question of whether an East Coast Forestry Project grantee should also be allowed to participate in the less restrictive ETS, and, if so, whether the East Coast Forestry Project grant should be reduced to recognise the financial value of the ETS.

6.1.4.3 Plan of action on sustainable land management and climate change

The government is working in partnership with the agriculture and forestry sectors, Māori and local government to develop a plan of action on sustainable land management and climate change. This is critical to secure the changes to land-use practices needed for New Zealand to successfully adapt to changes in climate, reduce agricultural greenhouse gas emissions and secure new forest planting. This plan of action will include three "pillars":

- adapting to a changing climate
- reducing emissions and enhancing sinks
- capitalising on business opportunities.

These three pillars will be supported by research and innovation, technology transfer and communication. Further information on the plan of action is provided in section 6.6.3.

As part of the plan of action, the government is considering introducing a new Afforestation Grant Scheme (AGS) to provide an alternative financial afforestation incentive for parties that choose not to join the ETS. AGS grants would only be available for new forests planted from 2008 that were not included in the ETS. Discussion of the objectives and design of the possible AGS is provided in the companion document *Forestry in the New Zealand Emissions Trading Scheme*.

6.2 Liquid fossil fuels (primarily transport)

6.2.1 Context

New Zealanders have a strong culture of mobility. We travel frequently, have a high level of vehicle ownership by comparison with other countries, and our fuel costs have historically been relatively low. Our geographic isolation has made us reliant on ships and planes to connect us to the rest of the world, and our use of energy for freight transport has increased as the economy has grown.

Emissions from transport increased 61.9 per cent from 1990 to 2005. If we make no changes to the way we travel and transport freight, transport energy use is expected to grow by about 35 per cent by 2030, with three-quarters of that growth coming from road transport. Greenhouse gas emissions from transport would increase at a similar rate. The risks of climate change make it unacceptable for us to continue on this path. Likewise, change is desirable to reduce the vulnerability of our transport system to disruptions in oil supply and price uncertainty, as well as addressing the local environmental impacts currently associated with fossil-fuel-based transport.

Our key challenge is to reduce the greenhouse gas emissions from transport fuels while continuing to improve our quality of life and to benefit from a strong, competitive economy. A focus on reducing greenhouse gas emissions from the transport sector will also help to reduce New Zealand's dependence on oil.

6.2.2 Sectoral design features

Table 6.2: Summary of design features for the liquid fossil fuels sector

Design feature	In-principle decision
Source of emissions	Liquid fossil fuels (primarily used for transport).
Greenhouse gas	CO_2
Scope of activities	Removal from a refinery or importation of refined oil products. This is typically the point where liability to pay excise or excise equivalent duty arises. Exemption: any fuel exported or intended for use on international trips.
Commencement of unit obligation, monitoring and reporting	1 January 2009
End of initial compliance period	31 December 2009
Participants with unit obligations	Preferred: oil companies that import liquid fossil fuels or remove them from a refinery. Alternative: as above, with an option for large consumers of jet fuel to be a point of obligation on a voluntary or mandatory basis.
Free allocation	Zero free allocation to participants with unit obligations.

6.2.2.1 Scope of activities

Liquid fuels used in New Zealand include petrol (regular and premium), diesel, aviation gasoline ("avgas"), jet kerosene ("jet fuel"), light fuel oil, heavy fuel oil and lubricating oils. Only domestic fuel use would be covered. Emissions from fuel used for international aviation and marine transport will be exempted from the scheme, consistent with the Kyoto Protocol. The mechanism that will be used by participants in the scheme to recognise fuel that is exempt will be fuel that has a zero rate for goods and services tax (GST). Goods can be zero rated for GST purposes if they are "exported". Fuel sold for use on an international trip is considered to be exported for GST purposes.

Lubricating oils will be excluded from the scheme because of the administrative complexity associated with their inclusion and the small amount of emissions concerned. The burning of used oil on a large scale is covered by the scheme under stationary energy. Liquified petroleum gas (LPG), including that used for transport, is covered under the stationary energy sector (because the majority of natural gas is used for stationary energy).

6.2.2.2 Date of entry into the NZ ETS

The government's strong preference is to introduce liquid fossil fuels into a NZ ETS on 1 January 2009. This reflects the fact that it is relatively easy to introduce liquid fossil fuels into an ETS (there are five firms concerned, and they track the volume of fuel they purchase for, among other reasons, the purposes of the excise duty regime).

6.2.2.3 Participants with unit obligations

The most suitable point of obligation for emissions from the use of liquid fossil fuels (primarily used for transport)[61] is upstream on fuel suppliers when they purchase fuel rather than on emitters (ie, vehicle users). An upstream point of obligation would allow for greater coverage of oil sector emissions, would require reporting by a small number of points of obligation (minimising administration and compliance costs), and would provide similar end-user price incentives.

In practice, the obligation would be placed on refined oil products at the time of removal from a refinery or importation, when a liability to pay excise or excise-equivalent duty arises if applicable. If this is not applicable, then the obligation would be placed at the same point in the supply chain as where a liability to pay excise duty would arise. This regime would currently involve five oil companies in New Zealand: BP, Caltex, Gull, Mobil and Shell.

However, the government is interested in engaging with the sector regarding an option to allow large consumers of jet fuel to serve as the direct point of obligation for emissions from liquid fossil fuels, either on a voluntary or mandatory basis. In order to avoid double-counting of emissions obligations, this would require a carve-out mechanism to apply at the level of the obligation placed on fuel suppliers.

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[61] Liquid fossil fuels can also have stationary energy applications. If a midstream option is selected for other stationary energy emissions (ie, coal and gas), then we should consider any implications for the treatment of liquid fossil fuels.

6.2.2.4 Allocation

The costs associated with the purchase of emission units are likely to be passed through the supply chain to consumers of liquid fossil fuels, regardless of any free allocation of emission units. Thus, a free allocation would only amount to a windfall gain to the fuel companies and would not change behaviour. The government has therefore decided not to allocate any units to fuel companies for free.

6.2.3 Complementary measures

6.2.3.1 Biofuels sales obligation

The government has developed a Biofuel Bill to introduce the biofuels sales obligation, which was announced by the government in February 2007. The obligation will require oil companies to sell an amount of biofuel (measured in terms of energy) representing a proportion of their sales of petrol and diesel from 1 April 2008. The level of the obligation begins at 0.53 per cent in 2008, increasing to 3.4 per cent by 2012. The obligation will be administered by the Ministry of Economic Development.

6.2.3.2 Govt^3 – vehicle procurement

The government has reviewed the vehicle fleets of 21 government organisations and will be encouraging changes to more efficient and low-carbon vehicles through procurement policies.

6.2.3.3 Fleet operator commitment and driver training programmes

The government is developing a fleet operator commitment and driver training programme (heavy and light commercial fleets) that will include providing information and training to drivers of heavy vehicles. Driver behaviour can help improve the fuel economy of the existing vehicle fleet. Differences in driver behaviour alone can vary fuel use by up to 35 per cent, and it has been estimated that a targeted driver training programme for heavy vehicle drivers could give energy savings of at least 10 per cent, or 6.1 petajoules per annum.

6.2.3.4 Fuel economy information label

This programme will introduce a regulation requiring a fuel economy information label to be displayed on new and used cars at the point of sale from a registered motor trader by 1 December 2007. Consumers will benefit from the programme because it enables them to compare the fuel consumption of cars, which affects both running costs and greenhouse gas emissions. More information is delivered via a website, the labelling scheme and a promotional campaign. This programme will help consumers to make better choices about the cars they drive. There are also substantial future benefits of labelling. For example, the programme allows comparisons within and between different vehicle classes, which means the government could develop future policies using this information (eg, rewarding the best performers in the fleet).

6.2.3.5 Sales-weighted standard for fuel economy

The government has noted that establishing a vehicle fleet sales-weighted standard for fuel economy would spread the incentive to improve fuel consumption across all vehicles entering the fleet, as well as providing flexibility to the industry and choices to consumers. The Ministry of Transport is working with industry on options for such a standard, and will report back to the government later this year.

6.2.3.6 Public transport

In the 2007 Budget the government committed $900 million of additional government investment in public transport in the period 2006 to 2010, in particular on rail infrastructure improvements in Auckland and Wellington, as well as national rail improvements.

6.2.3.7 Urban rail development

In the 2007 Budget the government committed $600 million over six years to contribute to urban rail development projects in Auckland and Wellington.

6.2.3.8 Public education

In May 2006 the Ministry of Transport launched the Fuel$aver website (http://www.fuelsaver.govt.nz/), which provides consumers with information to compare the fuel consumption of new or used Japanese vehicle models, and to calculate vehicle fuel costs.

In March 2007 the Ministry of Transport launched the second phase of the Choke the Smoke campaign. This campaign encourages people to go on the "low carbon diet"; for example, by using public transport, carpooling, walking or cycling, tuning their cars, keeping tyres inflated correctly, and using their accelerator more sparingly.

6.2.3.9 Travel planning

The Ministry of Transport is also working with a number of non-transport government agencies to reduce transport emissions. Initiatives such as the walking school buses and the Auckland school travel plan programme (managed by the Auckland Regional Transport Authority) have been successful in getting cost-effective changes in behaviour, with safety, health and climate change benefits.

6.3 Stationary energy (coal, natural gas and geothermal energy)

6.3.1 Context

Stationary energy includes all fuels used for electricity generation and in the direct production of power and heat in the industrial, commercial and residential sectors. It does not include emissions from the liquid fossil fuels that are primarily used for transport, or industrial process emissions, which are covered in separate sections.

New Zealand's stationary energy emissions come mainly from the provision of energy sourced from non-renewable fuels (mainly coal and gas) and, to a lesser extent, from geothermal fields. Energy policy is the primary focus for climate change policies abroad. However, New Zealand is in an unusual situation because approximately 69 per cent of our electricity is generated from renewable sources (mainly hydro), which is the third highest level of renewable generation capacity in the developed world.

Notwithstanding our high use of renewable electricity sources, New Zealand needs to take action on emissions from electricity generation. Between 1990 and 2006, greenhouse gas

emissions from electricity generation increased by approximately 138 per cent,[62] while emissions from energy use by manufacturing industries increased by approximately 10 per cent. Without further action, the government projects that greenhouse gas emissions from stationary energy (including fugitive emissions)[63] will increase by approximately 7 per cent between 2005 and 2015.

6.3.2 Sectoral design features

Table 6.3: Summary of design features for the stationary energy sector

Design feature	In-principle decision
Source of emissions	Coal, natural gas and geothermal energy
Greenhouse gas	CO_2, CH_4
Scope of activities	"Importation" of an emission source or "sale" of an emission source by specified persons. Exemptions: • emission sources when exported • coal-seam methane vented or flared (but not sold) • (potential) emissions subject to carbon capture and storage • sales to downstream firms with obligations • sales for non-fuel uses where the product is exported (eg, methanol feedstock) and it is considered preferential to provide an exemption at the time of export of the final product • sales for non-fuel uses (eg, urea feedstock) where the emissions from the final product are not yet (or will not be) covered by the ETS (eg, emissions arising from the use of urea).
Commencement of obligation	1 January 2010
End of initial compliance period	31 December 2010
Participants	There is a range of options for discussion; for example: *Upstream points of obligation:* • coal importer; coal miner (coal-mining licence and coal-mining permit holder) • gas importer; gas producer (petroleum permit or licence holder); gas processor • geothermal electricity generator or direct user for industrial heat • industrial producer that obtains used oil for the purpose of combustion. *Upstream and midstream points of obligation:* • a combination of upstream and midstream points of obligation, such coal wholesalers and gas distributors, and/or major users of coal and gas.

[62] Ministry of Economic Development 2007, *New Zealand's Energy Greenhouse Gas Emissions 1990–2006*, Ministry of Economic Development: Wellington. http://www.med.govt.nz/energy/ghg/2007/. While the percentage increase in emissions from electricity generation since 1990 is large, it should be noted that our small absolute level of emissions from this sector tends to magnify percentage changes.

[63] Fugitive emissions are those that do not come from the combustion of fuels to produce useful energy including heat. They arise from the production, processing, transmission, storage and use of fuels, and from non-productive combustion.

Free allocation	Zero free allocation to fuel producers/importers and electricity generators. Some assistance to eligible industrial producers (excluding electricity generators) for direct and indirect emissions from stationary energy after entry into the NZ ETS and declining to zero by 2025; addressed separately under 'Industrial production' (section 6.5).
Progressive obligation	Option to consider the use of progressive obligations; refer to section 6.5 on 'Industrial production'.

6.3.2.1 Scope of activities

The government has decided in principle that the NZ ETS will apply to activities that result in emissions of CO_2 and CH_4 (methane) from the combustion of hydrocarbons in New Zealand, such as natural gas and coal, and the use of geothermal fluid and steam.[64] There will be exemptions from the NZ ETS for activities that are too small to have a measurable effect on total emissions. The government will engage with stakeholders and Māori on what the appropriate minimum threshold for inclusion should be. In the stationary energy sector an exemption would apply to any exported emission sources such as exported coal, compressed natural gas (CNG) or liquified petroleum gas (LPG). An exemption would also apply to coal and gas sold for non-fuel uses if the resultant products are outside the scheme or are exported (eg, gas sold for methanol and urea feedstock).

The NZ ETS will apply to the venting and flaring of natural gas, and a permit is already required for these activities. Any CO_2 that is "stripped" from gas streams during treatment will also be included in the NZ ETS. It is likely that this emission source will be covered through the use of an emission factor for the natural gas when it is first sold by the petroleum permit holder rather than through an obligation on the activity of stripping CO_2.

The NZ ETS will also apply to used oil that is obtained for combustion for energy. The viability of any used oil recovery programme will be a matter for discussion with stakeholders, and may influence the start date for the inclusion of this activity in the scheme.

Fugitive emissions of coal-seam methane will be excluded from a NZ ETS, because coal permit and licence holders do not own coal-seam methane and fugitive emissions are difficult to measure or estimate. However, if coal-seam methane is extracted and sold for use as a source of energy, it is necessary to have a petroleum permit and the methane would be treated the same as any other natural gas activity under the NZ ETS.

An obligation would be placed on the extraction of geothermal fluid for electricity generation or industrial process heat, and not on retail operations such as motels and public baths.

In the future, it may be necessary to adapt the NZ ETS legislation to exempt any emissions that are subject to proven and effective carbon capture and storage technology.

6.3.2.2 Date of entry into the NZ ETS

Emissions from coal, natural gas and geothermal fluid will be included in the NZ ETS from 1 January 2010. This entry date reflects the fact that in the stationary energy sector, compared with liquid fossil fuels (used primarily for transport), the NZ ETS will apply to a larger number

[64] CO_2 and CH_4 are contained in geothermal fluid, which is released when the fluid is used and/or converted into steam. These emissions are covered by the scheme because they are in excess of what would occur naturally and are therefore anthropogenic. This is consistent with the Kyoto Protocol.

of participating firms with more varied characteristics and outputs. For example, the range of options regarding the point of obligation will need time for careful consideration.

The reporting obligations imposed by the NZ ETS will draw on existing business functions and information collection as much as possible. Therefore, the entry date for stationary energy should not need to be extended further. It should also be possible for firms to undertake monitoring and reporting of emissions prior to facing mandatory unit obligations.

The government will engage with stakeholders and Māori on the operational detail of how the NZ ETS will apply to the stationary energy sector, such as the emissions monitoring methods employed and the determination of appropriate emissions factors.

6.3.2.3 Participants with unit obligations

The government wishes to apply the NZ ETS in a way that minimises compliance and administration costs, and captures the most emissions activities and sources. The government therefore wishes to engage with stakeholders and Māori on options for how to apply obligations to firms in the stationary energy sector.

In this sector we believe that costs are minimised and coverage is maximised through an upstream obligation at the first point in the supply chain. An upstream point of obligation for coal and natural gas would apply directly to the firms that import or extract the coal, gas or geothermal resource. In the case of domestic coal and gas producers, the point of obligation would be the permit or licence holder for Crown-owned minerals. The inclusion or exclusion of private coal miners is a matter for discussion. We anticipate that large geothermal field operators (rather than owners) would be the most suitable point of obligation for emissions from the extraction of geothermal fluid.

There is a range of other options for the point of obligation in the stationary energy sector. For example, the point of obligation could also apply to the firms that actually produce energy and emissions from thermal fuel. A midstream obligation could still capture a large proportion of domestic gas and coal consumption, reflect the composition of delivered gas or coal, require monitoring of a small number of firms, and provide consumers with an appropriate price signal.

To implement a combination of upstream and midstream obligations, it would be necessary to carve out upstream sales to downstream firms that face their own NZ ETS obligations. In either case, an upstream obligation would still be required on natural gas producers in order to capture fugitive emissions (ie, the venting and flaring of natural gas and the stripping of CO_2).

Officials are actively considering the potential treatment of carbon capture and storage activities within a NZ ETS, and would welcome any suggestions relevant to this policy.

