

Responding to Climate Change: A Carbon Tax or an Emissions Trading Scheme? A New Zealand Perspective

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Abbreviations

AAU	Assigned Amount Unit
ABARE	Australian Bureau of Agricultural and Resource Economics
AEU	Australian Emissions Unit
AETS	Australian Emissions Trading Scheme
AU CPRS	Australian Carbon Pollution Reduction Scheme
BC	British Columbia
BEFU	Budget Economic and Fiscal Update
CAP	Climate Action Plan
CCC	Climate Change Convention
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CH₄	Methane
CO₂	Carbon Dioxide
CO₂-e	Carbon Dioxide Equivalent
COP	Conference of the Parties
CP1	Commitment Period 1(the first commitment period)
CPRS	Carbon Pollution Reduction Scheme
EECA	Energy Efficiency and Conservation Authority
EITE	Emissions Intensive, Trade-Exposed
ERU	Emission Reduction Unit
ETS	Emissions Trading Scheme
EU	European Union
EUA	European Union Emission Allowance
EU ETS	European Union Emissions Trading Scheme
GDP	Gross Domestic Product
Gg	Gigagram
GHGs	Greenhouse gases
GPC	Greenhouse Policy Coalition
GST	Goods and Services Tax
HFCs	Hydrofluorocarbons
IPENZ	Institution of Professional Engineers New Zealand
IPCC	Intergovernmental Panel for Climate Change
I-CER	Long-term Certified Emission Reductions
LSA	Living Streets Aotearoa
LFF	Liquid Fossil Fuels
LUCAS	Land-Use Carbon Analysis System
LULUCF	Land Use, land-Use Change, and Forestry
MEPS	Minimum Energy Performance Standards
MMP	Mixed-Member Proportionate
Mt	Million (Mega) tonnes
N₂O	Nitrous Oxide
NGAs	Negotiated Greenhouse Agreements
NGO	Non-Governmental Organisation
NSW	New South Wales
NZ	New Zealand
NZBCSD	New Zealand Business Council for Sustainable Development

NZCAS	New Zealand Carbon Analysis System
NZCMP	New Zealand Carbon Monitoring System
NZICA	New Zealand Institute of Chartered Accountants
NZU	New Zealand Unit
OECD	Organisation for Economic Co-operation and Development
RMU	Removal Unit
SADEM	Supply And Demand Energy Model
SEIP	Stationary, Energy and Industrial Processes
SF₆	Sulphur Hexafluoride
SOP	Supplementary Order Paper
t-CER	Temporary Certified Emission Reductions
UK	the United Kingdom
UK ETS	the United Kingdom Emissions Trading Scheme
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
US	the United States
WMA	Waste Minimisation Act
WOGOCOP	Working Group on CO ₂ Policy

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Executive Summary

Consequences of global warming and climate change issues have become more apparent over the last several decades. Heat waves, floods, tornados and storms are not just natural disasters occurring elsewhere, but they are now serious environmental catastrophes threatening New Zealand (NZ) and nearby countries as a result of continuously escalating greenhouse gas (GHG) emissions. Thus, the Kyoto Protocol was prepared for countries to work collaborately to provide a solution through encouraging countries to commit themselves to reducing their individual share of the total GHG emissions. To date, NZ has gone through several phases of modification – introducing and revising two distinctive climate change policies (a Carbon Tax and an Emissions Trading Scheme [ETS]) as a tool to reduce GHG in NZ. These attempts to address climate change, coupled with the question raised by McDonald (Irish Times, 2009) doubting the actual effect of a tax on behaviour-change, provide an extensive basis for a case study in a NZ context involving an evaluation of the effectiveness of these regimes on incentivising behaviour-change to reduce and stabilise the level of GHG emissions.

In an attempt to answer the research question and conduct a case study in a NZ context, a triangulation approach incorporating both quantitative and qualitative research methods was undertaken. Statistical data analysis was conducted as a quantitative method to analyse and compare numerical changes ‘with’ and ‘without’ the existence of climate change policies. To enhance the results obtained from the quantitative research, qualitative information was also collected by interviewing politicians directly related to the introduction, implementation and the review process of the climate change policies in a semi-structured manner.

The results of this study reinforced the need for regulations and policies to reduce and maintain the level of GHG emissions. Statistical data analysis proved that the existence of climate change policies results in lower level of GHG emissions. The interviewees also perceived that some sort of policy is definitely required to regulate the level of emissions, although whether the current, National-led Government's modified-ETS is the 'right' approach is still uncertain. However, the majority of interviewees agreed that the type of tool does not matter, as long as it is correctly-designed to reflect the necessary policies to influence the decision making process of individuals and businesses, and ultimately change their behaviour as a result. However, in order to maintain NZ's relationship with other countries, it is preferable to retain its ETS regime until other countries decide to do otherwise.

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Chapter One:

Introduction

1.1. Overview of Thesis

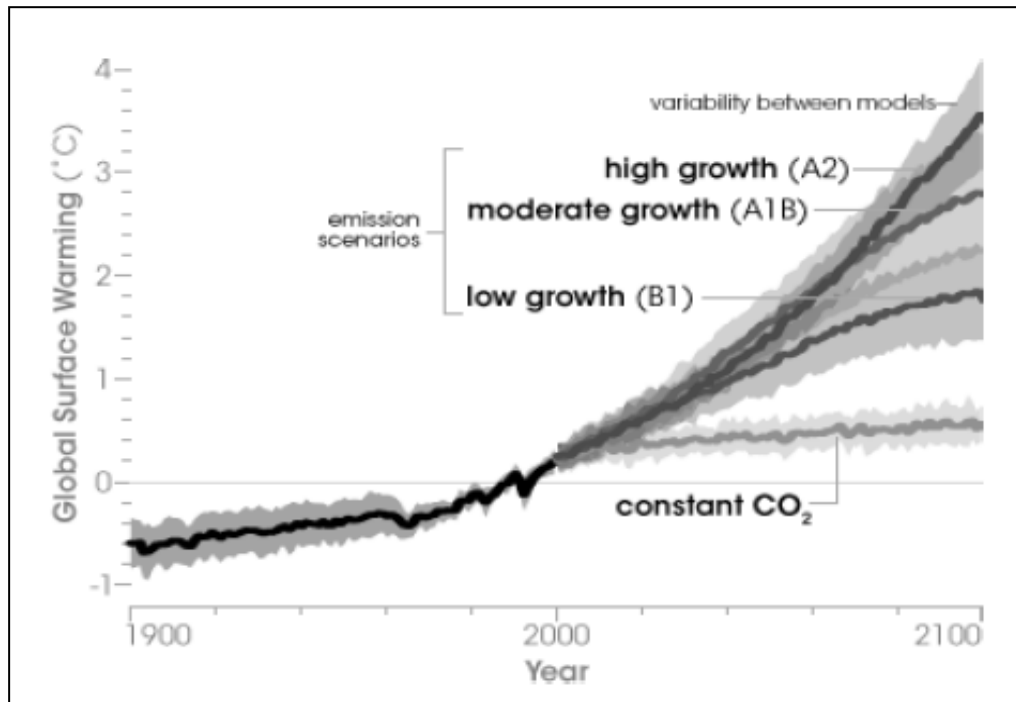
“The defining challenge of the 21st Century will be to face the reality, [which is] that humanity shares a common fate on a crowded planet” (Sachs, 2008, p 35). It has only been a decade since the beginning of the 21st Century and already, there is overflowing evidence of the ‘crowded planet gone bad’ – the global climate change crisis. European and American snow storms; South-eastern Australian heat waves; floods and mudslides in Madeira, Rio de Janeiro and Australia; a Southern Ontario tornado outbreak; Klaus; Xynthia; Cyclone Yasi; and North American storm complexes: just some of the major consequences of the global climate change in the form of natural disasters, victimising thousands of individuals and families (IPCC, 2007; and TVNZ, 2011). Climate change is argued to be the resultant of global warming:¹ a repercussion from increasing carbon emissions levels emitted from human-induced activities (Steinfeld *et al.*, 2006). Examples of human-induced activities that primarily cause global warming by creating carbon dioxide (CO₂) emissions include: fossil fuel burning; ozone depletion; cement manufacture; land use; aerosols and fertilisers; and deforestation (Steinfeld *et al.*, 2006).

As of 2011, prospective greenhouse gas (GHG) emissions in 2030 are estimated to be double that of 2005 if nothing is done to restrict this escalation of emissions. A possible cause of a reduction in the level of average global emissions may be the aftermath of the global financial recession since 2007 – a decline in the level of global economic activity – however, it appears to be insufficient to offset increasing emissions from rapidly-expanding countries such as China and India (Morton, 2011). The foreseeable future as suggested by Morton (2011) is manifested in Figure 1.1, where it illustrated the anticipated climate change over two centuries

¹Global warming is defined as an acceleration of average global temperatures over the last several decades (Steinfeld *et al.*, 2006)

(1990 – 2100) in three possible scenarios – high, moderate, or low growth (Ministry for the Environment, 2010, p 5):

Figure 1.1: Estimated Climate Change over Two Centuries (1990 – 2100)



Consequently, there has been a growing awareness of, and increasing concerns over, climate change and global warming issues from both developing and developed countries. However, regardless of the growth in human awareness of this global crisis, the environment is being destroyed at an accelerating speed (IPCC, 2007). As a result, UNFCCC² was formed to inhibit this destruction, which led to proposing two contrasting climate change policies (a Carbon Tax and an Emissions Trading Scheme [ETS]) to price the carbon in order to stabilise the level of emissions. According to the Working Group of CO₂ Policy (WOGOCOP) (WOGOCOP,

²United Nations Framework Convention on Climate Change - an international environmental treaty produced at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit., with an aim to stabilize GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The official website for UNFCCC is <http://unfccc.int/2860.php> (UNFCCC, 1992, p 1).