6.3.2.4 Allocation

Incorporating the costs of greenhouse gas emissions into the stationary energy sector is expected to increase the price of gas, coal and geothermal energy (see chapter 7). Fuel suppliers and electricity generators are likely to pass any increased costs on to consumers through higher prices, regardless of whether they receive a free allocation of units. As a result, the government does not propose to freely allocate any units to fuel suppliers or electricity generators. Instead, stationary energy participants with unit obligations will be expected to purchase units from the market or through any government sale of NZUs.

Electricity prices are expected to rise to reflect the increased cost of thermal generation, but a significant proportion of New Zealand's electricity is generated from renewable resources, which will not face an emissions cost. Because of this, it is expected that generators, and in particular those with large renewable portfolios, will make a windfall gain with the introduction of emissions trading. This is because they will benefit directly from the higher expected wholesale price, but will not face an offset cost from higher fuel charges. The analysis suggests some thermal generators will also benefit, as the expected rise in wholesale price will more than compensate for the additional emissions costs that they face. The level of profit increase that the generators experience will depend on a large number of variables that are difficult to predict (eg, the weather). A significant fraction of any increased profit would be returned to government through dividends from state-owned electricity generators and increased tax revenue.

In recognition of increasing stationary energy costs, the government proposes to provide some assistance to the industrial sector, whose members are significant users of electricity, coal and gas but who are restricted in their ability to pass on any cost increases to their customers. This is addressed below under section 6.5 on 'Industrial production'.

The government is also looking at options to assist residential consumers through the transition to a low-emissions energy system. This is discussed below.

6.3.3 Complementary measures

6.3.3.1 New Zealand Energy Strategy

The final New Zealand Energy Strategy (NZES) will set out the government's strategic response to energy and related climate change issues. It is strongly motivated by the need to have secure and reliable energy supplies and more efficient energy use to support economic development, reduce greenhouse gas emissions, and generally transition to a low-carbon and sustainable energy system. Earlier this year the government consulted with stakeholders on the best way to achieve these objectives. The current policy direction is to:

- introduce an economy-wide emissions trading scheme and devolve the cost of greenhouse gas emissions to those who produce them
- maximise the efficient use and conservation of energy
- maximise the contribution of New Zealand's abundant and cost-effective renewable energy resources
- promote the early uptake of sustainable energy technologies.

A price on emissions is expected to provide an incentive for energy producers and consumers to respond by reducing demand, investing in improved energy efficiency technologies, and switching to less carbon-intensive energy sources. The NZES will include additional measures to emissions pricing that may fall into two groups.

1. Additional regulatory measures to achieve specific outcomes beyond those delivered by emissions pricing. These measures might be considered to achieve a specific objective earlier than would occur under emissions pricing (eg, a fund to assist with the deployment of marine energy and other renewable and low-carbon technologies and practices).
2. Strategic policy mandate and support for complementary measures to accelerate the uptake of energy efficiency and conservation programmes that bring forward emission reductions. These emission reductions are unlikely to be fully realised as the result of emissions pricing alone because of market failure or barriers to investment and behaviour change, such as:

- a lack of information about the options available and the benefits of investment
- capital/income constraints
- misalignment of incentives where the investor does not realise the benefits (eg, in rental properties)
- the impact on consumer prices not being sufficient to trigger a significant change in consumer behaviour and choice.

The Marine Energy Fund has also been established under the NZES. This is a contestable $8 million fund over four years to support the early deployment of marine-based electricity generation, such as wave or tidal.

6.3.3.2 New Zealand Energy Efficiency and Conservation Strategy

The New Zealand Energy Efficiency and Conservation Strategy (NZEECS) will give effect to many of the objectives laid out in the NZES. It details programmes in five sectors – homes, business (including rural business and tourism), transport, the energy system, and government – to promote the accelerated uptake of energy efficiency, energy conservation and renewable energy measures.

Many of the NZEECS programmes are specifically designed to overcome the barriers outlined above. These programmes include:

- **homes** – programmes to raise awareness of what action families can take to increase the uptake of energy efficiency and conservation measures and renewable energy, what benefits can be gained from these activities, and how to access grants and incentives to overcome financial barriers. Standards are being raised for products, to prevent inefficient appliances from entering the market, and for buildings.
- **business** – programmes to help businesses reduce their exposure to rising energy and emissions costs and become more competitive. These include awareness-raising, audit, grant and technology assistance programmes. Such programmes will be further extended into the rural and tourism sectors.
- **transport** – programmes to reduce demand for travel, build capacity across transport modes, and encourage increases in the efficient use of transport. Action will also be taken to accelerate improvements in vehicle fuel efficiency and the uptake of renewable fuels, including renewable electricity.
- **a renewable and efficient electricity system** – action to improve the efficiency with which the electricity system is planned, built and operated. This will include work to improve the regulation of the system to encourage efficiency improvements and facilitate the accelerated uptake of renewable electricity generation, including distributed generation systems.
- **government** – programmes for local government to improve urban form and manage demand for travel to reduce travel-related emissions within communities. Central government will also lead the way by improving its own uptake of energy efficiency and conservation measures, increasing renewable energy and reducing waste and travel. Many central government programmes in this area will contribute towards achieving the target for the core public service to have plans in place for carbon neutrality from 2012.

To a large extent the rate of uptake of energy efficiency, energy conservation and renewable energy measures will reflect the public's acceptance of the need to transform society to achieve increased sustainability and address climate change. The NZ ETS will create further incentives to change behaviour and invest in energy efficiency and renewable technologies.

6.3.3.3 Measures to address electricity price increases

The government is looking at mitigation options to assist residential electricity consumers during the transition to a low-emissions energy system. Further information will be provided as policy decisions are made.

6.4 Industrial process (non-energy) emissions

6.4.1 Context

The emissions included in the industrial processes sector are from the chemical transformation of materials from one substance to another. Although fuel is also often combusted in the manufacturing process, emissions arising from combustion are included in the energy sector. CO_2 emissions relating to energy production (eg, refining crude oil and the production of synthetic petrol from natural gas) are also considered within the energy sector.

New Zealand has a relatively small number of plants emitting non-energy related greenhouse gases from industrial processes. However, there are six industrial processes in New Zealand that emit significant quantities of CO_2:

- reduction of ironsand or recycled steel in steel production
- oxidation of anodes in aluminium production
- calcination of limestone for use in cement production
- melting of soda ash in glass production
- calcination of limestone for lime.

Non-CO_2 emissions from the industrial processes sector include perfluorocarbons (PFCs) from aluminium smelting, hydrofluorocarbons (HFCs) used as substitutes for ozone-depleting substances, PFCs from refrigerants, and sulphur hexafluoride (SF_6) from electrical switchgear. Emissions from New Zealand's industrial processes sector represented 5.6 per cent of total greenhouse gas emissions in 2005. Those emissions increased 31.8 per cent from 1990 to 2005.

6.4.2 Sectoral design features

Table 6.4: Summary of design features for the industrial processes (non-energy) sector

Design feature	In-principle decision
Source of emissions	Industrial processes, including: • material transformation for production of steel, aluminium, cement, burnt lime, glass, gold and paper (note that production of urea, hydrogen, ammonia and methanol is covered in the stationary energy sector) • lime fertiliser production • loss of inert synthetic gases.
Greenhouse gas	Material transformation: CO_2, PFCs (aluminium only) Lime fertiliser: CO_2 Loss of inert synthetic gases: HFCs, PFCs, SF_6

Scope of activities	Material transformation: use of emission source for material transformation in an industrial process, net of carbon embedded in final products. Exemption: all carbon embedded in final products. Lime fertiliser: sale of limestone products sold as fertiliser. Loss of inert synthetic gases: importation of SF_6 and synthetic fluorocarbons (when liable for excise duty). Exemption: importation of HFCs and PFCs in manufactured equipment.
Commencement of unit obligation, monitoring and reporting	1 January 2010 (with deferral of SF_6 until 1 January 2013)
End of initial compliance period	31 December 2010 (with deferral of SF_6 until 31 December 2013)
Participants with unit obligations	Material transformation: producers of steel, aluminium, cement, burnt lime, glass, gold and paper. Lime fertiliser: producer. Loss of inert synthetic gases: electricity and refrigeration industry entities that import relevant synthetic gases.
Free allocation	Some free allocation to eligible participants after entry of the sector into the ETS and declining to zero in 2025; addressed separately under section 6.5 ('Industrial production').
Progressive obligation	Option to consider the use of progressive obligations.

6.4.2.1 Scope of activities

Material transformation

Emissions from industrial processes primarily include CO_2 from metal production (such as steel aluminium and gold), mineral products (such as cement and burnt lime), chemical production (ammonia and urea), wood processing (such as for pulp, paper and wood product manufacture) and PFCs from aluminium production. There are relatively few sites with these emissions. Emissions from the production of hydrogen, ammonia, methanol and urea are included in the stationary energy sector.

Lime fertiliser

This category includes the sale of lime fertilisers[65] that are used on grasslands.

Loss of inert synthetic gases

Synthetic gases are used in electrical switchgear (SF_6), metered dose inhalers (HFCs) and refrigeration (HFCs and PFCs). Emissions trading could be used to manage the emissions of synthetic gases, particularly of fluorocarbons used as refrigerants (ie, in refrigerators and cars) and the use of SF_6 in electrical switchgear.

6.4.2.2 Date of entry into the NZ ETS

The government has decided in principle on a 1 January 2010 date of entry for industrial process emissions into the NZ ETS, with the exception of emissions of SF_6. These will not

[65] The use of lime on grassland is included in the land-use, land-use change and forestry section of the national inventory. However, for the purposes of the ETS, these emissions are included along with other limestone products under industrial processes. This is a non-calcined limestone product.

enter the NZ ETS until 1 January 2013, because they are covered in a memorandum of understanding between the Crown and major users through 2012.[66]

6.4.2.3 Participants with unit obligations

Material transformation

Points of obligation are best placed on emitters themselves: producers of steel, aluminium, cement, burnt lime, glass, gold and paper. Depending on what is agreed for the points of obligation in the stationary energy sector, it is possible that many of these emitters, being major users of coal and gas, may also have obligations for the fuels they use for stationary energy.

Lime fertiliser

Points of obligation are best placed on limestone fertiliser companies.

Loss of inert synthetic gases

For inert synthetic gases, points of obligation are best placed on the importers of relevant inert synthetic gases (at the time a liability for excise duty arises). Importation would be the recommended point of obligation rather than end users, because end users are relatively numerous, whereas the importation points are few and companies already collect the relevant information due to the existence of the excise duty regime.

Emission units could be rebated if gases are re-exported in finished projects (eg, refrigerators). Obligations would provide appropriate abatement incentives and the transaction costs would be reasonable. A *de minimus* threshold will be considered (especially in the case of importers of metered dose inhalers and of refrigerants) if it would improve transaction costs without compromising coverage. This will be addressed during engagement with the sector.

6.4.2.4 Allocation

The government proposes offering some free allocation of emission units to participants that are sources of industrial process emissions when they meet eligibility requirements. This is addressed in section 6.5 below on 'Industrial production'.

6.4.3 Complementary measures

The No Loss Synthetic Greenhouse Gas Initiative ("No Loss") is a scheme that requires companies that handle synthetic greenhouse gases (greenhouse gas emissions that are, on average, several thousand times more powerful than CO_2) to have formal accreditation to minimise the risk of synthetic greenhouse gases leaking into the atmosphere.

As noted above, the SF_6 memorandum of understanding between the Crown and users promotes industry to adopt best practice in relation to the management of emissions of SF_6.

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[66] In 2004, a non-binding memorandum of understanding (MOU) was signed between the Crown and major and minor users of imported SF_6 in the electricity sector. Major users were to be exempt from any climate change policy costs in return for meeting a specified target. All users agreed to adopt best practice in SF_6 management. This MOU is intended to end on 31 December 2012 (with the exception of ongoing reporting), and had provisions for a review in 2005, 2007 and 2010.

The Ministry for the Environment is in the process of developing resources to assist firms that want to monitor and report their emissions on a voluntary basis. This guidance will be targeted at businesses that wish to track the greenhouse gas emissions they are responsible for (eg, from electricity and transport use). Initially, this guidance will focus on a limited set of common emission sources. The guidance will not specifically cover the details of industrial process emissions (the ETS and international guidance will do this). However, alongside the requirements of the ETS, the guidance would be relevant to firms that have industrial process emissions and would like to do comprehensive reporting voluntarily on the emissions sources they use (eg, for corporate sustainability or triple bottom line reporting purposes).

6.5 Industrial production: direct/indirect emissions from stationary energy and industrial process emissions

6.5.1 Context

This section addresses industrial producers, excluding electricity generators. Such producers will be affected by the NZ ETS both directly and indirectly. Some will be direct points of obligation for industrial process emissions. The government is considering an option for some industrial producers to opt into the NZ ETS as points of obligation for emissions associated with fuels used for stationary energy (ie, coal, natural gas and geothermal). Otherwise, such producers will be indirectly affected by the pass-through of emission costs in fuels consumed on-site for stationary energy. Finally, industrial producers are often large consumers of electricity, and will be indirectly affected by the pass-through of emissions-related increases in the price of electricity.

When industrial producers cannot pass on emission costs because they are trade exposed, they may bear a disproportionate impact relative to other sectors of the economy. Ideally, assistance should be targeted at producers that have high emission levels, are emissions intensive and are unable to pass costs on. When designing transitional assistance measures it is useful to give joint consideration to the treatment of direct emissions from stationary energy, direct emissions from industrial processes, and indirect emissions associated with the consumption of electricity.

A further issue is whether to extend support to industry for increases in the price of land transport fuels. This may be important in certain industries such as fishing, forestry, cement and some parts of the mining industries. However, to do so would add considerable complications to the scheme, and it is not clear how significant the cost increases would be in the context of fuel price movements generally.

6.5.2 Sectoral design features

As noted previously in this framework document, the government is considering two forms of assistance to industrial producers: free allocation of emission units or the use of a progressive obligation for emissions from fuels that are primarily used for stationary energy as well as from non-energy industrial processes. The government favours providing assistance via free allocation, but has left open the possibility of using a progressive obligation in sectors such as the industrial sector.

The comments below assume that a free allocation model is used; if a progressive obligation model is decided upon then it will operate within the same total level of assistance to industry.

6.5.2.1 Free allocation

Level of total assistance to industry

The government proposes that a free allocation of NZUs be provided to industrial producers for direct stationary energy emissions (such as gas and coal), for increases in electricity costs, and for industrial process emissions. This would operate within a total envelope of assistance to industry defined as 90 per cent of 2005 emission levels (for firms within the scope of activities).

How to allocate between industrial firms

Once the overall level of assistance to industry is agreed, decisions are then needed on how to determine the level of allocation that particular firms should receive. This requires a decision on whether to calculate each firm's allocation on the basis of historical emission levels or benchmarking. The government's initial preference is to use a firm's recent historical emissions, rather than using the more complex benchmark approach, unless there is clear agreement within an industry sub-sector and a benchmark can be developed rapidly. The use of historical emissions has clear administrative benefits, and to the extent that New Zealand firms are near to "world's best practice", a historical emission level will approximate a benchmark approach anyway.[67]

Which industrial firms should receive emission units

Ideally, assistance should be targeted at firms that are likely to face high costs as a result of the ETS and are unable to pass costs on to consumers. There are, however, practical limits on the extent to which it is possible to identify and target firms in this way. Also, highly targeted assistance will lead to inequities between firms that gain assistance and those that do not. At the other end of the spectrum, an untargeted approach (ie, providing broad, generalised support) would not provide the right economic signals and is not preferred.

There is a range of options for determining how (and to whom) assistance for industry should be organised. The government has an initial preference for either:

- a moderately targeted approach, where support would be provided to eligible firms through the use of free allocation for any emissions above a predefined threshold
- a limited targeting approach, where broad support would be provided through a progressive obligation approach for stationary energy emissions, together with free allocation specifically for industrial process emissions.

[67] In the context of an ETS that will operate on an absolute basis as opposed to an intensity basis, using a benchmark approach to determining allocation has attraction where there is evidence to suggest that significant numbers of firms are operating in a particularly inefficient manner in relation to emissions. It is not clear in New Zealand that this is the case.

How many units should be allocated to industrial firms

Both of these approaches would operate within an overall level of allocation to the industrial sector. There are no hard-and-fast rules for assessing the appropriate level of assistance to provide, but within a context of a relatively generous initial allocation, the following has been developed for consideration:

- providing free allocation as a percentage of total emissions in a base year (including emissions implicit in electricity price rises) above a set threshold
- allowing firms the choice of determining a base year between 2003 and 2005.[68]

Using this approach, the level of free allocation to provide to individual firms in the industrial sector would be determined on the following basis:

- the eligibility of individual firms to receive an allocation would be limited to those that pass a simple trade exposure test, and have total emissions (from industrial processes, direct stationary energy use and consumption of electricity) above 50,000 tonnes
- each eligible firm's share of the total allocation to industry would be calculated by taking its emissions from one of the years from 2003 to 2005, subtracting the 50,000 tonne threshold,[69] and then calculating the firm's proportion of emissions relative to other eligible firms' emissions using the same formula.

The government is by no means fixed on this particular approach for determining the level of assistance to provide to individual firms (within the overall assistance package to the industrial sector). Some specific issues that have been identified for consideration are:

- whether it is desirable to include an emissions-based size threshold at all, and, if so, at what level the threshold should be
- whether it is worthwhile considering an allocation to all firms within a sector once some firms from those sectors have been identified as eligible to receive assistance
- whether there are more effective ways of providing recognition for early entry.

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[68] A historical period is chosen to remove incentives to grow in order to gain additional units. Allowing firms to choose the most advantageous base year between 2003 and 2005 provides some opportunity to reward early action to reduce emissions. Emissions would be calculated based on corresponding data used to prepare audited financial statements. (If such data is not available this approach may well need some adjustment.)

[69] Subtracting the 50,000 tonne threshold from firms' emissions is important in such a calculation as it reduces incentives for firms to raise reported emissions to a level above the threshold in order to gain free allocation.

Box 7: The government's rationale for the proposed approach to allocation to industry

The government recognises that elements of this proposed approach can be seen as somewhat arbitrary. No method for determining levels of allocation for individual firms is perfect. While the government considers that this proposed approach supports its objectives, it wants to engage with stakeholders and Māori on the workability and effectiveness of the proposed approach.

The government is willing to adjust the specific parameters that are proposed where good reasons exist. Further, the government has not ruled out adopting the progressive obligation approach for providing assistance to industrial producers if compelling arguments against its current allocation plans, such as its administrative workability, are raised.

There are two elements to the proposed approach for allocating to industry. These are the:

1. assessment of the total allocation to industry
2. division of that total level of assistance to individual firms.

In terms of the former, the government's view is to base the total level of assistance to industry at 90 per cent of its 2005 emissions. This reflects a desire for industry to take responsibility for at least some of its emissions from the outset, and reflects the importance of inter-sector equity as previously discussed.

There is no simple answer to the question of how much assistance to provide, and international practice varies considerably. The international evidence suggests that considerably smaller levels of assistance than 90 per cent are often needed to maintain firm profits, although the actual level required depends on whether firms can pass on costs to consumers.

Drawing direct comparison with international practice is difficult. The proposed total allocation to industry (once industry enters the ETS) can be argued to be broadly comparable with the proposed allocation in Phase 2 of the EU ETS (in this regard, it is important to note that the treatment in different member states varies considerably, and also that the EU ETS does not compensate firms for the impact of increased electricity prices under the scheme). It is significantly more generous than the Norwegian approach.

A further issue relates to whether to extend support to industry for increases in price for land transport fuels. This may be important in certain industries such as fishing, forestry, cement and some parts of the mining industries. From a theoretical viewpoint, assistance to industry would also be provided to cover increases in liquid fossil fuels. However, to do so would add complications to the scheme and it is not clear how significant the cost increases would be in the context of fuel price movements generally.

The second feature of the proposal for assistance to industry is the approach for determining the level of assistance at an individual firm level. This has a number of features (again, it is worth stating that the government is not tied to this particular model for allocating between firms).

The proposed trade exposure rule is designed to avoid giving NZUs to firms that will not face any competitive disadvantage under the ETS, and will be able to pass much of their costs on to consumers. Its proposed approach is to exclude firms selling goods or services into the New Zealand market that are clearly not internationally tradable, such as domestic building or aviation services. While this may be desirable in principle, it may well prove difficult to assess in practice.

The government's consideration of an eligibility threshold of 50,000 tonnes of CO_2 equivalent emissions per year is designed to target free allocation towards larger, more emissions-intensive firms. The government expects this threshold to lead to allocation being limited to a relatively small number of firms. A separate test of emissions intensity is not proposed, as anecdotal evidence suggests that the clear majority of these large emitters are relatively emissions intensive. In turn, the proposed approach of providing assistance to cover emissions over and above the 50,000-tonne threshold is designed to minimise distorting the behaviour of firms with emissions just above or below the threshold. (A threshold of this nature reduces administration difficulties, but inevitably the use of any threshold results in some inequities at the margin.)

Furthermore, the government is considering giving each eligible firm the right to choose which of the years between 2003 and 2005 to use to determine its share of the overall allocation. This is aimed at avoiding unfairly disadvantaging firms which have had a significant drop in output in one particular year, or which have taken early action to reduce emissions. However, the government is conscious that this proposed approach could have the effect of unfairly advantaging firms that enjoyed a single year of unusually high levels of output or emissions. Ideally, it would seek evidence from firms to demonstrate that their selected year was 'representative' of their historical levels of output and emissions. However, this may not prove administratively practical.

Another possible approach is to attempt to directly determine the level of assistance given to each firm on the basis of maintaining its individual levels of profit. However, the government considers that this approach is likely to prove very complex and time consuming. Further, it is arguable whether an objective of maintaining firm profits is consistent with an equitable sharing of the costs of the ETS across all parties.

6.6 Agriculture

6.6.1 Context

The agricultural sector[70] currently contributes 52 per cent of the value of our exports and 10 per cent of our GDP. Its GDP contribution is expected to rise from $7.6 billion in March 2006 to $8.7 billion by March 2008. The dairy sector, in particular, has been a major driver in agricultural sector output and productivity growth, and its production is forecast to continue growing at 3 per cent per year.[71] Hence, the continued health and vitality of this sector is vital to the continued growth of the New Zealand economy.

The agricultural sector has become more diverse and intensified over the past few decades. Productivity gains have been driven by increases in the use of nitrogen fertiliser, improved animal genetics and various on-farm technologies. However, the environmental effects of decades of fertiliser use and animal-intensive farm production are becoming increasingly apparent in our waterways, ground water and lakes.

[70] In the context of this document, the agriculture sector includes pastoral and arable farming and horticulture.

[71] Dairy and Environment Review Group 2006, *Dairy Industry Strategy for Sustainable Environmental Management 2006*. http://www.dexcel.co.nz/main.cfm?id=335.

The agricultural sector has strategies to improve the long-term sustainability of farming, including making more effective use of technologies and management practices, and seeking the continual improvement of these. This approach allows the sector to achieve higher levels of production while addressing negative environmental effects.

Globally, only 12 per cent of greenhouse gas emissions come from agriculture. However, New Zealand has an unusual greenhouse gas emissions profile, with 49 per cent of emissions coming from the agricultural sector (excluding the agricultural sector's use of energy).[72] The emissions consist of methane (CH_4) from livestock, and nitrous oxide (N_2O) from animal waste and nitrogen fertiliser use. New Zealand's agricultural emissions have grown by 1 per cent per year since 1990, and are predicted to continue to grow at this rate over the medium term. However, productivity gains through farming animals more efficiently have led to a reduction in the level of emissions per unit. For example, CH_4 emissions per unit of milk solids (MS) have been decreasing by 1.2 per cent per year. In 1990, 8.4 kg CO_2-e/kg MS of CH_4 was released, whereas in 2005, 6.85 kg CO_2-e/kg MS of CH_4 was released. Agricultural emissions are projected to be 40.6 million tonnes above 1990 levels for the first commitment period of the Kyoto Protocol from 2008 to 2012.

Changing land management practices will have an important role in helping New Zealand to adapt to climate change, reduce emissions and, potentially, increase carbon storage. These goals can be achieved through better integration of trees on farms, the more efficient use of fertilisers, the development of crops for biofuels, increasing the amount of soil carbon, and reducing methane emissions.

6.6.2 Sectoral design features

Table 6.5: Summary of design features for the agricultural sector

Design feature	In-principle decision
Source of emissions	Synthetic fertiliser use. Enteric fermentation and manure management.
Greenhouse gas	Synthetic fertiliser use: N_2O. Enteric fermentation and manure management: CH_4 and N_2O.
Scope of activities	Synthetic fertiliser use: sale of nitrogenous fertilisers. Enteric fermentation and manure management: (a) probable: processing of meat and dairy products (b) possible: farming activity.
Commencement of unit obligation, monitoring and reporting	1 January 2013[73]
End of initial compliance period	31 December 2013

[72] Ministry for the Environment 2007, *New Zealand's Greenhouse Gas Inventory 1990–2005*, Ministry for the Environment: Wellington.

[73] Due to the nature of agri-business cycles, later dates of introduction within 2013 may be considered for the dairy industry and meat processors.

Participants with unit obligations	Synthetic nitrogenous fertiliser use: (a) preferred: importers and producers of nitrogenous fertiliser (b) alternative: farmers (c) alternative: sector bodies. Enteric fermentation and manure management: (a) preferred: processor/company (b) alternative: farmers (c) alternative: sector bodies.
Free allocation	90 per cent of 2005 levels at the time of entry into the ETS; declining to zero at a linear rate from 2013 to 2025. Three possible options as the point of receipt of free allocation are: (a) farmers (b) processors (c) sector bodies.
Progressive obligation	Option to consider the use of progressive obligations.

6.6.2.1 Scope of activities

The government proposes that coverage for sources of agricultural gases be limited to those that are currently accounted for under New Zealand's nominated activities for the Kyoto Protocol. This is to ensure that the scheme coverage reflects New Zealand's current obligations under Kyoto, and is because of the limited technical feasibility of including additional sources.

Broadly speaking, the ETS has been developed to cover the bulk of emissions from pastoral agriculture (sheep, beef, deer and related production such as wool and velvet), horticulture and arable production. This means that other minor sources may be included in the scheme where it is practical to do so, but a pragmatic approach will be taken and there is likely to be a range of minor emission sources to which the *de minimus* principle will apply.

6.6.2.2 Date of entry into the NZ ETS

The government has decided in principle to formally bring all agricultural emissions into the ETS on 1 January 2013, and not to introduce any other price-based measures in the interim. However, the government may require participants to monitor their emissions prior to 2013 to ensure the relevant monitoring and reporting systems are functioning properly.

This in-principle decision reflects the operational challenges faced in bringing the agricultural sector into the ETS and previous undertakings by the government. However, an earlier introduction is considered to be technically feasible, and the government is open to discussing this option with the sector.

6.6.2.3 Participants with unit obligations

To capture the major sources of agricultural greenhouse gas emissions in an ETS, the government has identified a range of options for the point of obligation to surrender units, including the farm level, processor/company level and sector body level. In terms of providing incentives for behaviour change, the farm-level obligation represents the best option. However, a farm-level obligation is not likely to be feasible in the short term due to a range of issues, including administrative complexity and the difficulty of measuring and verifying emissions.

The government's initial preference is to bring the agricultural sector into the ETS with a company/processor level point of obligation. This would include emissions from:

- nitrogen fertilisers at the fertiliser company level

- the dairy sector at the dairy processor level
- other animal agriculture at the primary (meat) processor level.

However, the government is open to considering the options identified above for emissions from both nitrogen fertiliser and livestock. This will be a subject for further engagement with the sector.

6.6.2.4 Allocation

The total level of free allocation when the agricultural sector enters the ETS in 2013 is defined as 90 per cent of 2005 levels of emissions. This is the same approach as that used to define the total allocation to industry and is relatively close to the target that was outlined in the Memorandum of Understanding signed between the Crown and the agricultural sector in 2002.[74] As in the industrial production sector, the level of free allocation will decline to zero at a linear rate from 2013 to 2025.

There are issues that are specific to the agricultural sector. In particular, the agricultural sector is characterised by a large number of sellers producing relatively homogeneous and perishable product. For the most part, downstream processors are price takers on international markets and cannot influence the price of goods sold. Likewise, farmers are price takers and cannot influence the price obtained from downstream processors. As a result, all costs introduced into the agriculture value chain are generally absorbed at the farm level.

The government has identified three key options for allocating free NZUs in the agricultural sector.

- The government could allocate directly to farmers on the basis of historical emission levels or some other proxy for emissions. The key advantage of this option is that farmers would capture the benefits of the free allocation, offsetting lost profits and impacts on land prices. Allocating to farmers would be challenging, however, because there is a range of ownership structures to consider and agricultural land use frequently changes over time, meaning that static allocations based on a single year or reference period will fall out of alignment with land use over time. There would also be issues to address relating to new entrants and competition.
- The second option is to allocate to processors, based on their historical levels of throughput. This allocation would be based on the fact that some major agricultural processors are co-operatives and/or operate in a highly competitive market, and therefore the effects of a free allocation to processors could be incorporated into their supply pricing to the benefit of farmers. One advantage of this is that the net effect would be to shield farmers from exposure to the full price of emissions. In reality, however, there is currently a range of ownership structures, particularly in the meat sector, and it is uncertain whether a free allocation to processors would benefit farmers through supply prices.
- A third option would be to allocate to sector bodies, which would take responsibility for managing the units on behalf of farmers. The allocation could be based on historical production throughput, as above.

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[74] The wording of the MoU is that the "target of the Research Strategy is to ... lower New Zealand's total ruminant methane and nitrous oxide emissions by at least 20% compared with the 'business as usual' emissions level, by the end of the Kyoto Protocol's first commitment period (2012)". Eighty per cent of projected 2012 levels of emissions from agriculture would result in a marginally less generous free allocation than 90 per cent of 2005 emissions.

The government does not have a clear preference for any one of these options. However, it will want to ensure that the approach ultimately chosen directs the benefits of free allocation to farmers as far as possible.

6.6.3 Complementary measures

6.6.3.1 Plan of action on sustainable land management and climate change

It is important that the agricultural sector makes use of the period up until its entry into the ETS (2013) to take steps towards mitigating the sector's emissions levels. The government is working in partnership with the agriculture and forestry sectors, Māori and local government to develop a plan of action on sustainable land management and climate change. This is critical to secure the changes to land-use practices needed for New Zealand to successfully adapt to changes in climate, reduce agricultural greenhouse gas emissions and secure new forest planting. This plan of action will include three "pillars":

- adapting to a changing climate
- reducing emissions and enhancing sinks
- capitalising on business opportunities.

These three pillars will be supported by research and innovation, technology transfer and communication, as detailed below.

Adaptation

The government proposes to work with the primary sector, local government and Māori to develop a five-year work programme focused on building adaptive capacity in the sector in relation to climate change. In the meantime, work will commence on developing detailed regional information on climate impacts on agriculture and forestry, identifying the areas most vulnerable to gradual and extreme climate impacts, and implementing a rural water enhancement fund.

Reducing emissions and enhancing sinks

The sector will be encouraged to adopt practices that reduce emissions, to monitor and report emissions and practices at a farm level, and to increase contributions to technology transfer. This includes commitments to roll out mitigation technology and energy efficiency on farms. The government will work with the sectors to assist with farm-scale greenhouse gas information and reporting that support emission reduction activities. The government is also considering introducing an Afforestation Grant Scheme to provide an alternative financial afforestation incentive for parties that choose not to join the ETS (for further information refer to section 6.1.4 and the companion document *Forestry in a New Zealand Emissions Trading Scheme*).

Capitalising on business opportunities

The government will work with the land management sector to develop a five-year work programme aimed at addressing barriers that hinder the private sector from capitalising on climate change opportunities. This will include developing an extensive greenhouse gas footprint response for the primary sectors, as well as reviewing market opportunities such as non-Kyoto trading markets and the creation of markets for emission-reducing technologies.

Research and innovation

Strategic framework

Research is needed to inform decision-making, develop cost-effective means for mitigation and adaptation, and reduce uncertainty around climate change impacts. A strategic framework will be developed to provide a comprehensive research and technology platform to underpin the plan

of action. This will provide consistency and avoid duplication, and direct new funding to priority areas. The focus will be on:

- the impacts of climate change and adaptation
- mitigation of agricultural and forestry greenhouse gas emissions (eg, animal genetics and feed types)
- greenhouse gas measurement
- cross-cutting issues, including economic analysis, life-cycle analysis, farm catchment systems analysis, and the social dimensions of climate change.

Pastoral Greenhouse Gas Research Consortium (PGGRC)

Much of the research effort to mitigate agricultural greenhouse gas emissions has been co-ordinated through the PGGRC, a joint government- and industry-funded research consortium that implemented a five-year research strategy in 2003. A new round of funding has recently been agreed, and the PGGRC will continue to be a critical vehicle for undertaking research into reducing greenhouse gas emissions in the sector.

Technology transfer

The process from initial research through to the adoption of new technologies by the agricultural sector can take up to 20 years. However, well-targeted programmes delivered by industry with funding support can speed up the technology transfer and implementation process. A Technology Transfer Work Programme is proposed to develop the capacity of the sector to roll out and adopt new technology in order to:

- reduce total greenhouse gas emissions and related environmental effects, and improve the efficiency of resource use
- adapt to a changing climate
- take advantage of new business opportunities relating to climate change.

Communication

A key component of the plan of action is the development of a modest communication programme in partnership with the sector. Communication of factual information and key messages will be critical in order to achieve sustained action over the medium to long term.