1996), the use of these economic policies and other possible measures is to achieve the twin objectives of (WOGOCOP, 1996, p 3):

- Stabilising the net carbon dioxide (CO₂) emissions [a commitment made by NZ under the Framework Convention on Climate Change]; and
- Minimising the impacts and risks to economic growth at the same time.

UNFCCC consists of three different classifications of parties:³ Annex I countries; Annex II countries; and developing countries (UNFCCC, 2009b). Most Annex I and II countries, including Germany, Japan, New Zealand (NZ), the United Kingdom (UK), and the United States (US), signed the Kyoto Protocol with the aim to commit themselves to reducing the level of GHG emissions (UNFCCC, 2009b). No specific quantitative targets are set for non-Annex I countries to lower their emissions. Yet, several approaches are available to regulate activities in order to minimise GHG emissions, in the form of mitigation action plans, taxes, renewable energy and energy efficiency goals. This is evident in China, where they had a mitigation action plan that restricted the use of old coal-fired power plants, which were perceived to be less efficient and more carbon-intensive, releasing large amount of emissions (PBL, 2009). However, these action plans are not recognised as climate change commitments under the Kyoto Protocol (Stern, 2007).

As a means of addressing the issue of reducing and stabilising GHG emissions, annual conferences, namely the Conference of the Parties (COP), are being held by the parties to the United Nations Framework Convention on Climate Change (UNFCCC)⁴ since 1995. The

³Definitions of these classifications and a full list of countries categorised under these classifications are disclosed in Appendix 1.

⁴ United Nations Framework Convention on Climate Change members include 194 developed and developing countries (UNFCCC, 2006).

objective of these conferences is to regularly monitor and assess the progress made by individual parties in managing climate change (UNFCCC, 2009b). In 1997, the Kyoto Protocol was introduced, constituting legally-binding targets to enforce individual parties to commit to monitoring and minimising GHG emissions (United Nations, 1998). The most recent conference was held in December 2009, located in Copenhagen, Denmark. Hence the conference was named as the ‘Copenhagen Conference’, generally known as the ‘Copenhagen Summit’. Brazil, China, India, South Africa, and the US⁵ prepared a blueprint of a resulting document, the ‘Copenhagen Accord’. Nevertheless, the parties failed to settle on an agreement for a framework to mitigate global warming and climate change post-2012, consequently failing to produce a legally enforceable document (UNFCCC, 2009a).

The motivation to conduct this research comes from developing concerns of individuals and businesses about climate change, and ongoing debates surrounding the effectiveness of rapidly transforming patterns of an ETS in comparison to a Carbon Tax as a means of reducing the level of GHG emissions. To date, numerous studies have been conducted, both on the broad notion of a Carbon Tax and an ETS, and also on the effectiveness of either policy within a specific sector, for example, the energy sector, or the agriculture sector. Nonetheless, scant prior literature exists around studies that examined either approach within NZ as a whole economy. One of the fundamental documents published in NZ is a discussion document of WOGOCOP published by the Ministry for the Environment in 1996. This document provided detailed information about key issues surrounding climate change at that time, and a comprehensive analysis of the cost-effectiveness of the main available options: Carbon Charge, Tradeable Certificates and Capped Tradeable Certificates.⁶ The primary objective of this publication was to assist the NZ government and the community in making

⁵In alphabetical order.

⁶A Carbon Charge is equivalent to a Carbon Tax, and Tradable Certificates correspond to the notion of an ETS.

informed decisions about maintaining economic growth and on ways of sustaining the environment (WOGOCOP, 1996).

Effectively, this study focuses on evaluating and analysing the anticipated behavioural-effectiveness of climate change policies on individuals and businesses, and their future implications in a NZ context. In order to obtain diverse evidence on climate change policies, and their projected behavioural-effectiveness, a mixture of quantitative and qualitative analyses was conducted. Actual and projected numerical changes of GHG emissions were analysed to examine the anticipated statistical impacts of the NZ ETS and a Carbon Tax on the NZ economy. Qualitative interviews were also conducted to enhance the quantitative results by obtaining realistic evidence of NZ's environmental future, from politicians directly involved in the implementation and/or review process of climate change policies.

In summary, the outcomes of quantitative and qualitative analyses suggested the same; that it is not the tool, but rather it is the design that matters. Whatever the tool may be, as long as it is designed properly to incentivise individuals and businesses to reduce GHG emissions, it would be the most adequate approach in NZ. However, majority of interviewees perceived the National-led Government's (National's) modified-ETS, in its current form, provides insufficient incentives for businesses and individuals to change their behaviour in order to stabilise GHG emissions below 1990 levels in NZ. Yet, based on the prospective global trend towards an ETS, most politicians, including those who prefer a Carbon Tax, unanimously voted for an 'ETS future'. Therefore it is believed by all interviewees that the NZ should retain its ETS, but with further modifications to 'make it work'.

1.2. Research Objectives and the Development of the Research Question

Since ratifying the Kyoto Protocol in late 2002, NZ has made three attempts to address its obligations to reduce GHGs in response to climate change: a Carbon Tax, a comprehensive ETS and a modified-ETS (Ministry for the Environment, 2006; and Bertram and Terry, 2009). The effectiveness of these policies, which had been the centre of attention from the introduction of the initial ‘cap and trade approach’ notion in the US in 1990 (Coniff, 2009), attracted more awareness when delegates of the 2009 Copenhagen Conference could not reach an agreement, questioning the adequacy and the validity of an ETS (COP Copenhagen 2009, 2009). With these three differing approaches to addressing climate change, this study seeks to explore the proposed environmental policies in a NZ context from a political perspective in order to determine the most appropriate option for reducing and stabilising GHG emissions in NZ. Ultimately, the research question this thesis aims to address is:

When the strategies of imposing a Carbon Tax or implementing an Emissions Trading Scheme are compared, how effective is a Carbon Tax in comparison to an Emissions Trading Scheme, in incentivising individuals and businesses to change their behaviour with respect to reducing GHG emissions?

More specifically, the research question aims to focus on the following objectives:

- To study the history of Kyoto Protocol mechanisms in NZ, from the initiation of the Carbon Tax proposal, to the implementation of the current National’s modified-ETS;
- To review political and public perspectives, including international responses, by examining various reports, political literature, submissions and media releases;
- To assess the effectiveness of both a Carbon Tax and an ETS, by investigating the behavioural effects of implementing these mechanisms; and
- To evaluate the mechanisms and behavioural changes, in order to determine an appropriate approach for reducing GHG emissions in NZ.

1.3. Importance of Research

Continuous discussion on pricing CO₂ emissions to discourage the use of carbon-intensive energy sources: for example, oil; coal; and natural gas, and instead, encourage the development of less carbon-intensive sources of energy, such as renewables (Carbon Tax Center, 2009b), resulted in the implementation of one of two distinctive approaches – a Carbon Tax and an ETS (WOGOCOP, 1996). Essentially, a Carbon Tax is a levy placed on the level of GHG emissions, with the aim of decreasing emissions by penalising emitters in the form of taxes. In contrast, an ETS requires trading of emissions trading units, progressively imposing stricter limits on fossil fuel use to incentivise emitters to reduce GHG emissions through discouraging activities that release CO₂ emissions (Carbon Tax Center, 2009b).

Although the global trend appears to be leaning towards the implementation of an ETS to achieve emissions reduction, whether a Carbon Tax is more effective than an ETS in discouraging activities that release CO₂ emissions is still subject to a debate (for example, Humphreys, 2009; Irish Times, 2009; Jotzo, 2009; NZ Energy, 2009; Wong, 2009; Yale Environment 360, 2009; and IPS, 2010). There are numerous published studies on the effectiveness of a Carbon Tax and ETS in several developed countries for example, European Union (Kopp, 2007; Convery, 2009); Australia (Humphreys, 2009); and the US (Metcalf, 2009). Notwithstanding the attempts made by NZ to reduce GHGs in response to climate change, media releases are the major source of information in NZ, with little in the way of academic literature on comparing the effectiveness of two major climate change regimes (Scrimgeour *et al.*, 2005; Lee *et al.*, 2008; and Bullock, 2009).

Thus, this research aims to examine the adequateness of the policies in a NZ context by providing a comprehensive information on key issues surrounding climate change, and

through producing a detailed analysis of the ‘behavioural-effectiveness’ of two fundamental climate change policies: a Carbon Tax and an ETS. McDonald (Irish Times, 2009) questioned the actual implication of imposing a tax on individuals’ and businesses’ behaviour – whilst it is certain that the ultimate goal of a Carbon Tax and an ETS is to change individuals’ and businesses’ behaviour to reduce the level of GHG emissions, the actual effect of this course is still unclear. Based on McDonald’s question and on the history of attempting to address climate change, a study was conducted exploring the ‘behaviour-change’ of individuals and businesses both prior to, and following the implementation of two contrasting policies in NZ in order to ‘resolve’ this climate change dilemma.

1.4. Structure of the Thesis

The remainder of this proposal is structured as follows. Chapter 2 provides an overview of key contributors to the Carbon Tax and ETS literature, including aspects regarding the background information about an ETS and a Carbon Tax, as well as key media releases, political literature, and international responses on this issue. The research approach and the methods employed for this study are outlined in Chapter 3, followed by the discussion of the quantitative analysis in Chapter 4 and qualitative outcomes in Chapter 5. Finally, Chapter 6 concludes this thesis by setting out the conclusion, key assumptions, limitations and recommendations for future research.