6.7 Waste

6.7.1 Context

The waste sector has reduced its greenhouse gas emissions by 26 per cent from 1990 levels. It was responsible for 2.4 per cent of national CO_2-e emissions in 2005, and is the only sector to have reduced its emissions below 1990 levels. This result has been achieved through improved landfill management, increased recycling and composting, and the rapid uptake of landfill gas-recovery technologies.

6.7.2 Sectoral design features

Table 6.6: Summary of design features for the waste sector

Design feature	In-principle decision
Source of emissions	Solid waste
Greenhouse gas	CH_4
Scope of activities	Disposal of solid waste likely to contain an organic component at a landfill
Commencement of unit obligation, monitoring and reporting	1 January 2013
End of initial compliance period	31 December 2013
Participants with unit obligations	Landfill operators
Free allocation	Zero free allocation

6.7.2.1 Scope of activities

It is proposed to include methane (CH_4) emissions from solid waste disposal in the ETS. At this stage, it is proposed that emissions of CH_4 and nitrous oxide (N_2O) from wastewater treatment, and emissions of CO_2 from the fossil fuel component of solid waste incineration, are to be excluded.

Emissions from wastewater handling and treatment plants accounted for 20 per cent of emissions from the waste sector in 2005; this represents 0.5 per cent of New Zealand's greenhouse gas emissions. The emissions of these gases are difficult to measure precisely at an individual site. There are hundreds of wastewater treatment facilities (which include septic tanks) in New Zealand. There are no solid waste incinerators currently operating in New Zealand that emit significant volumes of greenhouse gases.

The administration and compliance costs associated with the inclusion of wastewater treatment facilities and solid waste incinerators in an emissions trading scheme are likely to outweigh the benefits. Therefore, it is proposed to exclude greenhouse gas emissions from wastewater facilities and solid waste incineration from the ETS.

Emissions of CH_4 from solid waste disposal are created by bacterial action on organic waste. Consequently, only landfills that dispose of waste with some organic component will be included within the scope of the ETS. The amount of CH_4 produced depends on a number of factors, including waste disposal practices, moisture content, temperature, and waste composition. A proportion of the emissions are often flared off. Any CO_2 emissions from flaring will be outside the ETS. Emissions of CO_2 from aerobic decomposition are not included in the national inventory and will not be included in the ETS.

At the time of printing, the Local Government and Environment Select Committee was considering the Waste Minimisation (Solids) Bill. The bill sets up a funding system to support future solid waste minimisation and management activities at local and national levels. One possible funding mechanism is a national levy on waste volumes disposed of at landfills. Although this levy does not directly address greenhouse gas emissions, the government considers that it would be inappropriate to apply two price measures on the sector that both seek improved environmental outcomes. For this reason, it is proposed that CH_4 emissions from solid waste disposal not be included in the ETS until 1 January 2013. Note that this position could be revisited should the Waste Minimisation (Solids) Bill not be enacted, if the resultant

Act does not apply a financial cost to solid waste disposal, or if the levy is found to be sufficient to address emissions.

There are some methodological issues that will hopefully be resolved in partnership with the sector.

6.7.2.2 Date of entry into the NZ ETS

It is proposed to include net CH_4 emissions from solid waste disposal in the ETS from 1 January 2013. As noted above, this entry date could be bought forward if the Waste Minimisation (Solids) Bill fails to become legislation, or if the bill does not apply a direct price instrument on solid waste disposal. There are no plans to include greenhouse gas emissions from solid waste incineration or wastewater treatment in the ETS, although this position might be revisited if a municipal solid waste incinerator comes into operation.

6.7.2.3 Participants with unit obligations

It is proposed that landfill operators be required to surrender emission units based on a calculation of emissions associated with the volume of waste received at a landfill. We anticipate that the methodology to calculate emissions will be resolved in partnership with the sector before the start date for the waste sector. Definitions of "waste disposal" for the purposes of ETS legislation will need to be aligned with the definitions contained in the Waste Minimisation (Solids) Bill.

6.7.2.4 Allocation

It is anticipated, based on the allocation principles set out in this document, that there will be no free allocation to landfill operators for emissions from solid waste disposal.

6.7.3 Complementary measures

The National Environmental Standard on Landfill Gas Emissions directly addresses CH_4 emissions from solid waste disposal. This environmental standard requires landfills over a certain capacity to install and operate landfill gas collection systems.

As noted above, a national waste levy or other financial charge on the disposal of waste under the Waste Minimisation (Solids) Bill, if enacted, would likely influence greenhouse gas emissions from landfills. It is likely that the levy would encourage the additional diversion of waste from landfills and would provide funds for organic waste management initiatives, which in turn would result in further emission reductions. Also, the New Zealand Waste Strategy contains a range of targets, some of which relate specifically to organic waste and waste disposal. Initiatives introduced in response to these targets are likely to influence greenhouse gas emissions from the waste sector.

It is possible that emissions from wastewater treatment and waste incineration could be the subject of offset projects due to the current intention to exclude them from the scope of the ETS.

7 The Impacts of the Emissions Trading Scheme

This chapter covers the likely impact of emissions trading on:

- **New Zealand's emission levels**
- **macroeconomic performance**
- **prices for affected goods and services, notably electricity and liquid fuels**
- **various sectors of the economy**
- **New Zealand households**
- **the net Kyoto liability of the New Zealand government.**

7.1 Measuring the impacts of the NZ ETS

Because an ETS would be a new regulatory instrument in New Zealand, it is difficult to forecast its impacts to a high degree of accuracy. We can, however, draw on overseas experience and our knowledge of the New Zealand market in estimating the impacts the scheme will have.

7.1.1 Impacts of an ETS versus impacts of international climate change agreements

First of all, it is important to understand the distinction between the general impacts of New Zealand's obligations under international climate change agreements and the specific impacts of an ETS. For example, New Zealand's obligations under the Kyoto Protocol mean that, from 2008, New Zealand must pay a price for all emissions over our agreed allocation based on 1990 emissions levels. Based on April 2007 policy settings, New Zealand faces a Kyoto deficit of 45.5 Mt CO_2-e, which has a value of $683 million at $15/t CO_2-e and $1.1 billion at $25/t CO_2-e. The cost of the deficit will be incurred by New Zealand as a sovereign nation, and could be distributed across taxpayers, emitters and consumers.

When we consider the impacts of an ETS, the key question is not the total cost to New Zealand of our emissions obligations, but how *distributing* that cost affects our emissions levels, our behaviours, our macroeconomic performance, the performance of sectors within the economy, and the wellbeing of households. The alternative (the base case against which impacts of an ETS should be assessed) is not the absence of any Kyoto obligations, but rather a scenario in which they are met by the taxpayer in their entirety.

7.1.2 The difficulty of modelling the impacts of a price-based measure

Determining the impacts of the NZ ETS on emissions levels and individual firms and consumers requires estimates of the effect of the ETS on prices and the responses that consumers and firms make to price changes: that is, predicting the wide-ranging behavioural

change that is the desired outcome of an ETS. The difficulty in modelling the impacts of an ETS is that, although consumer responses to discrete price changes can be readily modelled, the ETS provides firms that are "points of obligation" with a flexible range of options for responding to the price signal (indeed, that flexibility is one of the chief advantages of an ETS). Those firms can manage an ETS liability by:

- purchasing units from other New Zealand unit holders; or
- purchasing international units; or
- in some instances, reducing their emissions through investing in abatement strategies (eg, in energy efficiency, or in plant and equipment with lower emissions levels);[75]
- reducing their emissions by reducing production; or
- any combination of the above.

There is also added uncertainty relating to whether and to what extent firms that face emissions costs under the ETS will pass these on to consumers through higher prices, and whether any price increases that are passed on are significant enough to prompt a reduction in consumption.

Given the number of variables, modelling the impact of an ETS can only realistically give a general sense of the direction of change. Any projections of the amount of that change need to be treated with caution. This is true of all attempts internationally to model the impacts of climate change policies. Professor William Nordhaus of Yale University, the builder of one widely cited model known as DICE (for Dynamic Integrated Model of Climate and the Economy), said recently:

> *At the outset, it must be emphasized that models such as DICE are primarily tools for understanding the behavior of complex systems. They are not truth machines. The results convey a spurious precision that does not accurately reflect the modeling, behavioral, and measurement errors and uncertainties. At the same time, integrated assessment models provide an essential discipline by ensuring that assumptions and conclusions are internally consistent and that the consequences of alternative assumptions or policies can be mapped out.*[76]

The government has commissioned a number of modelling exercises throughout the climate change policy development process, and will continue with these exercises through the process of finalising and implementing the ETS. The results presented below represent the best available data at this point in time.

The costs and benefits of introducing an ETS have been analysed through the policy development process. The findings of this process are outlined in the Emissions Trading Scheme's Regulatory Impact Statement as is standard practice for government initiatives of this nature.

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[75] This option would not be available to those who merely import a product, such as fuel oil, and have little or no influence over its production and emissions content.

[76] Nordhaus, W, 2007, *The Challenge of Global Warming: Economic Models and Environmental Policy*, p 81. http://nordhaus.econ.yale.edu/dice_mss_072407_all.pdf.

7.2 Impacts on New Zealand's emissions levels

International experience is that market-based schemes tend to have a better track record at reducing pollution at lower cost than other regulatory options.[77] Market-based schemes provide a long-term price signal to which firms can respond in determining business strategies and investment plans. Introducing a price on emissions automatically increases the returns on emission reduction strategies. International experience suggests that there are often a large number of low-cost options for reducing emissions (so-called "low-hanging fruit") that will be uncovered with the incentive of an emissions price.

Among market-based options, an ETS is generally regarded as effective at reducing emissions because:

- multiple emission reduction opportunities are identified
- emitters can choose whether to make emission reductions in their own operations or to pay the price of emission units and support emission reduction activities elsewhere
- emissions trading places a value on abatement opportunities that are yet to be realised, and creates opportunities for entrepreneurs to identify these and to find innovative ways of realising them.

Under an internationally linked scheme, New Zealand "points of obligation" will not be confined to taking advantage of domestic emissions reductions, but will be able to purchase international units (which represent emission reductions in other countries). Therefore, an important variable in determining the impact of an ETS on New Zealand's domestic emissions will be the cost of domestic emission reduction options relative to offshore emission reductions.

With that caveat, preliminary modelling does give a general picture of potential outcomes for domestic emissions under an ETS.

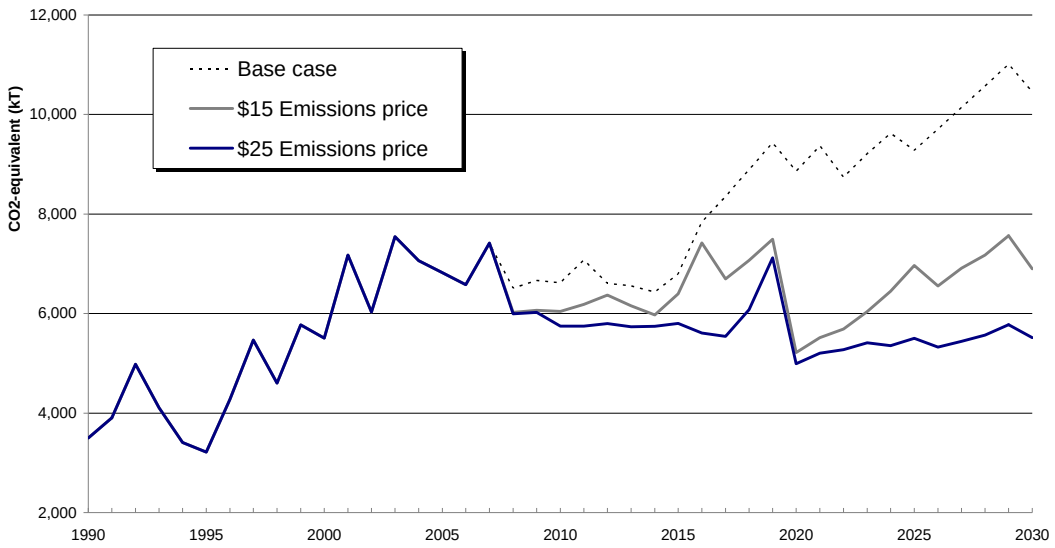
7.2.1 Emissions from electricity

Preliminary modelling work on the electricity sector (see Figure 7.1) indicates that:

- in the short term, price-based measures may only lead to a moderate emission reductions relative to the base case, irrespective of the emissions price (due to lead times in bringing new renewable generation on line)
- over the long term, emission price levels of around \$15 to \$25/tCO_2-e would keep emissions from the electricity generation sector at about current levels through some moderating of demand growth and encouraging new investment in renewable generation (this represents an improvement over the business-as-usual base outlook, which projects steady growth in electricity sector emissions).

[77] See, for example, Harrington W, Morgenstern RD, Nelson P, 1999, *On the Accuracy of Regulatory Cost Estimates, Resources for the Future Discussion Paper*, 99–18, Resources for the Future: Washington, DC. "The most flexible emission reduction polices involve substantial use of economic incentives, and we note that for all the economic incentive polices in our sample, the cost was overestimated or the quantity of emission reductions was underestimated".

Figure 7.1: Electricity sector CO_2 emissions under different carbon price scenarios



Source: Ministry of Economic Development, June 2007

In light of these results, the government is considering further measures to encourage additional reductions in emissions from electricity generation in the short term. This will include a variety of demand-side strategies to encourage more energy-efficient choices by consumers (including building codes and standards for electrical appliances).

7.2.2 Emissions from transport

The impact of the ETS on transport emissions will occur through the moderation of demand that is expected to result from increases in the price of fuels. However, because fuel use is highly inelastic, emissions are likely to drop only by a small percentage. For every 10 per cent increase in petrol price, medium- to long-term demand is expected to fall by 3 per cent. The use of diesel for the heavy fleet is assumed not to respond to price because they will pass the increased costs through to customers. Combining these two assumptions gives the following overall emission reductions, relative to business as usual (ie, no emission pricing).

Table 7.1: Emission reductions in the transport sector

	Emission price	
	$15/t CO_2-e	**$25/t CO_2-e**
Transport sector emission reductions over the medium to long term with emission pricing (relative to business as usual)	0.3%	0.6%

However, these modest reductions are insignificant compared with the growth expected in transport emissions due to rising population and economic growth. Emissions are expected to have grown over current levels by over 40 per cent by 2030, with most of this increase coming from increased diesel use as a result of increased economic activity. Once again, the ETS will be only one measure among a range of measures that the government will take to address the need to reduce transport sector emissions. These are noted in section 6.2.

7.2.3 Emissions from forestry

In the absence of effective deforestation controls, and assuming no expectation of future controls, the Ministry of Agriculture and Forestry (MAF) estimates that deforestation in the first commitment period would be approximately 41 million tonnes[78] CO_2-e (slightly less than 10 per cent of New Zealand's projected emissions over this period). The exact amount depends on the quality of the land and the carbon in the trees being harvested. The most "convertible" land would be most affected (land with foregone expected profits of conversion up to $10,000/ha, and more in exceptional cases). MAF estimates that up to 280,000 hectares of exotic forest is at risk of deforestation based on land-use classifications and 2006 prices, excluding land in government ownership, subject to a Crown Forest Licence, or in the Lake Taupo catchment. These exclusions amount to 166,000 hectares.

It is likely that little of this deforestation would occur if the forestry sector were exposed to the full cost of emissions.

The devolution of credits for new forests should increase afforestation. This is because devolved emission units (with associated liabilities) for afforestation are expected to increase forestry internal rates of return. However, the amount of increase is highly dependent on assumptions on a discount rate and future emission price. As long as investors expect the emission price to increase at a rate less than the investor's discount rate, the internal rate of return on a new forest will increase. At a constant price of $15/t$CO_2$, the internal rate of return increases from 6.4 per cent to 8.5 per cent for a radiata pine investment.

7.2.4 Emissions from agriculture

The non-CO_2 emissions from agriculture will be brought into the ETS from 2013. Prior to that date there will be two impacts under the ETS that have flow-on effects for emissions in the agricultural sector.

- There will be a slower rate of conversion of forestry land to dairy farming as a result of applying the ETS to the forestry sector from 2008. This is likely to be the largest impact of the ETS in the short term.
- There will be impacts arising from higher prices for electricity, other stationary energy and transport fuels. There is no readily available information at this stage to assess what impact these will have on agricultural production and hence sector emissions.

The significance of these impacts will be influenced by projected increases in world commodity prices for dairy products. For example, the government's Kyoto emissions estimates associated with agricultural production (both non-CO_2 emissions and CO_2 from energy) increased by 5.8 Mt CO_2-e in 2007 relative to 2006, primarily because of the higher level of dairy production and associated dairy processing coupled with changes to projected commodity prices for dairy products.

[78] As noted previously, emissions from deforestation could be significantly greater than this amount if the forestry sector were to bring forward deforestation.

From 2013, once non-CO_2 emissions from the agricultural sector enter the NZ ETS, emission reductions relative to business as usual will result from three main effects:

- a slower rate of conversion of forestry land to other types of farm production
- changes in on-farm practices that reduce emissions (eg, reducing nitrous oxide emissions through the use of nitrate inhibitors)
- changes in the type and intensity of agricultural operations.