Chapter Two:

Literature Review

2.0. History of New Zealand's Climate Change Policies

2.1. Overview

Currently, climate change is a fundamental 'homework' that humanity needs to solve, as a result of continuous industrialisation and development of numerous countries. This led to a creation of a worldwide environmental treaty, the United Nations Framework Convention of Climate Change (UNFCCC), as a means of minimising inevitable increases in the global temperature through encouraging a reduction in the level of greenhouse gas (GHG) emissions caused by human-induced activities. Specifically, the aim of UNFCCC is to achieve *"stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interferences with the climate system"* (UNFCCC, 1992, p 4).

The Kyoto Protocol was enacted to accommodate the existing UNFCCC in 2005. It is a set of provisions that set powerful and legitimate targets to encourage countries to commit themselves to be responsible by taking actions to stabilise their share of the global emissions (United Nations, 1998). As of October 2010, 191 states, including the Cook Islands and Niue, affirmed their participation in the global attempt to decrease emissions below 1990 levels by signing the protocol.

The parties to UNFCCC are classified under three categories – 'Annex I', 'Annex II' and 'developing countries' – with the universal objective of committing themselves to reduce four types of GHGs, Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), and Sulphur Hexafluoride (SF₆) and two other types of gases, Hydrofluorocarbons (HFCs) and Perfluorocarbons (PFCs) (United Nations, 1998). In particular, NZ has the history of proposing three environmental policies to participate in reducing GHG emissions: a Carbon

Tax, an ‘all-gases and all-sectors’ ETS, and a modified-ETS. The Labour-led NZ Government offered five reasons for ratifying the Kyoto Protocol, of which Sawyer (2007, p 459) perceived the following as crucial:

- Abandoning the Kyoto Protocol would damage NZ’s credibility and reputation as a global citizen in climate change fora and also over a wide range of international issues; and
- NZ’s effectiveness in climate change negotiations means it is one of the few developed countries that stand to make a small net economic gain from the first Kyoto Protocol commitment period. Economic benefits are also likely to include technology and energy-efficiency improvements.

According to the American Association for the Advancement of Science (2009), the primary cause of global warming is CO₂ emissions is a heat trapping, human-induced (anthropogenic) GHG emissions (US National Research Council, 2001; Staudt *et al.*, 2008). Thus, appropriate policies are required for ratified countries to be accountable for their emissions and stabilise global warming and climate change. Universally, a Carbon Tax and an Emissions Trading Scheme (ETS) were perceived to be the two most commonly implemented regimes. These policies are intentionally designed to increase the competitiveness of less carbon-intensive technologies, such as renewable technologies, in comparison to the conventional approach of burning fossil fuels (IPCC, 2001). As it currently stands, New Zealand (NZ) is the only single domestic country to have an all-sectors, all gases ETS. The European Union (EU)⁷ also has an ETS; however, the EU ETS is a multinational scheme, only applicable to energy and

⁷The EU is comprised of numerous countries, which are treated as a single market (Frazer Lindström, 2009b).

industrial sectors. With respect to other industrialised countries, they have the history of imposing a Carbon Tax (New Zealand Parliament, 2010).

2.2. Carbon Tax

Approximately two decades ago, numerous countries initiated introducing a Carbon Tax as a means of addressing the current and serious environmental issue – climate change. A Carbon Tax is an environmental levy on carbon dioxide equivalent (CO₂-e) emissions, by taxing the amount of emissions released at a fixed rate; for example, \$x per tonne of CO₂-e (Carbon Tax Center, 2009b). With Finland's initiation of implementing this regime in 1990 (Vourc'h and Jimenez, 2000), numerous developed countries, including several European countries,⁸ several states in the United States (US) (Makower, 2005), and NZ (Hodgson, 2005) already have the history of, or at least expressed an interest in, implementing a Carbon Tax.

Of particular interest is NZ's agreement to commit itself to reducing the level of GHG emissions through the imposition of a Carbon Tax in 2005. Initially, the price of carbon was proposed at NZ\$15 per tonne of CO₂, with a cap at NZ\$25 per tonne of CO₂. If implemented as scheduled, the Carbon Tax would have been effective from 1 April 2007, being applicable to most sectors in NZ that release GHG and human-induced emissions. The agriculture sector, which comprises approximately 49 percent of NZ's total emissions, was to be excluded from the tax (Smith, 2009).

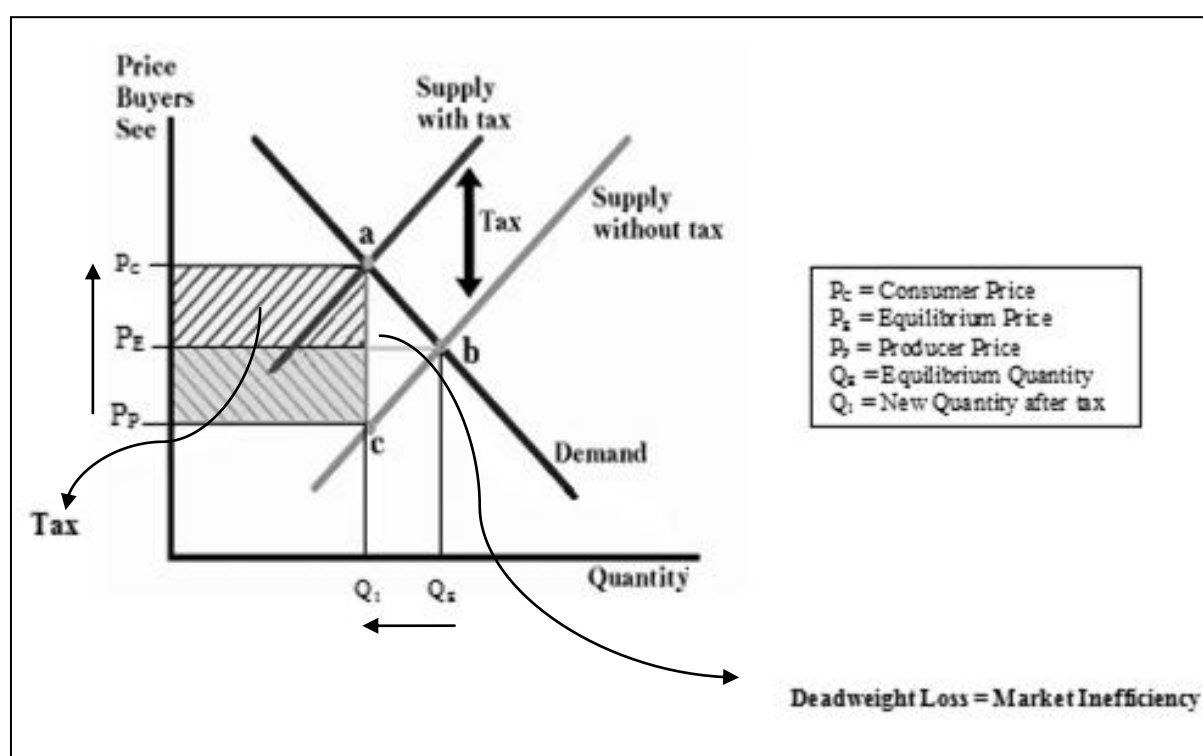
The introduction of this regime was expected to have some physical shift in the consumption and investment patterns to less carbon-intensive goods and services, through increasing the price of emission-intensive commodities, for example petrol and electricity (Hodgson, 2005).

⁸Refer to Chapter 2.2.3 for more details on international responses to a Carbon Tax regime.

Nonetheless, NZ's then Labour-led Government announced their intention to recycle the revenue earned back into the tax system, rather than to benefit from the tax by improving its fiscal position (Scrimgeour *et al.*, 2005).

In economics, pollution, including CO₂ emissions, is considered to be a negative externality that causes market failure – the market fails to correctly price the cost of this negative effect on a good or service (Hepburn, 2006). Effectively, economists perceive that a Carbon Tax is imposed to discourage the release of these negative externalities, in the form of taxation. Nonetheless, the Carbon Tax is considered to be an indirect tax creating a Dead Weight Loss (DWL) in the economy as the emitter passes the effects of this obligation to the consumers through increases in prices (Hepburn, 2006). Figure 2.1 (Schenk, 2007, p 1) illustrated the economic effect of imposing a Carbon Tax – market inefficiency created from the resulting DWL.

Figure 2.1: Economic Effect of Imposing a Carbon Tax



The introduction of a Carbon Tax attracted numerous parties, and countless publications were released on the advantages and disadvantages of imposing a Carbon Tax (for example, Warren, 2008; ABC News, 2009; Carbon Tax Center, 2009a; Irish Times, 2009). Advantages of a Carbon Tax include its accuracy and simplicity, while many studies criticised this approach with reasons that suggested the tax is fundamentally *“flawed due to its errors in the methodology, calculations and projects and that it would not serve the intended aim of reducing emissions”* (Sawyer, 2007, p 455).

2.2.1. Responses to the Proposed Implementation of a Carbon Tax

In general, the initial response to the Carbon Tax proposal was pessimistic, because of the perception that the Carbon Tax would generate a substantial increase in energy prices and in transport costs. Furthermore, consumers will have to bear the burden of the increase in costs, with no guarantee of positive impacts of the imposed tax – a reduction in the level of GHG emissions (Sawyer, 2007). In particular, politicians from the opposition parties at the time, including members of the National Party, were against the notion of a Carbon Tax because they expected the tax would *“increase the cost of living, undermine the competitiveness of business and achieve nothing for the environment”* (Taylor, 2005, p 1). Therefore, oppositions claimed that it is worth considering abandoning the tax regime if it would cost NZ, its international reputation (Fallow, 2005). Effectively, several commentators submitted some serious requests to the NZ Government in relation to redirecting NZ’s focus on less carbon-intensive technologies, for example, renewable, solar and biomass energy, rather than on approaches that would penalise innocent citizens (Sawyer, 2007).

2.2.2. Public Submissions on the Proposed Implementation of the Carbon Tax

As a response to then Labour-led NZ Government's request for submissions on the Carbon Tax proposal in 2005, over 90, including seven readily and publicly available submissions, were received. Various views were expressed, of which some of the main submissions are outlined below (Sawyer, 2007).

Cycling Advocates' Network (CAN) strongly supported the notion of implementing a Carbon Tax as a means of addressing a serious environmental issue. CAN believed that committing to Kyoto Protocol will encourage individuals and businesses in NZ to make 'correct' decisions of reducing carbon emissions in NZ. In addition, Contact Energy, a major energy provider, also supported the proposed Carbon Tax implementation policy, on the basis of its accuracy and simplicity. However, Contact Energy also expressed concern over the uncertainty of the tax rate and its long-term future in NZ. The IPENZ Transportation Group and Living Streets Aotearoa (LSA) are two other parties in support of implementing a Carbon Tax. Both parties provided similar reasons for their support – the Carbon Tax is one of the useful, and preferred tools to satisfy a need for managing the demand for motor vehicle travel (Sawyer, 2007).

Conversely, BusinessNZ strongly opposed the proposal for several reasons. Basically, BusinessNZ described the Carbon Tax as a selective tax, providing discrepancy among GHG emitters. Consequently, this resulted in increasing distortions between, and possibly within, various sectors. Ultimately, this was claimed to be 'in breach of the principles of a 'good' tax system'⁹ (Sawyer, 2007, p 465). Furthermore, BusinessNZ perceived that a Carbon Tax would penalise domestic businesses against international competitors with no tax burden

⁹ Adam Smith's canons of taxation describe the principles of a good, fair and efficient tax system (Brown, 1997).

(Sawyer, 2007). The Electricity Commission, another major energy provider, expressed concerns over the implications for the security of electricity supply. However, they supported the implementation of a Carbon Tax, provided that some modifications are made to resolve their concern in a cost-effective way consistent with then Labour-led NZ Government's overall policy objectives for the introduction of the Carbon Tax (Sawyer, 2007).

Among diverse responses, the New Zealand Institute of Chartered Accountants (NZICA) solely provided a neutral opinion, with its submission focused on technical issues. Ultimately, the most significant submission out of all of those received, as suggested by Sawyer (2007), was received from Greenhouse Policy Coalition (GPC). GPC is against the notion of a Carbon Tax, perceiving that it would result in an *"economic drag on the economy"* (Greenhouse Policy Coalition, 2005, p 3), and that there are other approaches that can achieve the same, if not better outcome by providing positive incentives. Their opinion was based on NZIER's estimation that the imposition of a Carbon Tax would negatively impact the NZ economy, as evident in the Government's official projection of 0.03 percent decrease (loss of \$47 million per annum from 2010 onwards) in the level of economic growth, measured in terms of Gross Domestic Product (GDP) (Sawyer, 2007).

2.2.3. International Responses on the Carbon Tax Regime

Numerous countries have already had the experience of imposing a Carbon Tax, or have expressed their intentions to implement one. However, regardless of their history, most of these countries and regions currently have implemented, or in the process of considering the option of implementing an ETS as a mechanism to address climate change (Pearce, 2005; ABC News, 2009; and Carbon Tax Center, 2009b).

2.2.3.1. Australia

In Australia, both a Carbon Tax and a Cap-and-Trade Scheme options have been under consideration (ABC News, 2009). Initially, in 2007, a Carbon Tax was nominated to be the adequate approach by the Productivity Commission¹⁰ (The Age, 2007). Instead, the Carbon Pollution Reduction Scheme (CPRS)¹¹ was proposed, as a result of the Federal Government's preference on the cap-and-trade system recommended by the Garnaut Climate Change Review.¹² However, after a long debate, this proposal was 'voted-out' in the Senate by several parties: the Australian Greens; the Conservative Liberal; National Coalition; an independent Senator, Nick Xenophon; and a climate change sceptic, Steve Fielding for its ineffectiveness and for its negative impacts on key economic sectors (Xenophon. 2009). The proposed and 'now-on-hold' Australian ETS is comprehensively explained in Chapter 5.11.

2.2.3.2. Canada

Canada's initiation of minimising possible global warming and climate change was through the introduction of a Carbon Tax in the Province of Quebec in 2007. The tax was applicable to energy; and the tax revenue was invested in energy-efficiency programs, as well as in improving public transport services (Carbon Tax Center, 2009b). Subsequently in 2008, the Province of British Columbia (BC) imposed the Carbon Tax, priced at Canadian (CAN) \$10 per tonne of CO₂-e emissions (CAN\$0.0241 per litre on gasoline), becoming the first North-American jurisdiction to take part in the global attempt to reduce GHG emissions (Government of British Columbia, 2010). Thereafter, the tax would consistently increase on an annual basis until 2012, with a cap at a price of CAN\$30 per tonne (CAN\$0.072 per litre at

¹⁰Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians (Productivity Commission, 2007).

¹¹ The CPRS is a proposed Cap-and-Trade system of emissions trading for anthropogenic GHG, as part of Australia's climate change policy (Bartholomeusz, 2007).

¹²The Garnaut Climate Change Review is an independent study conducted by Professor Ross Garnaut, with authorisation from then-Opposition Leader Kevin Rudd and the Australian State and Territory Governments (Garnaut Climate Change Review, 2008b, p 1).

the pumps) (Fowlie and Anderson, 2008). In the same year, the Canadian Federal Government proposed to impose a Carbon Tax at the Federal level. The tax would be revenue-neutral, offsetting the tax revenue by other forms of tax cuts for the benefit of individual citizens. However, after a long agitation, this was abandoned due to unpopularity among Canadian citizens (Hercus *et al.*, 2009).

2.2.3.3. Europe

Of the European countries, Finland, Denmark and the Netherlands were the first few countries to impose a Carbon Tax in 1990 (National Center for Environmental Economics, 2010). Finland set the carbon price at US\$90 per tonne of carbon, providing a special exemption to some businesses by permitting them to pay only half the specified portion of the required tax expense. The tax was moderately successful, reducing the level of GHG emissions by five to seven percent in 2000. Nonetheless, Finland declined in the world ranking in terms of GDP from 23rd in 1990 to 31st in 2006, suggesting a possibility of the tax imposition having a negative effect on the economic development (Carbon Tax Center, 2009b).

In contrast, Denmark imposed a Carbon Tax, pricing the carbon at a lower level than Finland – at US\$50 per tonne of carbon. However, unlike Finland, the imposition resulted in a significant reduction in the level of GHG emissions – 15 percent in 15 years following the introduction of the Carbon Tax. Yet, it appeared to have had little effect on economic development, as the economy only grew approximately 43 percent during the equivalent period. Moreover, the Netherlands, another country that imposed a Carbon Tax in 1990, produced a disappointing outcome, increasing emissions approximately 19 percent with no significant impacts on the economy (Carbon Tax Center, 2009b).

Following the footsteps of other European countries, the UK Government imposed the Fuel Duty Escalator (FDE), a levy on retail petroleum products, in 1993. The main objective of the FDE was to minimise CO₂ emissions in the transport sector, which was effectively a substitute for a Carbon Tax, considering that fuel was taxed at a fixed rate in accordance to the proportion of carbon for a given quantity of fuel (i.e. a litre). However, the policy failed as a result of political criticisms in 1999 (Pearce, 2005). In the Republic of Ireland, it was announced in December 2009 that the proposed Carbon Tax will be enforced. Carbon was priced at €15 per tonne of GHG emissions applicable on petrol and diesel from December 2009 and on-home heating oil and gas from May 2010. The Minister for Finance claimed that this introduction of a Carbon Tax is to *“help support rural transport and alleviate fuel poverty”*, although actual effects of the imposed are yet unknown (Inside Ireland, 2009, p 1).

Overall, Sweden’s implementation of a Carbon Tax can be described a ‘success story’, reducing carbon emissions by 20 percent in nine years following its imposition (Grafstrom, 2010). On the other hand, the Carbon Tax failed in Norway, resulting in an increase in carbon emissions by approximately 15 percent subsequent to its imposition, although Norway’s economy dramatically elevated to second place in the world rankings (GDP per capita) from their initial placing of fifth position. Ultimately in the 1990s, the proposition of a Carbon Tax at the EU level inevitably failed as a cosequence of the efforts of industrial lobbyists (Johansson, 2000).

2.2.3.4. The United States

Given that different states have different laws and regulations; the imposition of a Carbon Tax differs between states, with no Carbon Tax at the federal level (San Francisco Chronicle, 2008). To date, only a few states are in the process of considering imposing a Carbon Tax.

For example, Bay Area Air Quality Management District imposed a Carbon Tax on businesses at US\$0.044 per tonne of CO₂ emissions, covering nine districts in the San Francisco Bay Area (San Francisco Chronicle, 2008); and the ‘Assembly Bill 32 (AB-32)’ regulated by the State of California, requiring Californians to reduce the level of GHG emissions (California Environmental Protection Agency, 2010a).

Colorado is another State in support of imposing a Carbon Tax. In November 2006, ‘Initiative 202’, the Climate Action Plan (CAP) Tax, was ‘voted-in’ by the citizens of Boulder Colorado,¹³ initialising the imposition of a direct energy tax upon its residents by the Municipal Government of the US, to overcome global warming. The CAP Tax is applicable to the consumption of energy sources, providing incentives to receive tax rebates by converting to less carbon-intensive products, for example, carbon-neutral and renewable energy sources (City of Boulder Colorado, 2009).