Through the Pastoral Greenhouse Gas Research Consortium, the agriculture industry is researching options for reducing agricultural emissions through improved practices and new technologies. The ETS will create further financial incentives to accelerate the introduction of such measures as they are developed.

7.2.5 Other emissions

Outside of the energy generation, transport, agriculture and forestry sectors, New Zealand has a range of firms whose production processes involve greenhouse gas emissions. As with agriculture, reductions in emissions from these firms will flow from either reduced output or the deployment of new technologies and improved management practices. The NZ ETS will provide a long-term price signal that firms will factor into decisions regarding new investments and major plant upgrades.

As discussed, it is very difficult to assess how firms will react to emission pricing, and this will vary from firm to firm, industry to industry. Direct emission reductions from New Zealand industry over the next 10 to 15 years under an ETS will be somewhat constrained by the nature of the existing facilities, although there are still promising opportunities to reduce emissions. These include:

- switching from using coal to using gas or biomass for industrial heat, wherever possible
- increasing the use of cogeneration in conjunction with industrial heat production (cogeneration technology allows heat that is generated for industrial processes to be used to produce electricity as well)
- improving energy efficiency and other emissions management practices
- investing in new technology as part of the cycle of capital stock turnover.

Over the longer term, new technologies are expected to allow for dramatic improvements in industrial energy efficiency and emission reductions in some areas.[79] The actual level of emission reduction will be determined by the price of emissions relative to the cost of the abatement activities.

[79] For a discussion of some of the technologies that are available, or will be available soon, see International Energy Agency 2006, *Energy Technology Perspectives 2006*, http://www.iea.org/w/bookshop/b.aspx?Subject=Technology%20-%20RD, Chapter 7. Also see International Energy Agency 2007, *Tracking Industrial Energy Efficiency and CO_2 Emissions*, http://www.iea.org/w/bookshop/b.aspx.

7.3 Macroeconomic impacts

The impact on New Zealand's macroeconomy of any price-based emission reduction measure will be driven by:

- the underlying impact of the international price of emissions, which is set by the stringency of international agreements (ie, the Kyoto Protocol and its successors)
- New Zealand's success in reducing emissions in a least-cost manner, and in assisting other countries to do so (hence capturing additional credits).

At a macroeconomic level, the NZ ETS would be expected to have an impact similar to that of a carbon tax if both measures reflected the same price of emissions and if revenues were returned to the economy. Modelling carried out to show the effort of introducing a carbon tax in New Zealand from 2008 to 2012 can therefore also cast light on the likely impact that an ETS would produce on the macroeconomy over this period.[80]

Modelling of the economic impacts of meeting New Zealand's Kyoto Protocol commitment was undertaken as part of the government's 2005 Review of Climate Change Policies by ABARE.[81] ABARE modelled a series of different scenarios. The most comparable scenario showed that the impact in 2010 (taken to be a representative year for the first Kyoto period) for an internationally linked scheme including agriculture, with a price of emissions of \$13/t CO_2-e, would shave GDP growth by 0.04 per cent in that year relative to business as usual.

Infometrics[82] carried out modelling to show the impact on GDP of placing a tax of \$25/t CO_2-e on all emissions (excluding non-CO_2 emissions from agriculture), with the revenue recycled to lower company tax. A snapshot of the tax year 2011/2012 was taken to be representative of the first commitment period. The effect on GDP did not exceed a reduction of 0.1 per cent.

It is important to note that these estimates are against a business-as-usual benchmark. For example, the ABARE results do not say that the economy will be 0.04 per cent smaller than it is today. What they mean is the economy will be 0.04 per cent smaller than it *would have been* in 2010 if the price of emissions had not been increased. The Treasury is forecasting that, over the coming few years, real GDP will grow by about 2 percentage points a year. This means that, while New Zealand's Kyoto Protocol commitment might reduce growth somewhat, we will still be wealthier as a nation than we are now.[83]

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[80] Modelling of this nature relies on assumptions, such as assuming costless and smooth transition. Thus care needs to be taken in interpreting results but they should give a sense of magnitude.

[81] ABARE is an Australian government economic research agency that has been involved in modelling climate change policy since 1993.

[82] Infometrics 2006, *Issues Surrounding a Narrowly-Based Carbon Price Instrument*, a report prepared for the Ministry for the Environment: Wellington. Infometrics is a privately-owned and operated NZ company. It offers a range of economic consulting and forecasting services on commercial terms to companies, businesses and government departments.

[83] The government is currently conducting modelling of the macroeconomic impacts on the New Zealand economy of different carbon constraints for the post-2012 period.

The ETS is a measure for distributing emissions costs in a way that attempts to maximise the uptake of mitigation opportunities and ensures that the least-cost opportunities receive priority. While it is difficult, if not impossible, to measure with any accuracy the economy-wide impact of an ETS versus, say, an emissions tax, the design and operation of an ETS will clearly result in greater efficiency across the economy in decisions on emissions choices and, hence, a reduced impact on GDP relative to other measures.

The advantages of an ETS will, of course, not be fully realised during the implementation period, when the taxpayer is still bearing emissions costs that will eventually become the responsibility of sectors. However, even during the implementation period, an ETS will provide greater certainty to firms about the future costs and opportunities resulting from their emissions, and will influence their long-term investment decisions. By accepting the responsibility of managing their own emissions (rather than having them met by taxpayers), participants in the ETS have an opportunity to derive additional value through emissions abatement and trading activities. In other words, an ETS will foster an "industry" in reducing emissions and trading the units that are freed up as a result.

7.4 Microeconomic impacts

The implementation of a NZ ETS will impact widely across the economy as the prices of goods and services change to reflect the cost of the emissions associated with their production. This price signal is the key driver of emission reductions under emissions pricing. An ETS will reduce the returns to some activities at the margin, meaning that the prices received by producers for each new unit of production they sell will be reduced.

7.4.1 Free allocation and other forms of assistance

This change of price incentive at the margin is precisely the aim of the scheme; however, the government wishes to avoid forcing changes on New Zealand firms and households at an unreasonable pace. For this reason, the government has designed the ETS with a number of features and complementary measures that will moderate the impact of the scheme. These include:

- free allocation of emission units in some sectors on the basis of recent historical emissions, while leaving an incentive for firms to avoid increasing emissions at the margin
- programmes to make it easier for people to increase the energy efficiency of their houses
- additional policy measures to reduce the financial impacts of higher electricity prices so that low- and modest-income households are not disadvantaged while still ensuring that incentives for energy efficient use remain
- delayed entry into the scheme for some sectors (which essentially means taxpayers will fund the cost of their emissions in the interim).

The nature and extent of the measures that will be implemented will be the subject of further engagement, so it is not possible to give a detailed analysis of the impact of the ETS on households and firms. The aim, however, is to preserve sufficient pressure for behavioural change, while enabling firms and households to make a smooth transition to lower emissions.

7.4.2 Indicative changes to energy prices

Some indicative price changes under an ETS, to give a sense of magnitude, are shown in Table 7.2 relating to energy prices. It is important to note that these *do not* account for any assistance or compensation packages. These changes would be the same under a carbon tax set at the corresponding emission price.

Table 7.2: Examples of energy price increases under emissions pricing

	Emission price scenarios	
	$15/t CO_2-e	**$25/t CO_2-e**
Liquid fuels (transport)		
Petrol cents/litre GST inclusive (% increase over current price)	3.7c (2.5%)	6.1c (4%)
Diesel cents/litre GST inclusive (% increase over current price)	4c (4%)	6.7c (7%)
Electricity		
Wholesale cents/kwh (% increase over business as usual)	0.7c (9%)	1.4c (19%)
Retail cents/kwh GST inclusive (% increase over business as usual)	1c (5%)	2c (10%)
Other fossil fuels		
Wholesale gas $/GJ (% increase over business as usual)	$0.8 (11%)	$1.4 (18%)
Retail gas $/GJ (GST inclusive) (% increase over business as usual)	$0.9 (2%)	$1.7 (4%)
Wholesale coal $/GJ (% increase over business as usual)	$1.5 (40%)	$2.5 (67%)
Retail coal $/20kg bag (increase over current price of $9 a bag)	$0.9 (10%)	$1.5 (17%)

Note: GJ = xxx.

The measures to assist producers and consumers in making the transition to emission pricing are detailed elsewhere in this document.

7.4.3 Impacts on households

The implementation of a NZ ETS will have a wide impact across the economy as the prices of goods and services change to reflect the cost of the emissions associated with their production. This price signal is the driver of emission reductions under emissions pricing. Table 7.3 indicates the impact on households of the above energy price increase scenarios. This impact would be lessened by rebates and other forms of assistance, the details of which have yet to be determined.

Table 7.3: Impacts on households of energy price increases from emissions pricing

	Emission price scenarios	
	$15/t CO_2-e	**$25/t CO_2-e**
Average increase in household energy expenditure (eg, electricity, coal, natural gas and transport fuels) per annum[84]	$100–$200 pa	$170–$330 pa
Approximate % of total household expenditure	0.3%–0.5%	0.5%–0.8%

[84] Data from 2004 Household and Economic Survey, for a range of different household compositions, re-weighted for Treasury Taxmod, inflated to March 2007 using Taxmod (for income and population) and disaggregated CP1 inflators (for the components of household expenditure, no volume changes).

There will also be second-order price effects on the cost to households of purchasing some goods and services beyond the energy-related costs described above.

7.4.4 Impacts on agriculture

New Zealand's agricultural products compete in a market characterised by a high degree of product homogeneity and a high number of sellers. As a result, the sector is a price taker: it is unable to fully pass increased production costs on to consumers.

The government has decided in principle to delay the sector's entry into the NZ ETS until 2013 and to develop a range of measures to assist the sector to make the transition to a lower-emissions mode of production. This is important not just for climate change reasons. Looking to the future, the sustainability of New Zealand agricultural products will most likely be an important factor in maintaining and/or expanding access to premium export markets. The participation of agriculture in the ETS may be an important element in countering negative messages, such as the current "food miles" debate in Europe.

The level of free allocation can be used to offset the reduction in profits caused by emission pricing. Theoretically, free allocation should not change the impact on production levels, but in practice this would depend on how the allocation were distributed to the sector, how participants choose to manage that allocation as an asset, and the way in which prices are transmitted to farmers.

Table 7.4 shows how providing the agricultural sector with a free allocation based on 90 per cent of their non-CO_2 emissions in 2005 would affect their payout in 2013 relative to a business-as-usual scenario.[85] This assumes that free allocation is directed to the points of obligation (ie, the dairy or meat processor) and is fully reflected in the payout. These impacts do not reflect the effect of increases in energy costs from emissions pricing. The following numbers are subject to considerable variability, and should only be used to give a sense of the magnitude of any possible impact.

Table 7.4: Possible impact of a free allocation scenario for agriculture

	Emission price scenarios: grandparenting at 90 per cent of 2005 emission levels in the year 2013	
Agricultural production (change in average payout relative to business-as-usual scenario)	\$15/t CO_2-e	\$25/t CO_2-e
Dairy	–1.0%	–1.6%
Beef	–0.2%	–0.3%
Sheepmeat	–0.70%	–1.2%
Venison	–0.1%	–0.2%

[85] This assumes that the costs to the agricultural sector are averaged across all production.

7.4.4.1 Impacts on horticulture, vegetable and arable sectors

The horticulture and vegetable sectors will be impacted by cost increases from CO_2 and nitrous oxide emissions. The sectors most affected will be those that rely on significant energy consumption for greenhouses and/or cool stores. These include forms of vegetable production and flower/nursery production. Increased costs for cool storage will affect pip fruit, kiwifruit and other fruit and vegetable growers.

Nitrogen fertiliser inputs comprise 15 to 20 per cent of production costs for the arable sector (the second largest single farm expense), which includes grain and specialty seed production and seed multiplication for export. The estimated price of nitrogen fertilisers is projected to increase by 7 per cent once nitrogen fertilisers enter the scheme in 2013, assuming a price of $\$15/tCo_2$-e. Free allocation could moderate this price impact.

7.4.5 Impacts on forestry

Landowners with pre-1990 forests, particularly those whose land has potential in other uses, will see a reduction in land value and economic opportunities as a result of the introduction of deforestation liabilities. This will be partly balanced by a free allocation of emission units to the affected landowners. Owners of post-1989 forests, and owners of land suited to afforestation, will have a substantial new opportunity in the ability to derive additional income through the ETS. Because the future emission price is uncertain, this opportunity comes with risks. These risks can, however, be managed, with some credits held aside in anticipation of future liabilities.

There are also implications for forestry operations. As new forests enter the ETS, forest managers will add carbon storage and management to their list of objectives. There could be an evening out of the age distribution of the post-1989 forestry estate, so that forest owners have credits from new forests to offset liabilities from forests being harvested.

Like all other industries, forestry and related industries will see increased energy costs. This, too, is an opportunity for the industry, with timber residues increasing in value as a source of renewable energy. This will have implications for timber production and supply.

7.4.6 Impacts on other major emitters

A price on greenhouse gases will result in emission reductions across industry. The precise volume of reductions and their location are difficult to predict, but one of the benefits of a price-based measure is that it will "discover" emission reduction opportunities.

Large energy users with significant direct or indirect emissions contribute a small, but significant, proportion of New Zealand's emissions. They have a clear financial incentive to limit energy use even without a price on emissions. However, previous government initiatives, including the Negotiated Greenhouse Agreements programme, have resulted in these large firms identifying additional opportunities to reduce energy use and thus emissions. A price on greenhouse gases, whether faced directly or via an increase in energy prices, will result in additional incentives to identify low-cost opportunities to reduce emissions.

There are a number of recognised barriers to energy efficiency and other emission reduction action in some sectors. For example, such efforts are hampered for commercial buildings because of a lack of information about energy use and incentives that fall awkwardly between building owners and users. In these circumstances, additional government interventions may be required, but the price on emissions reinforces these interventions and makes them more effective.

In addition to having differing potential to respond to an emission price by improving efficiency and reducing emissions, major emitters will vary in their ability to pass emission costs to their customers. For this reason, the government is proposing transitional assistance to major emitters to support their adjustment to emission pricing. The government's rationale for which firms should be eligible to receive assistance, the appropriate level of assistance, and the mechanism for delivering assistance is detailed in chapter 5 on 'How emission units are allocated'. The government will engage with major emitters on the impacts of the NZ ETS and the options for transitional assistance.

7.5 Impacts of the NZ ETS on the Kyoto net position for 2008–2012

7.5.1 Background on the Kyoto net position

To comply with its international obligations for the first commitment period of the Kyoto Protocol (2008–2012), the government needs to retire one Kyoto emission unit[86] to match each tonne of its net emissions (ie, measured net of Kyoto-eligible forest carbon sinks). The government will receive a free allocation of Kyoto assigned amount units (AAUs) equal to five times its 1990 emissions (excluding emissions and sinks in the land use, land-use change and forestry sector). The difference between New Zealand's assigned amount and its projected emissions from 2008 to 2012 is registered in the Crown financial accounts as a liability. The value of this liability is calculated using the projected cost of purchasing Kyoto emission units internationally to cover the Kyoto deficit. The government's Kyoto net position and the associated financial liability are updated annually.

Under a most likely emission scenario, reflecting policies in place as of April 2007, New Zealand's net position is projected to be a deficit of 45.5 million units over the first commitment period of the Kyoto Protocol.[87] This deficit is calculated as follows (see Table 7.5).

Table 7.5: Projected balance of emission units over the first commitment period (million emission units)

			Upper scenario	Most likely scenario	Lower scenario
Emissions					
a	**Projected aggregate emissions**			**405.4**	
	Energy (excluding transport)		103.0	92.8	86.1
	Transport		84.7	80.1	76.7
	Industrial processes		22.3	22.2	22.1
	Solvent and other product use		0.3	0.3	0.3
	Agriculture		228.3	203.1	180.0
	Waste		7.3	7.0	6.7
b	**Assigned amount units**	**AAUs**	**309.5**	**309.5**	**309.5**
c	Emissions to be covered (b–a)			–96.0	
Projection of removal units					

[86] One emission unit is equivalent to one tonne of greenhouse gas emissions converted to carbon dioxide equivalents by the global warming potential.

[87] Ministry for the Environment 2007, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, Ministry for the Environment: Wellington. www.mfe.govt.nz.

d	Removals via forests		57.0	79.0	119.3
e	Deforestation emissions		–41.0	–21.0	–21.0
f	**Net removals via forests (d+e)**	**RMUs**	**16.0**	**58.0**	**98.3**
g	Balance (c–f)			–38.0	
h	AAUs allocated to projects		7.5	7.5	7.5
Balance of units (g–h)				**–45.5**	

Note: One emission unit is equivalent to one tonne of greenhouse gas emissions converted to carbon dioxide equivalents by the global warming potential.