2.2.4. Opinions on the Imposition of a Carbon Tax

Scientists, environmentalists, economists, commentators and business leaders from across the spectrum of political beliefs, provided differing perspectives on the Carbon Tax proposal. Several American conservatives favoured the Carbon Tax proposal, based on its characteristics: fixed rate, and its independence of income. As Al Gore, a former Vice-president of the US, claimed (Dingell, 2007, p A21):

We should start using the tax code to reduce taxes on employment and production, and make up the difference with pollution taxes, principally on CO₂. Now I fully understand that this is considered politically impossible. But part of our challenge is to expand the limits of what is possible. Right now we are discouraging work and encouraging the destruction of the planet’s habitability.

¹³A college town with roughly 100,000 residents situated in the foothills of the Rocky Mountains (City of Boulder Colorado, 2009).

In addition, the Carbon Tax regime is widely supported among numerous businesses and business leaders. Fred Smith, CEO of FedEx, announced his preference for a Carbon Tax in public (FedEx Multimedia Centre, 2009), as has James Owens, CEO of Caterpillar, who perceived that it was necessary to place a “*definitive price on carbon that will help drive the choice of individuals to reduce the amount of carbon consumed in this country*” (Whitten, 2009, p 1).

Nonetheless, there are several criticisms of introducing a Carbon Tax regime. According to Carbon Trust (2009, p 2), the characteristics of a tax, combining “*the two very difficult things in one instrument – setting of a price and the transfer of large revenues from industry to government*”, allows for a possibility of pricing the carbon at an inappropriate level, “*constrained by the politics of large-scale revenue transfers*” (CarbonTrust, 2009, p 2). Yet, it was confirmed that the existence of a cap would allow for negotiations between individual industries on ways of appropriately consuming the income generated from emissions allowances (Carbon Trust, 2009).

Another criticism of a tax as argued by Carbon Trust (2009) is the uncertainty of the ‘additionality’ of an emissions reduction. ‘Additionality’ is defined as the ‘additional’ reduction in emissions through a process of comparing ‘actual’ emissions to projected figures as a consequence of a no-tax environment. The sole effect of ‘additionality’ is difficult to measure because of other conjoining impacts with other policies, for example, effects of existing regulations and subsidies from the government. Thus, it would be possible for a government to create an offsetting effect through other changes in tax structures such as reduction in income taxes and/or upon introduction of a Carbon Tax (Carbon Trust, 2009).

Consequently in NZ, the strong opposition by the minor parties forced the Labour-led Government to abandon the Carbon Tax proposal in 2005 (NZ Herald, 2005). Instead, following a global trend, an ETS was proposed in late 2007 and legislated in 2008 by then Labour-led Government (Parker, 2008). The NZ ETS is comprehensively explained in Chapter 2.3.3.

2.3. Emissions Trading Scheme

An ETS is a scheme introduced by a government as a means of resolving the global environmental issue, through providing specific targets to control pollution and other emissions (Smith, 2009). The scheme is a market-based approach, which is increasingly being considered to be one of the fundamental, international GHG policies, as it is designed to be operational on the basis of providing economic incentives for businesses to become less carbon-intensive (Frazer Lindström, 2010b). There are two bases on which the scheme is applied (Frazer Lindström, 2010b, p 1):

- Regular basis
 - Worldwide: Kyoto Protocol;
 - Regional: the EU ETS and Domestic – the UK ETS, the NZ ETS, and AU CPRS (on hold); and
- Voluntary basis – Chicago Climate Exchange (CCX)

2.3.1. Emission Unit Types and Prices

An ETS is a unit-based climate change policy, requiring businesses to purchase emissions units in order to obtain permissions to emit (Ministry for the Environment, 2009c). However, as countries have their individual ETS tailored to their own economic circumstances, different

types of emissions units are available to accompany their respective ETS. Different types of emissions units are summarised in Table 2.1¹⁴ (Frazer Lindström, 2010a, p 1):

Table 2.1: Matrix of Unit Eligibility in Emissions Trading Schemes

Regime :	Kyoto	EU ETS	NZ ETS	AU CPRS
Domestic Units				
EUA		X		
NZU			X	
AEU				X
Kyoto Units				
AAU	X		X (restricted)	
CER	X	X	X	X
l-CER	X			
t-CER	X			
ERU	X	X	X	X
RMU	X		X	X

With reference to Table 2.1, it is apparent that the EU ETS, a state-wise ETS, has dominant coverage of emissions units for a single-market, domestic-regulated scheme (Frazer Lindström, 2010a). The EU ETS is distinguishable from others, such that although the EU consists of 27 European countries, it is considered to be a domestic-regulated scheme rather than an internationally-regulated one because members of the EU are regarded as a single-market. Consequently, the price for the European Union Emissions Allowance (EUA) is considered to be inadequate to be represented as an international price. To overcome this problem, Kyoto-compliant Certified Emissions Reductions (CERs)¹⁵ are being applied to post-2008 EU ETS prices. For domestic schemes – NZ ETS and AU CPRS – prices of the

¹⁴ Table 2.1 is representational only and does not consider price control restrictions that are contemplated in the early years of the NZ ETS and AU CPRS (Frazer Lindström, 2010b, p 1). A key to abbreviations used in the table can be found on pages ix and x.

¹⁵ CER is a Kyoto Protocol unit equal to 1 metric tonne of CO₂e. CERs are issued for emission reductions from Clean Development Mechanism (CDM) project activities. There are two special types of CERs: Temporary CER (t-CERs) and long-term CER (l-CERs), which are issued for emission removals from afforestation and reforestation CDM projects (UNFCCC, 2010a, p 3).

ETS units were dependent on their domestic units in the past, whilst it is feasible to expect the global CER price to replace domestic units in the long-term (Frazer Lindström, 2010a).

2.3.2. Types of Emissions Trading Scheme Designs

There are three basic types of ETS designs (Frazer Lindström, 2010b): cap-and-trade; baseline and credit; and offset. Among these basic types, the ‘cap-and-trade’ system is the prevalent design, administered in the largest single market – the EU. Moreover, it is also the basis for the NZ ETS. Essentially, in a ‘cap-and-trade’ system, the existence of a ‘cap’ limits the allowable amount of emissions to be emitted in a given period of time, for example, x number of tonnes per year. Initially, allocations are distributed to participants in two different ways within the allowance limit; either granted as free-allocation or purchased through an auction (only available in the long-term). Thereafter, participants can freely trade allowances for profit, incentivising the participants to minimise emissions (Frazer Lindström, 2010b).

In contrast to the ‘Cap-and-Trade’ system, the ‘Baseline and Credit’ approach requires participants to ‘earn’ credits prior to trading. The government defines the emissions baseline for each participant, which individual participant must then monitor and measure their actual emissions using specific procedures for a given period. Upon the expiration of a compliance period, the baseline calculation and the actual emissions during the period are compared. Participants are eligible for a refund of ‘credits’ in the case of positive compliance – lower actual emissions compared to the baseline – while extra ‘credits’ have to be purchased for the excess. Likewise to the ‘Cap-and-Trade’ system, credits are freely tradable between participants (Frazer Lindström, 2010b).

The ‘Offset’ approach is a way of achieving emissions reduction by investing in a project or an activity that can compensate (offset) emissions generated elsewhere (Strickland *et al.*, 2007). As emissions can be blended in the atmosphere, offsetting can take place anywhere, away from its original source. In developing countries, this approach is especially practical as the process of reducing emissions is easier and less costly (Strickland *et al.*, 2007). On a smaller scale, different sectors of the economy can use this design to offset their emissions for different purposes, for example, companies, governments, or other entities are able to comply with caps on the overall CO₂ allowances (Carbon Finance, 2010), whilst individuals, companies, or governments can lessen their individual level of GHG emissions from transportation, energy use, and other sources by voluntarily purchasing carbon offsets (Hamilton *et al.*, 2009).

Carbon offsets are generally funded through projects that reduce GHG emissions including, biomass energy, and energy-efficiency projects, such as hydroelectric dams and wind farms (Harris, 2008; and UNEP Risoe Centre, 2010), and therefore are recognised as one of the essential policy tools to stabilise emissions in the economy. Regardless of criticisms that exist on certain types of ‘offset’ approaches, it is considered be one of the cheaper and more convenient options in reducing individual fossil-fuel consumption (Gillenwater *et al.*, 2007; and Carbon Offsets Daily, 2009).

2.3.3. New Zealand Emissions Trading Scheme (NZ ETS)

In 2007, then Labour-led Government first proposed the NZ ETS through the Climate Change (Emissions Trading and Renewable Preference) Bill, with the following overall objective (Ministry for the Environment, 2009c, p 1):

To support and encourage global efforts to reduce GHG emissions by reducing NZ's net future emissions below business-as-usual levels, and complying with our international obligations, including our Kyoto Protocol obligations, while maintaining economic flexibility, and environmental integrity, at least cost in the long-term.

With reference to Figure 2.2, the operational process of the NZ ETS is as follows, in its simplest sense: a cloud of GHG emissions is formed as a result of industrialised, human-induced activities from electricity (including transport and Stationary Energy and Industrial Processes [SEIP]) and agriculture sectors. These emitters are required to pay the price for their respective emissions, which may be passed onto consumers (taxpayers) in the form of higher prices. On the other hand, the forestry sector can earn credits by planting trees that absorb CO₂ emissions, which can offset the level of GHG emissions in the atmosphere (Ministry for the Environment, 2009d):

Figure 2.2: New Zealand Emissions Trading Scheme (NZ ETS)



However, one fundamental limitation of Figure 2.2 is that it only illustrates the overall operational process and the relationship between different sectors, and it does not show the recent amendments made to the Climate Change (Emissions Trading and Renewable Preference) Bill (Ministry for the Environment, 2009c, p 1).

2.3.3.1. Status Quo and the Problem

The proposed NZ ETS was legislated through the 'Climate Change (Emissions Trading and Renewable Preference) Bill, which amended the 'Climate Change Response Act 2002'¹⁶, and renamed the act as 'the Climate Change Response (Emissions Trading) Amendment Act 2008 by then Labour-led Government. The act was amended to insert new provisions in relation to a comprehensive, all-sectors¹⁷ and all-gases¹⁸ NZ ETS. Subsequently, the newly-appointed National-led Government, with the support from the Māori Party and NZ First, amended the scheme in November 2009, following a review held by the select committee¹⁹ (New Zealand Parliament, 2009a). According to Bullock (2009 p 4), the terms of reference of the review included several considerations:

- The likelihood of post-2012 agreement;
- The economic impact of climate policy on the NZ economy;
- Merits of an adaptation approach versus mitigation approach;
- The merits of a Carbon Tax versus an ETS;
- The timing of introduction of the scheme; and
- The case for greater funding and regulation in this area

¹⁶ The revised version of the Climate Change Response Act 2002 was renamed as, *Climate Change Response (Emissions Trading) Amendment Act 2008* (New Zealand Parliament, 2009a).

¹⁷ Forestry, liquid fossil fuels (transport), SEIP, synthetic gases, agriculture, and waste.

¹⁸ Gases include all GHGs - Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulphur hexafluoride (SF₆).

¹⁹ The Finance and Expenditure Committee reviewed the NZ ETS in 2008, comprised of: five Labour, three National MPs and one MP from each of the Green, Māori, ACT, United Future and NZ First Parties (Bullock, 2009).

After a constructive review process, the ETS was revised and re-enacted under the Climate Change Response (Moderated Emissions Trading) Amendment Bill. The intention of this amendment was to *“reduce the costs to households and the impact on jobs while ensuring NZ takes a responsible approach to the global problem of GHG emissions and climate change”* (Frazer Lindström, 2010e, p 2). The amended NZ ETS took effect from 1 July 2010, affecting various sectors of the NZ economy.²⁰ There are two types of participants in the NZ ETS: ‘mandatory’ and ‘voluntary’. Whilst voluntary participants are those individuals or organisations involved in removal activities, such as post-1989 forestry and activities that involve large uses of coal, gases, and jet fuel; mandatory participants include (Ministry for the Environment, 2010, p 14):

- Forestry (pre-1990): landowners who deforest;
- Stationary Energy: importers and miners of coal and natural gas + heat or electricity generation from geothermal fluid, used or waste oil, or waste;
- Industry processes: producers of steel, cement, glass etc;
- Liquid Fossil Fuels: importing diesel, petrol etc;
- Waste: landfill operators;
- Synthetic gases: imports of gases (in bulk or in appliances); and
- Agriculture: processors (may move to farm level later).

The NZ ETS is administered as a self-assessment model, similar to the NZ tax system, where the involved participants for the NZ ETS are required to calculate individual GHG emissions from their activities (Ministry for the Environment, 2010). Subsequent to calculating their responsible emissions, one emissions unit per tonne of GHG emissions²¹ released will have to

²⁰ A summary of changes made to the initial NZ ETS can be found in Appendix 3.

²¹ Measured in tonnes of CO₂ equivalent (CO₂-e).

be submitted to the Government. However, during the transitional period ending in 2012, participants are eligible to ‘two for one’ surrender obligation, where they are only liable to pay one unit for every two tonnes of their responsible emissions. Thereafter, from 2013 onwards, the price of NZUs will be market-determined, similarly to other international units (Ministry for the Environment, 2010).

Whilst there are various types of units available for trade under the ETS²² internationally, the primary trading unit in NZ is the New Zealand Unit (NZU),²³ which are issued and allocated by the NZ Government. Detailed information about NZUs is disclosed in Appendix 4. For international compliance purposes, most types of international Kyoto emissions units²⁴ are eligible to be used under the NZ ETS in addition to NZUs, which are also transferred to the government (Ministry for the Environment, 2010).

During the transitional phase, individual sectors of the economy are scheduled to enter the scheme on different dates, spread over a period of five years. The scheme is a self-administered system, where each sector is obliged to be responsible for its individual usage from the date of entry – monitoring and reporting their emissions, and surrendering appropriate amounts of NZUs to the government (Ministry for the Environment, 2010). Upon amending the provisions in the ETS, the current National-led Government delayed the entry dates to ‘slow down the pace’ in order to place minimum burden on small and medium enterprises (SMEs) as well as individuals and households (Smith, 2010). Legalised dates of entry are as follows (Frazer Lindström, 2010e, p 2):

²² Refer to Table 2.1 for details.

²³ One NZU corresponds to 1 tonne of CO₂-e emissions.

²⁴ Units established under the Kyoto Protocol rules and include units assigned to parties at the start of the commitment period (currently 2008 to 2012) and for certified emissions reductions or removals (Ministry for the Environment, 2010).

Table 2.2: Entry Dates for Different Sectors of the New Zealand Economy

Sector	Date of Entry
Forestry	1 January 2008
Stationary Energy and Industrial Processes (SEIP)	1 July 2010
Liquid Fossil Fuels and Transport	1 July 2010
Waste and all other sectors	1 January 2013
Agriculture	1 January 2015

NZ is currently undergoing phases of transition until all sectors enter the scheme. Depending on the culture of individual sectors, different measurement systems will be used. Table 2.3 outlines measures used during the transitional period for each sector (Frazer Lindström, 2010c, p 1):

Table 2.3: Summary of Transitional Measures

50 percent obligation from 1 July 2010 to 1 January 2013	Stationary Energy, liquid fossil fuels and industrial processes will only have to surrender a one-tonne unit for every two tonnes of emissions.
Fixed price option of \$25/tonne	Sectors facing obligations will be allowed to pay rather than purchase units to limit cost and enhance stability in start up phase.
Intensity-based allocation for trade-exposed industry	Support for emissions-intensive/trade-exposed (EITE) industry on a production-based industry average approach. <ul style="list-style-type: none"> - Production or intensity approach means that allocation is increased or reduced relative to production rather than just 2005 levels. - Industry average approach means allocations based on average emissions per unit of production for particular industry not just 2005 levels.
Allocation phase-out	1.3 percent per year from entry date rather than eight percent per year from 2019.

Since the NZ ETS was proposed in 2007, there were concerns surrounding the possibility that the National-led Government's (National's) modified-ETS as presently-designed, may fail to achieve its primary objectives, as a consequence of several influential factors: the failure of the current Australian CPRS proposal; and the weak state of the current global economy.

Identified issues with the NZ ETS broadly fall into two categories²⁵ (Ministry for the Environment, 2009f, pp 5-6):

- Economic impacts – This includes concerns that the scheme could have large initial impacts on businesses given the current economic climate and that, in the longer term it could result in the loss of key industries that are exposed to a carbon price ahead of international competitors. A key initiative since the development of the current National's modified-ETS is the Australian CPRS. The proposed CPRS will provide greater assistance to Emission Intensive Trade Exposed (EITE) industries than the NZ ETS. This could disadvantage NZ firms that compete in markets with Australian firms.
- Implementation timeframes – There are some implementation dates in the Act, which will be difficult to achieve, as there is not enough time for allocation plans to be developed, and for the sectors to prepare to enter the NZ ETS. The most pressing is the entry date of the SEIP sectors which will begin to accrue obligations under the NZ ETS from the 1 January 2010. However, this problem has been overcome by the delay in the entry date to 1 July 2010.

Smooth transition process for sectors to enter the NZ ETS is required for adjusting to changes and concurrently coping through the current period of economic recession.²⁶ In addition, it is necessary to provide adequate assistance through allocation of free credits, and to ensure that the NZ ETS does not have a negative impact on domestic producers for them to lose their competitive advantage in the international market (Ministry for the Environment, 2009f). Finally, certainty regarding the future of the NZ ETS and the feasible long-term targets should

²⁵ Details of the economic impacts are outlined in Appendix 5.

²⁶ The current economic recession began late 2007, as a result of a financial crisis triggered by a collapse of US-based security firms (Ivry, 2008).

be provided to businesses. For these reasons, the newly-elected National-led Government amended the NZ ETS in consideration of following objectives for the modified NZ ETS²⁷ (New Zealand Parliament, 2009a, p 5):

- Strike a balance between NZ's environmental and economic interests;
- Provide a smoother transition for participants than the original scheme; and
- Achieve harmonisation with the proposed CPRS.

2.3.3.2. Effects on Households and Firms

The commencement of the NZ ETS is expected to have differing impacts on individual sectors of the industry and society, through certain participants receiving assistance in terms of free-allocations of units. Details on the allocation of units for each sector are to be outlined in its relevant allocation plan, which are yet to be finalised (Frazer Lindström, 2010d).

Upon proposing to implement the NZ ETS, the officials reassured individuals and households that there would be no direct impact except for a slight increase in power bills and fuel prices. The National-led Government kept its promise by halving the burden of the costs on individuals and households, from the initial provisions set out in the Labour's ETS (Woolly Days, 2010). Power costs are to increase twice during the transitional period, each time by five percent (one cent per kWh). Petrol and Diesel prices are also to increase twice, by three and a half cents per litre each time, resulting in a total increase of seven cents per litre (Frazer Lindström, 2010d).

²⁷ A table outlining the differences between the existing labour-led Government's NZ ETS and the moderated, National's modified-ETS is disclosed in Appendix 6.

Businesses are considerably different to individuals, such that they need to account for their share of the overall emissions released in NZ. As a means of providing compensation, the NZ Government decided to provide industrial assistance²⁸ to firms by way of free allocations, based on these two reasons (New Zealand Parliament, 2009a, p 7):

- To provide compensation for the reduction in the value of assets from the introduction of a carbon price; and,
- To protect the competitiveness of firms, particularly those that are EITE as these firms are unable to pass the carbon cost on to consumers.