MAF has provided a most likely scenario for deforestation of 21.0 Mt CO_2-e. This scenario is based on the government's current policy to cap the Crown's deforestation liability for pre-1990 forests at 21.0 Mt CO_2-e. A deforestation survey undertaken in 2006 indicated that deforestation is likely to exceed the 21.0 million tonne cap in the absence of policy interventions under current market conditions. The 2006 deforestation intention survey indicated that forest owners currently intend to deforest about 50,000 hectares during the first commitment period of the Kyoto Protocol. This area would generate deforestation emissions of approximately 41.0 Mt CO_2-e. If the upper deforestation scenario of 41.0 Mt CO_2-e is used in determining the deficit on the Crown's accounts, the deficit will be 65.5 million units.

Under April 2007 policy settings, the government – and therefore taxpayers – would assume the Kyoto liability with the exception of deforestation emissions beyond the 21.0 million tonne cap covered by the government. It is important to note that the calculated deficit of 45.5 Mt CO_2-e assumes that the government retains all of the credits for Kyoto-eligible afforestation (totalling 79.0 Mt CO_2-e) and applies them to reduce the deficit. If the government were to devolve those credits to landowners, then the deficit would increase from 45.5 Mt CO_2-e to 124.5 Mt CO_2-e.

7.5.2 Possible impacts of the NZ ETS on the Kyoto net position

Implementing the NZ ETS would be expected to lower the Kyoto deficit by:

- creating a further price-based incentive for emission reductions and removals by forest carbon sinks in New Zealand
- devolving a significant portion of the remaining Kyoto liability from the government to the sectoral participants with unit obligations.

The government would still retain the responsibility for:

- the sectors' emissions prior to their entry into the NZ ETS
- the sectors' emissions below a *de minimus* threshold that are exempt from the scheme
- emissions covered by units that are gifted to participants in the scheme
- in the case of progressive obligations in selected sectors, the portion of emissions not devolved to participants with unit obligations
- the government's Kyoto unit commitments under other policies, such as Projects to Reduce Emissions, Negotiated Greenhouse Agreements and the Permanent Forest Sink Initiative.

Table 7.6 illustrates one possible scenario for devolving the emissions liability to sectors on the basis of their proposed date of entry into the NZ ETS. Under this scenario, the government carries the emissions liability for sectors' emissions prior to their entry into the NZ ETS, and allocates free units to industrial producers totalling 15 Mt CO_2-e per year from 2010 to 2012. This scenario also reflects the government's prior commitments to the deforestation cap of 21 Mt CO_2-e and to participants in Projects to Reduce Emissions. This scenario does not account

for emission reductions in response to the NZ ETS, exemptions below a *de minimus* threshold for each sector, or the use of progressive obligations. The assessment of net units devolved to sectors (column 4) does not reflect the emission costs passed to downstream firms (eg, from electricity consumed); however, these costs are accounted for in the government's free allocation to industrial producers.

Table 7.6: One indicative scenario for devolving emissions liability under the NZ ETS

Sector	Proposed date of entry into the NZ ETS Year	Projected emissions[a] 2008–2012 Mt CO_2-e	Emissions covered by sectors[b] 2008–2012 Mt CO_2-e	Units covered by the government[b] 2008–2012 Mt CO_2-e
Projected emissions by sector				
Deforestation (high scenario)	1 January 2008	41	20	21
Liquid fossil fuels[c]	1 January 2009	99	80	19
Stationary energy (excluding liquid fossil fuels)	1 January 2010	74	12[d]	84[d]
Industrial processes	1 January 2010	22		
Agriculture	1 January 2013	203	0	203
Waste	1 January 2013	7	0	7
Solvents and other products	1 January 2013	0	0	0
Subtotal	2008–2012	446	113	334
Government's Kyoto emission unit balance				
Government's obligation for sectors' emissions (shown above)				334
Projects to Reduce Emissions				8
Total government obligation				**342**
New Zealand assigned amount units				310
Government's Kyoto net position				–32

(a) This reflects the most likely scenario for emissions in the absence of policies post-April 2007, including a NZ ETS.

(b) As a conservative scenario, this assumes zero emission reductions relative to business as usual.

(c) This includes liquid fossil fuels used for transport and stationary energy.

(d) This assumes total free allocation of 45 Mt CO_2-e to firms in these sectors from 2010 to 2012.

Note: One emission unit is equivalent to one tonne of greenhouse gas emissions converted to carbon dioxide.

The remaining consideration to complete this scenario is the treatment of credits for Kyoto-eligible afforestation activities, which are expected to generate removals of 79.0 Mt CO_2-e over the first commitment period. The government will receive Kyoto removal units (RMUs) for net forest carbon removals (ie, afforestation removals minus deforestation emissions) from 2008 to 2012. Because of the "netting" calculation, the government will receive fewer RMUs than actual removals from afforestation.

The government has decided in principle under the NZ ETS that landowners can opt to receive NZUs for post-1989 afforestation activities together with the associated liabilities for future emissions from harvesting or deforestation on that land. If landowners decline the credits and liabilities, they will accrue to the government. The government may choose to apply those credits towards improving its net position for the first commitment period, or to bank the credits to cover its future liability for harvesting or deforestation of that land.

To the extent that afforestation credits are devolved to landowners or banked by the government to cover future liabilities, afforestation activities will have zero impact on the government's net

position for the first commitment period. To be conservative, this scenario assumes that the government applies zero RMUs toward its Kyoto compliance during the first commitment period.

Under the above scenario, the government faces a deficit of 35 Mt CO_2-e over the first commitment period. This compares with a deficit in the absence of a NZ ETS of 124.5 Mt CO_2-e if the government fully devolves afforestation credits to landowners, and a deficit of 45.5 Mt CO_2-e if the government retains all of the afforestation credits for compliance in the first commitment period.

This scenario is not a realistic outcome, since emission reductions are expected to occur under the NZ ETS. However, it does provide a useful starting point for discussions and suggests that, in CP1 at least, the government will be in a net deficit position, even after the introduction of an ETS.

It is not at all clear how many forest sink credits will be available for use by the government in CP1. It is also important to consider that the government will receive increased revenue from implementation of the NZ ETS, particularly through increased profits to state-owned enterprises. The net fiscal impact of the NZ ETS on the government's accounts will thus reflect broader considerations than the Kyoto net position.

7.6 Conclusion

The impact of an ETS is difficult to measure with accuracy, but international experience is that emissions trading schemes are effective ways of reducing emissions. They provide a clear, long-term signal that influences investment decisions and encourages the use of innovative, low-cost, abatement options as a first priority.

The government has recognised that the full impact of an ETS would create transitional problems, and as a result has adopted an ETS design that features a staged implementation, some free allocation of credits, and a range of measures that ensure the impact of the scheme is shared evenly across the economy.

It is nevertheless the government's intention that, over time, the responsibility for managing New Zealand's greenhouse gas emissions will be shifted as much as possible to those who make the investment and consumption decisions that cause those emissions. In time, it is likely that carbon will be regarded as a cost of production in the same way as electricity and labour currently are.

8 Emissions Trading: Issues for Māori

This chapter addresses the implications for Māori of an ETS, including:

- **themes from the hui held on climate change and energy in March 2007, and the process going forward**
- **implications of the Treaty of Waitangi**
- **the potential impacts on Māori of an ETS.**

8.1 Māori relationship with the environment

Māori are inextricably linked to – and involved with – the sustainable management and use of natural resources. A Māori world view shapes a special relationship with the environment, expressed inter-generationally through kaitiakitanga.[88] The environment forms the basis from which cultural, spiritual and physical and economic sustenance flows. Māori beliefs and understandings regarding the environment provide an all-encompassing framework and motivational basis from which to respond to the challenges posed by climate change.

Land and water management practices based on an understanding of environmental systems have historically supported Māori efforts to maintain and sustain their families and communities. Climate change is a global issue that will have an effect on the relationship that Māori have with the environment and on the Māori use of natural resources, especially in coastal communities. Coastal areas are of traditional importance to Māori. Many areas are significant for cultural, historical, social and economic reasons and are intrinsic to Māori identity. In addition, the coastal environment is an important food resource. Coastal erosion and changes to the productivity of inshore fisheries and shellfish gathering areas could therefore have significant social, cultural and economic impacts on Māori in some regions.

Climate change presents considerable challenges to all landowners and managers, including Māori. Many areas of Māori land are steep and in regions vulnerable to storms and erosion. With the onset of climate change these lands will be even more exposed and vulnerable with the predicted arrival of more frequent and severe storms, and more frequent droughts in the east of New Zealand. In the forestry sector, deforestation (defined under Kyoto as conversions of forested land to other uses) is a major issue and one of the leading causes of climate change globally. Moreover, deforestation can have other potential negative environmental effects, such as increasing the risk of flooding. Taking action to prepare for the impacts of climate change is therefore critical.

[88] Kaitiakitanga means the exercise of guardianship by the tangata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources, and includes the ethic of stewardship.

8.2 Themes from February–March 2007 hui

In February–March 2007, the government held 13 hui on the policy options outlined in the five climate change and energy discussion documents. One of the key messages that emerged from the hui was that Māori agree that climate change is a real and important issue. Māori participating in the hui were well aware of the potential impacts of climate change on lands, waterways, flora and fauna, and food sources.

Strong feelings that Māori perspectives in relation to climate change should be adequately considered and the proposed policies should protect the environment, were heard at the first hui in Gisborne and became a recurring message. The need for Māori input into policy development alongside quality engagement was another key theme. Other themes related to the Treaty of Waitangi, government co-ordination and leadership, consultation, Māori-specific analysis, equity, impacts on Māori, and issues specific to certain regions.

Māori have generally acknowledged at earlier hui that greenhouse gas emissions are a global issue and that there is a need to change and/or modify activities that contribute to climate change. This has been seen as intrinsic to the kaitiakitanga role that Māori have in relation to the environment and its general wellbeing.

The Māori economy is reliant on the primary industries of agriculture, forestry and fishing for its prosperity. These sectors are those most directly affected by the changing weather patterns associated with climate change. By reducing greenhouse gas emissions – the main contributor to climate change – we can help reduce the impact of climate change.

Māori have significant interests in land management through ownership and management interests in large areas of pastoral farmland, and exotic and indigenous forests. As Treaty of Waitangi claims are progressively settled, Māori ownership of rural and productive land is expected to increase.

8.3 Potential issues and opportunities from the NZ ETS for Māori

The NZ ETS will help reduce emissions relative to business as usual, encourage and support global action on climate change, and help to put New Zealand on a path to sustainability.

Becoming more sustainable and dealing with climate change are important elements of the government's strategy for economic transformation. The government believes that the transformation to a more environmentally sustainable economy will open up opportunities for New Zealand firms. New Zealand is already a world leader in existing technology in important areas such as agriculture, forestry and biotechnology. There will be significant new economic opportunities for those who are at the forefront of the development of new carbon-friendly technologies.

The government recognises that the ETS could have both costs and benefits for many in the community, including Māori. The broader the coverage of the ETS, the more equitable it will be across sectors, and the more opportunities there will be for least-cost emission reductions.

Emissions trading will mean an increase in the costs of products such as petrol and electricity, and the government is developing ways to assist households, firms and industry sectors with the transition process. Of particular importance to Māori will be the potential impacts of the NZ ETS on Māori involvement in the primary industry sectors of forestry, agriculture and fishing, because these sectors dominate Māori economic development.

The government is undertaking a study of the impacts of the NZ ETS on Māori, which will inform policy development on the potential effects of an ETS on Māori. Impact analysis will be particularly relevant in places where there is a high level of social and economic reliance on agriculture and forestry related activities in remote rural regions of New Zealand that sustains high Māori populations through employment.

Under the ETS, the government will issue a number of emission units (New Zealand Units) through a combination of sale (by auction) and free allocation (gifting). Decisions about free allocation to participants in the ETS will be determined sector by sector, according to the likely impact of emissions pricing and the sector's ability to pass emission costs on to consumers.

These opportunities and issues for Māori associated with the introduction of the NZ ETS are likely to be discussed at the upcoming hui in September and October this year. The government's report on the analysis of the economic and socioeconomic impacts of the NZ ETS on Māori will inform these discussions.

8.3.1 Māori land use: agriculture and forestry

Māori have significant interests in land management through ownership and management of large areas of pastoral farmland, and exotic and indigenous forests. However, the primary production sectors are also the most directly affected by the changing weather patterns associated with climate change.

For Māori, balancing the need to invest in economic opportunity with the need to address environmental sustainability is an important issue, given that the primary industry sectors of agriculture, forestry and fishing dominate Māori economic development. For example, the increased fertiliser use associated with the conversion of forested land to pastoral land uses such as dairying has the potential to negatively affect the health of waterways and lakes through increased nutrient run-off.

There will be significant economic opportunities for Māori-owned forestry under the NZ ETS in terms of the potential to earn emission units for carbon sequestration on land afforested after 1989. In addition, the Permanent Forest Sink Initiative (PFSI) is expected to operate as a niche within the NZ ETS, and will be an attractive alternative land use for marginal hill country where the economic returns to pastoral farming can often be slender. A significant proportion of Māori land falls into this category. Outside of the ETS, the Afforestation Grant Scheme (AGS) – if it becomes policy – will be an incentive for Māori investors in smaller areas of forestry who may not be attracted to the NZ ETS because of compliance costs and associated liabilities. The NZ ETS, the PFSI and the AGS will also assist with adaptation to the expected impacts of climate change in a variety of ways, such as helping to reduce and prevent erosion and flooding damage.

In the agricultural sector, an option is for the government to allocate emission units directly to farmers on the basis of historical emission levels or some other proxy for emissions. The key advantage of this option is that farmers would capture the benefits of the free allocation, offsetting lost profits and impacts on land prices. Allocating to farmers would be challenging, however, because there is a range of ownership structures to consider and agricultural land use frequently changes over time, meaning that static allocations based on a single year or reference period will fall out of alignment with land use over time. There would also be issues relating to new entrants and competition to address.

Under the NZ ETS, the government has decided in principle to assume the liability for 21 Mt CO_2-e from 2008 to 2012, consistent with previous commitments. It will provide this assistance through the free allocation of emission units to the owners of pre-1990 exotic forest land.

For some, particularly larger Māori landowners, deforestation liabilities under the NZ ETS will be balanced by the opportunity to gain credits from post-1989 forests. Others, however, may consider that the ETS may affect their land development options. These may be issues for Māori to consider.

8.3.2 Geothermal and electricity production

Although geothermal energy is a renewable resource, it still has a carbon footprint. CO_2 and CH_4 are contained in geothermal fluid, which is released when the fluid is used and/or converted into steam. These emissions are covered by the scheme because they are in excess of what would occur naturally and are therefore anthropogenic. This is consistent with the Kyoto Protocol. Under the ETS, an obligation would be placed (from 1 January 2010) on the extraction of geothermal fluid for electricity generation or industrial process heat and not to retail operations such as motels and public baths. This may have implications for Māori who are active in the geothermal energy production sector.

8.4 The process going forward

Climate change policy development will continue to take account of the views expressed by Māori as Treaty partners with the Crown, through consultation, engagement and submission processes. Hui with Māori are scheduled over October this year to discuss the government's proposal for an ETS.

8.4.1 The Treaty of Waitangi

The government has considered the perspectives put forward by Māori during the hui and in submissions on the climate change and energy discussion documents with regard to the Treaty of Waitangi. The government's current view is that there is no pre-existing property right to emission units. Rather, the enactment of domestic legislation may create an interest and define the parameters of any interest arising from an ETS. The upcoming engagement with Māori will help inform understanding and analysis of Treaty issues.

9 Approach to Legislation for the Emissions Trading Scheme

This chapter explains what the legislative basis for an ETS would involve. The legislative mandate for a NZ ETS would be established through amendment to the Climate Change Response Act 2002, and the NZ ETS would be further developed over time through amendment and regulation processes.

9.1 An amendment to the Climate Change Response Act 2002

It is proposed that the NZ ETS be provided for in primary legislation as an amendment bill that inserts a new part or parts into the Climate Change Response Act 2002 (CCRA). The CCRA implements New Zealand's obligations under the Kyoto Protocol, including the establishment of a national emission unit registry and a national inventory of greenhouse gas emissions. Some of the features needed for the ETS already exist under the CCRA (although they will require modification). Therefore, the proposed amendment may also need to involve amending existing sections of the CCRA.

The benefits of having a number of climate change matters that require legislation grouped in one Act include:

- ease of access to the legislation for the public who use it (one "code")
- existing synergies with the CCRA and the ETS (eg, the potential use of the registry).

The purpose of the CCRA is focused on New Zealand implementing its Kyoto Protocol obligations into domestic law. The ETS is being designed not only to meet Kyoto obligations but to operate beyond Kyoto and to be able to work in the post-2012 period if there is no further Kyoto commitment period. The purpose of the CCRA would therefore have to be amended to reflect the objectives of an ETS.

The parliamentary process at the select committee stage provides for any member of the public to submit on the bill and have their submission heard by the committee. This gives an opportunity for further information to be gathered from stakeholders with regard to their views on the how the ETS legislation will work and any refinements made to the bill.