In general, assistance will be provided to firms in following ways during the transitional period (CP1) (Ministry for the Environment, 2010, p 17):

- One-off allocation to pre-1990 forestry and fishing quota owners;
- Allocation of units to EITE industry and agriculture:
 - To sectors or firms that cannot pass on costs of ETS;
 - Moderated ETS provides for intensity-based allocation;
 - Based on defined activities; and
- 90 percent and 60 percent thresholds for highly and moderately emissions-intensive industry.

Thereafter, from 2013 and beyond, general allocations rules will be as follows (Frazer Lindström, 2010e, p 3):

²⁸ Industrial allocation is a means of providing assistance or compensation to individuals who carry out strongly affected activities, in order to avoid the loss of industries that would not have occurred if competitors had adopted equivalent emissions pricing. The appropriate methods are chosen depending upon the reason for providing the assistance (Frazer Lindström, 2010f, p 3).

- The pool of units for eligible industrial producers and agriculture will be uncapped;
- The free-allocation will decrease on a linear basis by 1.3 percent per annum; and
- Firms that cease trading will not retain any free allocation.

As a consequence of the NZ ETS, the SEIP sector is to face several changes regarding its price options during the transitional phase. These changes have, or will, provide some benefits that will assure all sectors with the expectation that their burden on the cost of the ETS will not outweigh the cost incurred in similar developed countries, and encourage efficiency increases without any penalties on production increases (Frazer Lindström, 2010d):

- Only obliged to be responsible for 50 percent of its BAU level during CP1 from the fixed price;
- Option increased certainty from the fixed price option; and
- Six months delay in entry (from January 2010 to July 2010).

However, from 2013, the following allocation rules will apply (Frazer Lindström, 2010e, p 3):

- 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; and
- 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.

For the fishing sector, the changes resulted from the implementation of the NZ ETS are ultimately expected to affect quota values, and therefore the National-led Government decided to provide several benefits as a recognition for its impacts (Frazer Lindström, 2010d):

- 50 percent obligation that will halve the cost impact on fishing vessel operators; and
- The increase in allocation support from 50 percent to 90 percent for CP1 will also assist the transition.

Agriculture comprises of 49 percent of NZ's total GHG emissions. However, the impacts of the NZ ETS in this sector are minimal because of the delayed entry to 2015, and the change in the allocation of emissions from absolute to intensity basis. Although there are several influential factors for this delay, the most prominent cause is the limited available technologies to measure, monitor, and report the number of participants to reduce emissions, creating administrative difficulties. For this reason, the National-led Government is being more pragmatic about the process and the effects of including the agriculture sector in the NZ ETS. In addition, the National-led Government desires to have sufficient time for the benefit of the agricultural research to become apparent (Frazer Lindström, 2010d).

The forestry sector is distinguishable from other sectors, as they can receive carbon credits, and use those credits to offset their emissions released. The forestry sector entered the scheme on 1 January 2008. At that time, there had been no existing domestic market, as no other 'emitting' market had entered the scheme. However, the scheme was effective for the forestry sector from its date of entry, which allowed post-1989 forests to earn carbon credits. Due to the differing life cycles of the trees, the treatment of pre-1990 and post-1989 forests in the NZ ETS is not the same. For post-1989 forests, the carbon price is fixed at NZ\$25, but they

should not be overly disadvantaged as they have options to bank their units or internationally trade the excess. (Frazer Lindström, 2010d).

In contrast, the only change subsequent to the introduction of the NZ ETS for the approximately 1.2m hectares of pre-1990 forests is the access to the fixed price option of NZ\$25. These forests are still liable for harvesting but not replanting. Allocations for these forest owners proceeded in 2010 and these units are also internationally tradable and are able to be banked. Only minor changes were made to provisions regarding tree weeds and technical aspect of reporting. Provisions relating to offsetting in Commitment Period 1 (CP1) remained unchanged because of the high level of financial risks to the NZ Government and the economy (Frazer Lindström, 2010d). For the detailed change in provisions for the forestry sector, refer to Appendix 3.

2.3.3.3. Submissions on the Initial and Revised NZ ETSs

The NZ Parliament welcomed submissions on the Climate Change (Emissions Trading and Renewable Preference) Bill regarding its introduction in 2005 and also on the Climate Change Response (Moderated Emissions Trading) Amendment Bill 2008. A total of 282 submissions (excluding supplementary submissions) were received for the initial Climate Change (Emissions Trading and Renewable Preference) Bill. Approximately 39.4 percent of respondents supported the initial bill, 52.5 percent of the submitters opposed, and 8.16 percent supported it with modifications. In comparison, a total of 379 submissions were received for the Climate Change Response (Moderated Emissions Trading) Amendment Bill. Of those submissions received, 271 (approximately 71.5 percent) were opposed to the revised Bill, 15.5 percent supported, and 17.7 percent claimed to support it with some modifications.

Many respondents who were opposed to the National's modified-ETS favoured the initial Labour's ETS, based on the perception that the Climate Change Response (Moderated Emissions Trading) Amendment Bill lacks in practicality and efficiency. This suggested that whilst respondents were in favour of the notion of an ETS, they opposed several clauses in the amended Bill. Consequently, these respondents recommended the ETS to be put on hold until all concerns were considered and investigated (New Zealand Parliament, 2009d). In contrast, 49 submissions supported the National's modified-ETS. Nonetheless, just over half of the supporters suggested that specific parts of the Climate Change Response (Moderated Emissions Trading) Amendment Bill should be further considered and revised prior to the enactment.

Of particular interest is the nature of submitters and their responses. There are 241 individual submitters out of the total of 379 submissions (approximately 63.6 percent) for the Climate Change Response (Moderated Emissions Trading) Amendment Bill. The number of individual respondents increased, from 26.1 percent to 63.6 percent, indicating a high level of awareness and understanding of the NZ ETS by the general public. Of those individual submitters, approximately 92 percent of individual respondents opposed to the amended Bill, whilst 85.4 percent of individuals were opposed to the initial Labour's ETS Bill. Some reasons for the opposition to the National's modified-ETS Bill include (New Zealand Parliament, 2009d, p 21):

- Disagreement with the notion of intensity-based allocations of free credits without a limit. The respondents perceived that this allocation would do nothing to reduce emissions, and therefore will be a complete waste of taxpayers' money;

- The amended [National's] ETS is ineffective causing irreparable harm to New Zealand economy;
- Carbon should not have a price cap placed on it as it will seriously distort the outcome relative to the international market prices, therefore making redundant emissions trading as a market-based scheme, and decreasing the incentive to reduce emissions; and
- The ETS will damage the future environment rather than improving it, leaving the future NZ descendants socially, economically and environmentally worse off than if the scheme was not implemented.

Overall, 39.4 percent of the respondents opposed the Climate Change (Emissions Trading and Renewable Preference) Bill, whilst 72.8 percent disapproved the Climate Change Response (Moderated Emissions Trading) Amendment Bill, suggesting that the National's modified-ETS is generally unfavourable, and some modifications or an alternative approach should be considered for the ETS to be the ideal policy for domestic producers and consumers to be incentivised in changing their behaviour to reduce GHG emissions.

2.3.3.4. Sectoral Responses – Policies and Measures of the NZ ETS

In response to the global environmental crisis, NZ began taking responsibility for their share of emissions by adopting the 'New Zealand Climate Change Programme' in 1988. The initial programme was co-ordinated by the Ministry for the Environment, which, by 2010, expanded out to several government departments and agencies. As it currently stands, the NZ Government has two fundamental targets at the national level for their objective of reducing GHG emissions (Ministry for the Environment, 2009e, p 52):

- A medium-term responsibility target of a 10 to 20 percent reduction in emissions below 1990 levels by 2020; and
- A long-term target of a 50 percent reduction in net GHG from 1990 levels by 2050.

‘New Zealand’s Fifth National Communication’ (Ministry for the Environment, 2009e, p 52) defined the medium-term target range as a range that:

..... reflects a fair contribution by NZ to the international effort to reduce GHG emissions. This is because NZ’s national circumstances (including already high levels of renewable electricity generation and a large proportion of emissions from agriculture) make the cost of mitigation higher than for most other developed countries.

It is believed that the decision to implement the NZ ETS, with specific policies and measure for individual sectors, was made after a careful consideration of their social, economic and environmental responses, including international responses from other Annex 1 countries. The Ministry of Economic Development has the primary responsibility of co-ordinating the development of the energy policy in NZ. For the energy sector, ‘New Zealand Energy Efficiency and Conservation Strategy’ was produced under the Energy Efficiency and Conservation Act 2000, with an aim to (Ministry for the Environment, 2009e, p 56):

- Improve energy efficiency and conservation by providing a more detailed measures to increase the uptake of energy efficiency, energy conservation; and,
- Promote the use of renewable energy by implementing renewable energy programmes.

This strategy is in the process of being updated between 2009 and 2010.²⁹ According to Mr. John Boscawen, the newly-appointed Minister of Consumer Affairs and a member of the ACT Party, NZ already has a high level of renewable energy use, approximately 70 percent, evident from NZ's abundant and diverse renewable energy resources, a large proportion being hydroelectric power. This is a very high percentage, in comparison to Australia, NZ's largest trading partner, where they aim to achieve 20 percent renewable energy use by 2020. However, the National-led Government set a target of 90 percent renewable energy use by 2025, envisaging a potential further growth in the use of renewable resources as a substitution of fuel for energy, oil and gas, and direct heat production (Ministry for the Environment, 2009e).