9.2 Overall structure and development: regulations and further amendments to the CCRA

It is proposed that the ETS legislation will address the core design elements required for any ETS (as detailed in chapter 4). The ETS legislation (amendment bill to the CCRA) may not initially present the full detail of the scheme for every sector.

The intention is for the ETS legislation to present the substantive provisions relating to the general obligations of participants and core design elements (including the consequences of non-compliance with those obligations). It will provide more specific provisions governing the entrance of the first sectors into the scheme (eg, forestry and liquid fossil fuels). Where possible, it will also contain provisions to guide the entrance of subsequent sectors, accepting that more detailed design features must be subject to ongoing engagement.

Over time, further amendments may be required to the CCRA to support an ETS, such as sector-specific provisions for those sectors entering the ETS in later stages. To ensure effective implementation, regulations will be needed for some aspects of the ETS and to support the legislation. Some regulations may need to come into force at the same time as the ETS legislation. The regulation-making process for those regulations will therefore need to occur alongside the bill for the ETS going through Parliament.

There may also need to be further ETS regulations over time as details for various sectors involved in the scheme are implemented.

List of Abbreviations

AAUs	Assigned amount units
ABARE	Australian Bureau of Agricultural and Resource Economics
AGS	Afforestation Grant Scheme
avgas	Aviation gasoline
CAR	Competitiveness At Risk
CCRA	Climate Change Response Act 2002
CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
CH_4	Methane
CNG	Compressed Natural Gas
CO_2	Carbon dioxide
CO_2-e	Carbon dioxide equivalent
CP1	First Commitment Period of the Kyoto Protocol: 2008–2012
CPR	Commitment Period Reserve
DICE	Dynamic Integrated Model of Climate and the Economy
ECFP	East Coast Forestry Project
ERUs	Emission Reduction Units
ETS	Emissions Trading Scheme
EU	European Union
EUAs	European Allowances
EU ETS	European Union Emissions Trading Scheme
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GST	Goods and ServicesTax
HFCs	Hydrofluorocarbons
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
ITL	International Transaction Log
JI	Joint Implementation
lCERs	long-term Certified Emissions Reductions
LPG	Liquefied Petroleum Gas
LULUCF	Land Use, Land-Use Change and Forestry
MAF	Ministry of Agriculture and Forestry
MED	Ministry of Economic Development
MfE	Ministry for the Environment
MS	Milk solids
Mt	Mega tonne, equal to one million tonnes
N_2O	Nitrous oxide
NAPs	National Allocation Plans
NES	National Environmental Standard
NGA	Negotiated Greenhouse Agreements
NZ ETS	New Zealand Emissions Trading Scheme
NZEECS	New Zealand Energy Efficiency and Conservation Strategy
NZES	New Zealand Energy Strategy

NZEUR	New Zealand Emission Unit Register
NZU	New Zealand Unit
PFCs	Perfluorocarbons
PFSI	Permanent Forest Sink Initiative
PGGRC	Pastoral Greenhouse Gas Research Consortium
PRE	Projects to Reduce Emissions
RMUs	Removal Units
SF_6	Sulphur hexafluoride
tCERs	Temporary Certified Emission Reductions
UNFCCC	United Nations Framework Convention on Climate Change

Glossary[89]

Absolute based obligation	An obligation for a participant in an emissions trading scheme to surrender one emissions unit for every tonne of CO_2-e emitted.
Annex I party	A developed country or Economy in Transition listed in Annex I of the United Nations Framework Convention on Climate Change. These parties aim to return their emissions to their 1990 level by 2000.
Annex B party	Annex B of the Kyoto Protocol defines emission objectives (assigned amounts) for most Annex 1 parties. Countries listed in Annex B are allowed to participate in emissions trading under the Kyoto Protocol.
Assigned amount units (AAUs)	The emission units allocated to the Annex B countries under the Kyoto Protocol on the basis of their quantified emission target for the first commitment period, 2008 to 2012. One AAU is equal to one tonne of carbon dioxide equivalent.
Carbon dioxide equivalent (CO_2-e)	The quantity of a given greenhouse gas multiplied by its global warming potential, which equates its global warming impact relative to carbon dioxide (CO_2). This is the standard unit for comparing the degree of warming that can be caused by emissions of different greenhouse gases.
Carbon market	A shorthand term for an international or domestic market where greenhouse gas emission units are exchanged between buyers and sellers. The terms "carbon market", "greenhouse gas market" and "emissions market" can be used interchangeably.
Carbon tax	A tax applied to CO_2-equivalent emissions. The government's 2002 climate change policy package included a carbon tax on energy, industrial and transport emissions, capped at $25 per tonne of carbon dioxide equivalent (CO_2-e). In December 2005 the government decided not to proceed with the announced carbon tax.

[89] Some of the definitions have been sourced from the Greenhouse Gas Protocol Initiative's glossary, which can be found at: http://www.ghgprotocol.org/glossary.htm.

Clean Development Mechanism (CDM)	A Kyoto Protocol mechanism that allows emission reduction and afforestation/reforestation projects with sustainable development benefits to be implemented in developing countries that have ratified the Kyoto Protocol. CDM projects earn particular Kyoto units, which can be used by Annex B parties to help meet their Kyoto commitment.
Commitment Period Reserve	A rule within the Kyoto Protocol that requires each party with binding targets to hold a minimum number of Kyoto units in its national registry. In New Zealand's case this means that Kyoto units covering 90 per cent of our assigned amount (under the Kyoto Protocol) must be held in the registry at any point in time throughout the first commitment period (2008–2012). If this limit is reached, the registry would effectively close to outgoing international transfers until more Kyoto units (AAUs, CERs, ERUs or RMUs) were transferred into the registry.
Commitment period (CP)	A range of years within which parties to the Kyoto Protocol are required to meet their quantified greenhouse gas emissions limitation or reduction commitment. The first commitment period is 2008 to 2012
Competitiveness at risk (CAR)	Being in the position where bearing a price for greenhouse gas emissions significantly impedes a firm's ability to compete against international competitors in countries with less stringent climate change policies. Such competition could be on the basis of exports or imports.
de minimis	A threshold under which greenhouse gas emissions associated with an activity are immaterial or insignificant in terms of the objectives of the NZ ETS (for the purposes of this document, also has a meaning in the context of the law).
Economic leakage	Economic activity being displaced from one country to another, with a consequent reduction in economic welfare in the former country.
Emission factor	An intensity factor relating to greenhouse gas emissions per unit of activity (such as tonnes of fuel consumed, tonnes of product produced).
Emission unit	An instrument created under law that can be bought and sold and used to meet an entity's obligations under an emissions trading scheme. In the New Zealand Emissions Trading Scheme, one emission unit corresponds to one metric tonne of carbon dioxide equivalent emissions.
Emissions	The release of greenhouse gases into the atmosphere.
Emissions (or environmental) leakage	The shift in emissions (and other environmental impacts) from one country to another associated with economic activity being displaced from one country to another.
Exemption	A waiver from bearing an obligation under a policy measure. For example, under the former carbon tax and Negotiated Greenhouse Agreement (NGA) regime, NGA firms were to receive a full or partial exemption from the carbon tax that would otherwise have applied to their direct emissions of greenhouse gases.

Fossil fuel	Coal, natural gas, crude oil and fuels derived from crude oil such as petrol and diesel. They are called fossil fuels because they have been formed over long periods of time from ancient organic matter. They are not renewable.
Fugitive emissions	Those emissions that do not come from combustion but arise as a result of processing or transforming fuels. Examples of fugitive emissions include the venting of CO_2 at the Kapuni Gas Treatment Plant and the emissions from geothermal fields.
Grandparenting	The allocation of emission units or other forms of financial assistance to emitters on the basis of their historical emissions.
Greenhouse gas	Greenhouse gases are constituents of the atmosphere, both natural and anthropogenic, which absorb and re-emit infrared radiation. Greenhouse gas emissions covered by the emissions limitation or reduction commitment for the first commitment period of the Kyoto Protocol are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).
Grey market	In the New Zealand context, a shorthand term for the emissions trading market for units that cannot be used for compliance with the Kyoto Protocol. Grey market units can be generated by projects in Kyoto countries that do not pass through the Kyoto Protocol's crediting processes, or in countries that have not ratified the Kyoto Protocol.
Hui	The Māori word for a meeting, social gathering or assembly.
Intensity based obligation	An obligation for a participant in an emissions trading scheme to surrender units on an intensity basis (ie, one unit for every tonne of CO_2-e emitted *per unit of activity*).
Inventory	A list of an organisation's or a country's greenhouse gas emissions by sources, removals by sinks (eg, growing trees) and stocks (eg, carbon stored in forest biomass and soils).
Joint implementation (JI)	A mechanism that allows emission reduction and removal projects to be implemented in Annex I parties that have ratified the Kyoto Protocol. JI projects earn particular Kyoto compliance units known as emission reduction units, which can be used by an Annex I party to help meet its Kyoto commitment.
Kaitiakitanga	The exercise of guardianship by the tangata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources, including the ethic of stewardship.
Kyoto market	The emissions trading market for emission units included under the Kyoto Protocol.
Kyoto Protocol	A protocol to the United Nations Framework Convention on Climate Change that includes emissions limitation or reduction commitments for ratifying countries listed in its Annex B (developed countries and Economies in Transition) (see http://unfccc.int for further information).
Mitigation	Any action that results, by design, in the reduction of greenhouse gas emissions by sources or enhances removals by sinks. Mitigation and abatement are often considered to be equivalent terms.

National inventory	A quantitative report of anthropogenic emissions by sources, removals by sinks, and stocks of greenhouse gases not controlled by the Montreal Protocol.
Negotiated Greenhouse Agreements (NGAs)	Under the government's 2002 climate change policy package, NGAs were available to eligible firms whose international competitiveness would be placed at risk by the carbon tax. Eligible firms were to receive full or partial relief from the carbon tax in return for moving toward world's best practice in greenhouse gas emissions management. In December 2005 the government decided not proceed with the carbon tax/NGA regime.
New Zealand Emission Unit Register	A software system for the accounting of transactions in Kyoto Protocol units, including AAUs, RMUs, ERUs, CERs, tCERs and lCERs. Refer to http://www.nzeur.govt.nz/templates/Page____21789.aspx
New Zealand Emissions Trading Register	A software system for the accounting of transactions required under the NZ ETS. These transactions include holdings, transfers, and surrender of emission units acceptable for compliance under the NZ ETS (including NZUs and certain Kyoto Protocol units) as well as emissions reporting.
Pass-through	The increase in the consumer price of a product resulting from the imposition on the producer or supplier of a price for the product's greenhouse gas emissions.
Point of Obligation	The point in the supply chain of a market where an obligation is placed on a person to surrender emission units to cover the direct or indirect emissions associated with their products. Participants with these obligations may themselves be referred to as points of obligation.
Price-based measures	Also referred to as "economic instruments" and "market instruments", price-based measures can be applied to integrate the costs (or opportunity costs) of greenhouse gas emissions into decision-making in the marketplace.
Price of carbon	In the New Zealand context, a shorthand term for the price of greenhouse gas emissions in a trading market, typically calculated in dollars per tonne of carbon dioxide equivalent.
Progressive obligation	An obligation for an ETS participant to surrender units representing some percentage of the full obligation during a transitional period. For example, under a 50 per cent obligation, a participant would surrender one emission unit for every two tonnes of emissions. A progressive obligation could increase over time until it became a full obligation to surrender one unit for each tonne of emissions.
Rebate	An amount intended to refund the cost of a policy measure. For example, under the former carbon tax/Negotiated Greenhouse Agreements (NGA) regime, rebates were available to NGA firms to compensate them for increased electricity prices resulting from the carbon tax applied to fossil fuels.
Relief	Exemptions and rebates designed to offset the cost of a policy measure, such as a tax or other charge.

Retirement (of Kyoto units)	Under the Kyoto Protocol, the transfer of a Kyoto unit from an Annex B Party's holding account in its national emission unit register into a retirement account for the purpose of compliance with its quantified emission reduction or limitation commitment. Once a Kyoto unit has been retired in a commitment period, it cannot be traded or used in future commitment periods.
Revenue recycling	The return to the economy of revenue derived from a policy measure.
Sequestration	The uptake and storage of carbon. Carbon can be sequestered by plants and soil and in underground/deep sea reservoirs. (Underground storage is also called geological sequestration.)
Sink	A sink actively removes a greenhouse gas from the atmosphere, such as a growing forest or soil. A sink is distinct from a reservoir where greenhouse gases can be stored, such as an underground reservoir or a mature forest.
Surrender	The transfer of a New Zealand unit (NZU), Kyoto unit, or other overseas unit (if applicable) from an individual account to the government's surrender account in the registry for the purpose of compliance with a unit obligation. Surrendering an NZU will render it incapable of being further transferred, retired or cancelled. Once a Kyoto unit has been transferred to the government's surrender account, the government may retire it for compliance under the Kyoto Protocol.
Tangata whenua	In relation to a particular area, means the iwi, or hapū, that holds mana whenua over that area (where mana whenua means customary authority exercised by an iwi, or hapū, in an identified area).
Threshold	Criteria that define which firms, sites or other business units are required to participate in a policy measure.
Tikanga Māori	Māori customary values and practices.
Treaty of Waitangi	A broad statement of principles on which the British Crown and Māori made a political compact to found a nation state and build a government in New Zealand.
True-up Period	A period of 100 days following the completion of the Kyoto Protocol reviews of emissions information relating to the commitment period (2008–2012). Transfers of units may still take place until the end of this period, allowing Annex 1 parties to trade and retire units to comply with their emissions obligations. The true-up period is expected to commence in 2014.
UNFCCC	United Nations Framework Convention on Climate Change is an international treaty on climate change that came into force in 1992. It aims to stabilise greenhouse gas concentrations at a level that avoids dangerous human interference with the climate system.

Annex: Activity and Mandatory Participant Table

The NZ ETS legislation will specify a list of activities that give rise to emissions. Any firm or other entity that carries out one of the specified activities will have the obligation to monitor and report its emissions, using the methods outlined here, and to surrender to the Crown one emission unit (NZU or eligible Kyoto unit) for each metric tonne of emissions at the end of each annual compliance period.

The Activity and Mandatory Participant Table provides a preliminary list of the activities that are expected to be included in legislation, with details indicating how emissions are to be estimated for each activity.

The table is constructed as follows (by column):

- **Sector:** specifies the broad sectors that will potentially be entering the ETS at different times.
- **Activity:** defines an activity that will give rise to an obligation to surrender emission units.
- **Emission source:** within each activity there may be a number of actions (eg, use or production of a particular fuel, operation of a particular process) that give rise to emissions. These will not be detailed in legislation, because they may be subject to change over time as the details of technologies and products change, but they will be covered by regulation. Emission sinks are measures of carbon sequestered in outputs (eg, trees) and to be subtracted from the total emissions associated with an activity.
- **Emission source or sink unit:** units for the emission source (eg, terajoules (TJ) of a particular fuel or tonnes for a particular material flow).
- **Gas:** notes which of the greenhouse gases, as listed in Annex A of the Kyoto Protocol, is/are affected by a particular emission source.
- **Emission factor:** each emission source is multiplied by an emission factor to determine the corresponding tonnes of greenhouse gases per year emitted.
- **Global warming potential (GWP):** the conversion factor used to convert tonnes of any non-CO_2 greenhouse gas to tonnes of CO_2-equivalent.
- **Participant-specific emission factor:** it is expected that some emission sources will have standard emission factors, while in other cases participant-specific emission factors will be appropriate and may be re-determined on a regular basis. Further elaboration will be required regarding which emission sources and procedures will apply in the event that participants are able to use participant-specific emissions factors.
- **Mandatory participant:** preliminary identification of the entities that are expected to undertake these activities and have the consequent obligations.
- **Expected number of participants:** indicates how many entities are currently known to be carrying out relevant activities in New Zealand.
- **Exemption if relevant:** notes where exports of carbon-containing material, or other sources to be excluded or netted out, are relevant.
- **Comment:** provides notes on some issues relating to measurement and reporting.

Indicative detailed activity and mandatory participant table
New Zealand Emissions Trading Scheme

Sector	Activity	Emission source or sink [A]	Emission source unit	Gas	Emission factor (t/CO_2-e per unit) [B]	GWP [C]	Specific* emission factor (Yes/No)	Mandatory participant (person who undertakes activity)	Expected number of participants	Exemptions	Comment
		[A] × [B] × [C] = tCO_2-e									
Forestry											
Deforestation (applies to pre-1990 forest)	Conversion of forest land to non-forest land (excludes: when the land is replanted or allowed to regenerate; if the conversion takes place before 1 January 2008).	Change in carbon stored in forested land (includes live and dead plant material, organic litter and soil carbon)	Hectare	CO_2	To be determined. Methodology will be based on modelled carbon stocks varied by species, tree age and region.	1	N	Landowner, unless control over land use decisions has been legally delegated to a third party, in which case landowner can apply to have point of obligation transferred.	1,000 owners based on their ownership of land under exotic forest. Numbers of owners of land under indigenous forest are uncertain; current estimates suggest that including indigenous forest in the scheme will add a further 2,000–5,000 owners with more than 50 hectares of pre-1990 forest. 500 owners.	Any pre-1990 forest land where the owner's total holdings on 1 September 2007 were less than 50 hectares.	
Changes in net carbon stocks (applies to post-1989 forest where landowner voluntarily opts to join ETS)	Harvesting, or removal by a natural event, of trees from forest land where the landowner, or third party with legal claim over trees, has voluntarily opted into the ETS.	Change in carbon stored in forested land (includes live and dead plant material, organic litter and soil carbon)	Hectare	CO_2	To be determined. Methodology will be based on forest measurement and modelling of carbon stocks varied by species, tree age and region.	1	N	Landowner, unless forest held under a registered forestry right or registered lease, and all parties have agreed to the transfer of the point of obligation.	Highly uncertain - depends on take up. Possibly 2,000-9,000 given current ownership patterns.	Participation in the ETS is voluntary – by not opting into the scheme, potential participants are choosing to leave NZUs that they earn (assets) and that they owe (liabilities) resulting from either harvesting or growing of trees, with the government.	Potential emission unit liabilities limited to number of emission units previously earned. Landowners or registered forestry participants would be responsible for the emissions associated with the loss of trees through events such as wind or fire damage.
	Growing of trees on land where the landowner, or third party with legal claim over trees, has voluntarily opted into the ETS.	Change in carbon stored in forested land (includes live and dead plant material, organic litter and soil carbon)									

Sector	Activity	Emission source or sink [A]	Emission source unit	Gas	Emission factor (t/CO_2-e per unit) [B]	GWP [C]	Specific* emission factor (Yes/No)	Mandatory participant (person who undertakes activity)	Expected number of participants	Exemptions	Comment
		[A] × [B] × [C] = tCO_2-e									
Energy (upstream option; midstream options are noted in section below)											
Liquid fossil fuels (primarily used for transport)	Removal from the refinery or importation of specified fuels. Typically these fuels are liable for excise duty (some at a rate of zero). Under the Customs and Excise Act 1996 this is defined as 'when the fuel is removed for home consumption'. This avoids fuel being accounted for when it moves between customs controlled areas, ie, it is only 'counted' for the ETS when the fuel leaves a customs controlled area (after it is removed from the refinery or imported).	Petrol premium	Litre	CO_2	0.0024	1	N	Oil companies	5	Fuel exported or intended for use on an international trip (as with GST).	An option to include the purchase of jet fuel as an 'activity' under the ETS is noted in the section below: 'midstream option'.
		Petrol regular			0.00232		N				
		Diesel			0.00271		N				
		Aviation gasoline (avgas)			0.00217		N				
		Jet kerosene (jet fuel)			0.00254		N				
		Light fuel oil			0.00294		N				
		Heavy fuel oil			0.00303		N				
		Naphtha			0.00259		N				
Coal	Importation of coal (when removed from a customs controlled area and as purchased for financial accounting purposes). Sale of coal that has been mined in New Zealand by a mining permit or licence holder in the case of Crown-owned resources or a landowner in the case of privately owned land (recorded as revenue for financial accounting purposes).	Coal – anthracite	TJ	CO_2	106	1	Y	Coal importer, coal miner	28 coal mine permit and licence holders who are actively mining Crown resources, plus coal miners that are mining privately owned resources.	Coal exported. Coal-seam methane vented or flared (but not sold). Potential exemption for emissions subject to carbon capture and storage, alternative is that NZUs are distributed for this activity. Coal mined under a *de minimus* threshold during the year.	It may be appropriate, for coal that is mined in New Zealand, to describe the activity as the 'production' of coal rather then the 'sale' of coal. Discussions with industry will be important in determining the most appropriate activity description.
		Coal – bituminous		CO_2	90	1	Y				
		Coal – sub-bituminous		CO_2	92	1	Y				
		Coal – lignite		CO_2	95	1	Y				
Production, import, processing and sale of natural gas, gas liquids, LPG	Importation of compressed or liquefied natural gas (as recorded as purchased and imported through Customs for financial accounting purposes).	Natural gas	TJ	CO_2	52.39	1	N	Gas importer	Unknown		

Sector	Activity	Emission source or sink [A]	Emission source unit	Gas	Emission factor (t/CO_2-e per unit) [B]	GWP [C]	Specific* emission factor (Yes/No)	Mandatory participant (person who undertakes activity)	Expected number of participants	Exemptions	Comment
		[A] × [B] × [C] = tCO_2-e									
	Sale (as recorded and reported for financial accounting purposes) of natural gas by a petroleum permit holder.	Natural gas	TJ	CO_2	By field, 84.1 for the Kapuni field, 52.39 for gas that meets industry specifications for distribution in New Zealand's distribution network and the Maui field.	1	Y	Gas producer at gas well head (petroleum permit and licence holder)	8	Natural gas sold as a feedstock to a methanol producer if the methanol is all exported. Natural gas contained in methanol exported (if not exempted when natural gas was first sold). CNG or LPG exported.	By using emission factors that recognise the higher CO_2 content of some natural gas streams by field (ie, the use of an emission factor of 84.1 for Kapuni), the need for the ETS to account for CO_2 stripped from the gas stream by a downstream process is not required. However, if there is a move to use a standard emission factor for all gas, that does not recognise the high CO_2 content of some gas fields such as Kapuni, the activity of stripping CO_2 from natural gas would need to be explicitly covered by the scheme. The upstream coverage of natural gas means that emissions that occur when hydrogen, methanol, ammonia and urea are produced are covered in the 'stationary energy' sector rather than in the 'industrial process' sector. Additionally, the CO_2 emissions associated with the application of urea as a fertiliser could also be captured by an upstream natural gas obligation (alternatively natural gas sold as a feedstock for urea could be exempt at upstream point of supply chain). In New Zealand's national inventory, it is assessed that 3.5 per cent of gas entering the distribution system is 'unaccounted for'. This is assumed to be as a result of the combination of three possibilities – that it is either leaked, stolen or results from metering errors. The inventory assumes that half of this (1.75 per cent) is leakage, and records this as methane emissions. It is not proposed that this be accounted for under the ETS, however, it could be through a simple alteration of the emission factor or the GWP.
	Own use (as recorded and reported as an expense (or equivalent) for financial accounting purposes) of natural gas holder by a petroleum permit holder.	Natural gas	TJ	CO_2	By field	1	Y	Gas producer at gas well head (petroleum permit and licence holder)			
	Flaring of natural gas in the course of producing or treating natural gas by the petroleum permit holder.	Natural gas	TJ	CO_2	By field	1	Y	Gas producer at well head (petroleum permit and licence holder)			

Sector	Activity	Emission source or sink [A]	Emission source unit	Gas	Emission factor (t/CO_2-e per unit) [B]	GWP [C]	Specific* emission factor (Yes/No)	Mandatory participant (person who undertakes activity)	Expected number of participants	Exemptions	Comment
		[A] × [B] × [C] = tCO_2-e									
	Venting of natural gas in the course of producing or treating natural gas by the petroleum permit holder.	Natural gas	TJ	CH_4	By field	21	Y	Gas producer at well head (petroleum permit and licence holder)			
	Sale (as recorded and reported for financial accounting purposes) of butane by a petroleum permit holder.	Butane	TJ	CO_2	59.8	1	N	Gas producer at well head (petroleum permit and licence holder)			
	Sale (as recorded and reported for financial accounting purposes) of propane by a petroleum permit holder.	Propane	TJ	CO_2	61.4	1	N	Gas producer at well head (petroleum permit and licence holder)			
Used oil that is burned for energy	Receipt of used oil or waste oil for the purpose of combustion (receipt means when the used oil is delivered to the facility where it will get burned).	Used oil	Tonne	CO_2	2.94	1	N	Industrial facility	1		Note that emissions from the burning of used oil were exempt from the EU ETS during the first phase, but are not exempt during the second phase, ie, post-2008. The viability of the used oil recovery programme will be a matter for discussion with stakeholders.
Own use of specified fuels by a petroleum refiner	Own use (as recorded and reported as an expense (or equivalent) for financial accounting purposes) of specified fuels by a petroleum refiner.	Refinery oil (to be determined if other products are required)	Tonne	CO_2	To be determined	1	Y	Oil refinery	1		
Use of geothermal steam for electricity generation or process heat	Off-take of geothermal steam separated from geothermal fluid containing non-condensable gas components for electricity generation or industrial heat.	Geothermal steam (including non-condensable stream)	Tonne	CO_2	Mass fraction CO_2	1	Y	Electricity generator or industry using geothermal resources	7		
				CH_4	Mass fraction CH_4	21	Y				

Sector	Activity	Emission source or sink [A]	Emission source unit	Gas	Emission factor (t/CO_2-e per unit) [B]	GWP [C]	Specific* emission factor (Yes/No)	Mandatory participant (person who undertakes activity)	Expected number of participants	Exemptions	Comment
		[A] × [B] × [C] = tCO_2-e									
Energy (midstream/ downstream options)											
Liquid fossil fuels (primarily used for transport)	Purchase of jet fuel from a fuel supplier (who has imported the fuel or removed it from the refinery) if the volume of fuel purchased exceeds a *de minimus* threshold.	Jet kerosene (jet fuel)	Litres	CO_2	0.00254	1	N	Between two and 10 airlines in New Zealand (depending on *de minimus*)		*De minimus* to be determined	To be discussed with stakeholders. Criteria to consider a mixed option, ie, upstream/midstream and downstream would include, inter alia, coverage of emissions, compliance costs, administration costs and efficiency.
Coal and natural gas	(to be determined)	Coal and natural gas	As above	As above	As above	As above	N	A combination of those listed in the upstream option and a carve out to allow some or all of the following entities to participate in the scheme: • coal wholesaler • natural gas processor • natural gas distributor, and • major users of coal and natural gas (definition of major user to be determined).	Unknown	*De minimus* to be determined	To be discussed with stakeholders. Criteria to consider a mixed option, ie, upstream/ midstream and downstream would include, inter alia, coverage of emissions, compliance costs, administration costs and efficiency.
Industrial processes											
Material transformation	Importation or purchase from a domestic supplier (as recorded as purchases for financial accounting purposes) of specified products for use in an industrial process where greenhouse gas emissions are expected to occur (eg, the use of carbon pitch to make anodes that are consumed during aluminium smelting)	Carbon pitch, carbon black	Tonne	CO_2	To be determined	1	Y	Aluminium and steel producers	3		Other options include measuring anode carbon consumed during aluminium production, use of coal and coal products as a reductant during iron making, etc.
		Coke products default			2.85						
		Domestic coke			3.1						
		Coke for iron and steel manufacture			3.08						
		General industrial coke			2.99						
		Petro-coke			3.03						

Sector	Activity	Emission source or sink [A]	Emission source unit	Gas	Emission factor (t/CO_2-e per unit) [B]	GWP [C]	Specific* emission factor (Yes/No)	Mandatory participant (person who undertakes activity)	Expected number of participants	Exemptions	Comment
		[A] × [B] × [C] = tCO_2-e									
		Recycled steel			To be determined						
	Anode effects during aluminium smelting producing CF_4 and C_2F_6	Anode effect	Minutes	PFCs	Slope factor 0.14 (CF_4) and 0.018 (C_2F_6)	6500 (CF_4) 9200 (C_2F_6)	Y	Aluminium producer	1		The methodology noted here is a 'tier 2 method' that is used when calculating the national inventory which uses default slope factors, multiplied by minutes to give 'anode effect per cell day'. Site-specific measurement of emissions and/or emission factors is also a possibility and will be discussed with stakeholders.
	The calcination of limestone during cement production to produce 'clinker' (as recorded and reported as stock on hand for financial accounting purposes)	Clinker (intermediate cement product)	Tonne	CO_2	0.79	1	Y	Cement producer	2		Emission factors currently used for inventory (tCO_2 per t clinker) are confidential. The best way to legally define clinker will be discussed with stakeholders.
	The calcination of limestone during burnt lime production (as recorded and reported as stock on hand for financial accounting purposes)	Burnt lime	Tonne	CO_2	0.79	1	Y	Burnt lime producer	3		
	As for other limestone if applicable	Dolomitic lime	Tonne	CO_2	0.91	1	Y	Cement or burnt lime producer	Same as above		
	Purchase by importation or from a domestic supplier (as recorded and reported for financial accounting purposes) of soda ash for the purpose of using in an industrial process where greenhouse gas emissions are expected to occur (eg, during glass manufacture)	Soda ash	Tonne	CO_2	0.415	1	Y	Glass manufacturer	1		
	Purchase (as recorded and reported for financial accounting purposes) of limestone for the purpose of using in an industrial process where greenhouse gas emissions are expected to occur (eg, during gold processing)	Limestone	Tonne	CO_2	0.44	1	Y	Paper, steel and gold producers	3 to 6	This transaction may be exempt if the ETS has already captured limestone because its usual use is fertiliser.	

Sector	Activity	Emission source or sink [A]	Emission source unit	Gas	Emission factor (t/CO_2-e per unit) [B]	GWP [C]	Specific* emission factor (Yes/No)	Mandatory participant (person who undertakes activity)	Expected number of participants	Exemptions	Comment
		[A] × [B] × [C] = tCO_2-e									
Material where use results in emissions	Sale (as recorded and reported for financial accounting purposes) of limestone fertiliser products	Limestone (ground up and sold as fertiliser)	Tonne	CO_2	0.725	1		Lime fertiliser producer			Lime fertilisers are included in the LULUCF section of the national inventory but are classified as industrial process emissions for the ETS (to keep all lime products together).
Loss of inert synthetic gases	Importation of sulphur hexafluoride when liability to pay excise or excise equivalent duty arises	SF_6	Tonne	SF_6	1	23,900	N	Importer	6 (approximate)	Importation of HFCs and PFCs contained in manufactured equipment. *De minimus* to be determined.	Practicality of inclusion is still under consideration – particular feature is the exporting of a small quantity of HFCs in New Zealand manufactured equipment, lack of detail in excise duty coding as to exact gas being imported/exported, and probable blending of bulk imported gases. These matters will be discussed with stakeholders.
	Importation of hydrofluorocarbons when liability to pay excise or excise equivalent duty arises	HFCs	Tonne	HFCs	1	650 to 3,800 depends on which HFC	N	Importer	13 (approximate)		
	Importation of perfluorocarbons when liability to pay excise or excise equivalent duty arises	PFCs	Tonne	PFCs	1	6,500 to 9,200 depends on which PFC	N	Importer	13 approximately		
Waste											
Solid waste	Disposal of solid waste in a landfill where organic waste is also disposed of or has been disposed of. Final descriptions are to be aligned with definitions contained in the Waste Minimisation (Solids) Bill currently before select committee	Solid waste	Tonne	CH_4	To be determined annually by reference to implied national average within most recent national greenhouse gas inventory. Includes implied national average efficiency of gas destruction if such a process operates at the facility.	21	Y	Disposal facility operator – final descriptions are to be aligned with definitions contained in the Waste Minimisation (Solids) Bill currently before select committee	60	Emissions from wastewater treatment and waste incineration.	It is expected that emission factors will be developed as a result of compositional analysis at each site in accordance with the New Zealand Solid Waste Analysis Protocol. Participant-specific removals through gas destruction allowed to be included. It is also expected that there will be a default emission factor available to use if a landfill operator does not wish to arrange for a participant-specific emission factor.
Agriculture (further analysis needed)											
Synthetic fertilisers	Sale (as recorded and reported for financial accounting purposes) of synthetic fertilisers containing nitrogen by the importer or manufacturer of the synthetic fertiliser	Nitrogen component of synthetic compound fertilisers	Tonne	N_2O	0.01845	310	N	Nitrogenous fertiliser manufacturer or importer	3		
Enteric	Ownership, sale or	Ruminant	Stock unit	CH_4	To be determined	21	N	Meat and dairy	26 meat processors	A farm-level	Significant further analysis is required to

Sector	Activity	Emission source or sink [A]	Emission source unit	Gas	Emission factor (t/CO_2-e per unit) [B]	GWP [C]	Specific* emission factor (Yes/No)	Mandatory participant (person who undertakes activity)	Expected number of participants	Exemptions	Comment
		[A] × [B] × [C] = tCO_2-e									
fermentation and manure management	processing (to be determined) of ruminant animals or ruminant animal products	animals	or kg of animal or animal product	N_2O	by reference to standards tables that detail characteristics such as species, breed and age.	310	N	processors or farmers	and 14 dairy processors. Thousands of farmers if farm-level obligation.	obligation could require a *de minimus* threshold to exclude very small farming operations.	determine how and where this liability should be applied.

* Participants are permitted to get an emission factor that is specific to their operation. Procedures to enable such emission factors will be specified in legislation/regulation and will require approval by the administering agency.

Notes:

All emission factors are indicative only and will be finalised after technical review and discussions with relevant stakeholders.

The terms ‘sale’, ‘expense’, ‘purchased’ etc will need to be defined in legislation.