One downside of the energy sector is the inavailability of government subsidies. Instead, there are various opportunities available to promote energy efficiency. The table in Appendix 7 provides a detailed summary of schemes and programmes offered by the government agencies that are responsible; the Energy Efficiency and Conservation Authority (EECA) and the Electricity Commission (Ministry for the Environment, 2009e).

The Ministry of Transport has the sole responsibility of co-ordinating and developing transport policies in NZ. The 'New Zealand Transport Strategy 2008' was prepared by the Ministry of Transport as the primary document setting out some 'aspirational', long-term targets until 2040. As a contribution to the National-led Government's response to climate change, the Ministry of Transport included provisions for transport fuels in the NZ ETS, as well as ongoing research and development in the area of advances in new technologies and

²⁹ A copy of the 2007 strategy can be found at: <http://www.eeca.govt.nz/sites/all/files/nzeecs-07.pdf> and the draft 'New Zealand Energy Efficiency and Conservation Strategy 2010' can be found at <http://www.eeca.govt.nz/sites/all/files/nzes-nzeecs-draft-july-2010.pdf>.

fuels (Ministry for the Environment, 2009e). A table providing a summary of these new technologies and fuels are disclosed in Appendix 8.

The Ministry for the Environment is in charge of developing policies for the SEIP sector. As a contribution to the NZ ETS, a set of provisions outlining the aim of reducing GHG emissions from industrial processing projects is included. It sets out specific, achievable targets, requiring the SEIP sector to surrender one emissions unit for every two tonnes of CO₂-e during CP1, and one emissions unit for each tonne of CO₂-e thereafter (Ministry for the Environment, 2009e).

The Ministry of Agriculture and Forestry has the responsibility of developing policies for the Agriculture sector. NZ's unique characteristics of having a large proportion of the total emissions in agriculture allowed NZ to be the international leader in research and development on effective mitigation technologies that encourage the reduction of agricultural emissions. However, to date, there are limited policies to decrease the level of GHG emissions released for the agriculture sector (Ministry for the Environment, 2009e). Refer to Appendix 9 for a table outlining research and development conducted by the Ministry of Agriculture and Forestry on policies and measurements for the agriculture sector. Similarly, the Ministry for Agriculture and Forestry is responsible for developing policies for the forestry sector. The NZ ETS is the fundamental policy to encourage net removals through afforestation, and discourage net emissions through reductions in deforestation (Ministry for the Environment, 2009e). There are three major schemes to achieve this in NZ, which is set out in Appendix 10.

The Ministry for the Environment, in conjunction with regional and local councils, is accountable for the waste sector policies. In order to manage and minimise waste, ‘the NZ Waste Strategy’ framework was implemented under the ‘Waste Minimisation Act (WMA) 2008’ (Ministry for the Environment, 2009e).³⁰ A table that outlines the implemented policies and strategies for the purpose of waste management in NZ can be found in Appendix 11.

2.4. Response from the NZ Government on Climate Change

According to the ‘New Zealand’s Fifth National Communication’ (Ministry for the Environment, 2009e), NZ considered that the most effective route to appropriately apply the policies at every level of society is to intergrate climate change adaptation policies into existing structures. Therefore, the central and local governments implemented the Climate Change Adaptation Policy (CCAP) as a means of responding to climate change and being accountable for their actions.

At the central government level, the Resource Management Act (RMA) 1991 was legislated to govern NZ’s environmental management system, primarily on managing the risk for future flood and sea-level rise (Ministry for the Environment, 2009e). The Ministry for the Environment is carrying out on-going developments to meet continuously-changing climate change requirements including: supporting local government; planning for climate change; and developing further strategic directions for the future of the RMA (Ministry for the Environment, 2009e). Other areas under the Ministry for the Environment’s responsibilities are: primary production and land management; biodiversity; fisheries; community resilience to natural hazards; health; transport; labour market; tourism; education; and Māori. These

³⁰ Waste Minimisation Act (WMA) 2008 is the primary legislation for waste management.

guidance and planning developments will assist local governments in conducting their statutory duties (Ministry for the Environment, 2009e).

Moreover, the Interdepartmental Climate Change Adaptation Group, under the control of the Ministry for the Environment, formed a *'forum for cross-government initiatives on climate change adaptation'* (Ministry for the Environment, 2009e, p 110) with the intention to share information between departments and assist in ensuring that the climate change adaptation policy is consistently implemented and monitored across governments.

With the assistance from the central government, the local governments are responsible for implementing and conducting climate change policies and initiatives. The amended RMA requires the inclusion of climate change rules in regional and district plans. For the most effective outcome, climate change provisions were adapted to existing activities including natural hazards, and plans for subdivision and coastal sections (Ministry for the Environment, 2009e). To date, many regional councils including those located in Gisborne, Taranaki, Tasman, Bay of Plenty and Canterbury, undertook their regional climate change impact assessments. Taranaki Regional Council included a separate section outlining the responses to climate change effects in their proposed regional policy statement 2009. In addition, Nelson City Council developed and implemented a Climate Change Local Action Plan, while Auckland and Wellington are still in the process of developing their regional climate change energy and adaptation strategies (Ministry for the Environment, 2009e). Ultimately, as a response to the climate change adaptation, local governments have developed a 'Leaders' Position Statement' that deals with climate change issues. This statement includes (Ministry for the Environment, 2009e, p 116):

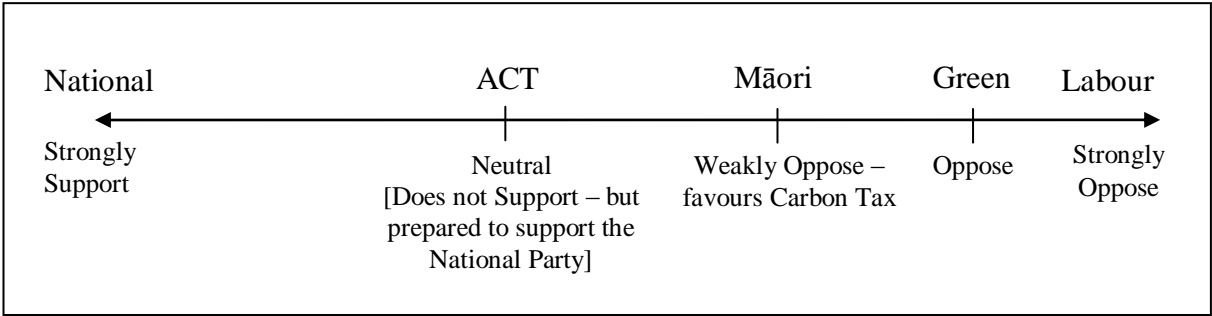
- A brief introductory context;
- A number of overarching statements in relation to local governments’ positions on climate change; and
- Explanation on the areas of adaption and mitigation.

It should be noted that the primary focus of NZ’s policy response is on collaborating local and central governments to engage stakeholders on the significance of preparing for any further effects of global warming and climate change. In addition, the focus is also on offering guidance at every level of the government and the community (Ministry for the Environment, 2009e). The subsequent subsection examines the response of the NZ Parliament – differing political perspectives on climate change issues, and the need for a solution through a comprehensive discussion.

2.4.1. Political Perspectives on Climate Change Policies

Political parties have different perspectives on climate change and the issue of implementing the National’smodified-ETS Bill. Figure 2.3³¹ illustrated the standings of NZ political parties, with the National and Labour Parties positioned at the opposite ends of the continuum.

Figure 2.3: Political Perspectives regarding NZ ETS



³¹ Information to draw up this continuum was gathered from ‘Cimate Change Response (Moderated Emissions Trading) Amendment Bill’ prepared by the Finance and Expenditure Committee (New Zealand Parliament, 2009b).

The National Party, the leading party of the NZ government since 2008, was responsible for revising the NZ ETS, with the belief that the amended Bill would provide “*a realistic balance between New Zealand’s environmental and economic objectives*” (New Zealand Parliament, 2009b, p 3). The National Party perceived that proposed changes are consistent with the Kyoto commitments and are designed to prevent leakages (New Zealand Parliament, 2009b). In addition, the changes are considered essential for several reasons (New Zealand Parliament, 2009b, p 3):

- To establish a manageable timeframe for introducing various sectors into the scheme;
- To ensure that the impacts on the economy and consequently on the consumers, are minimised in the first few years;
- To provide a level of transitional assistance to EITE entities designed to avoid leakages in accordance with Kyoto commitments; and
- To encourage increased afforestation and to reduce deforestation.

Evidently, the analysis conducted by the Ministry for the Environment and peer-review performed by the Treasury, confirmed that both the existing Labour’s ETS and the National’s modified-ETS would have a positive fiscal impact. James (2009, p 2) criticised the National’s modified-ETS by describing that it is:

...the ETS you have when you are not having an ETS - no cap on emissions (so no "cap" in the "cap-and-trade"), a cap on price (so no "trade", just tickle the taxpayer) and languorous phase-downs of gross emissions which push out hard decisions (if needed) into a misty future.

The National Party acknowledged that the existence of numerous affecting variables makes it difficult to model and predict long-term scenarios. Nonetheless, they intend to ensure that the

positive fiscal position is maintained over time by confirming the ability to make adjustments to allocation phase-out levels during the proposed review process (New Zealand Parliament, 2009b). Business lobby groups, such as representatives of the energy intensive sector – BusinessNZ and the Greenhouse Policy Coalition – are in favour of the modification as they had been persuading the NZ Government for a provisional price cap and a longer transitional phase for an allocation of free units (Fallow, 2009).

In contrast to the National Party's view, the Labour Party recommended that the Climate Change Response (Moderated Emissions Trading) Amendment Bill should not proceed based on the significant economic and environmental costs associated with the Climate Change Response (Moderated Emissions Trading) Amendment Bill, and every part of the hasty review and revision process was inadequate (New Zealand Parliament, 2009a). Consequently, it is considered to be *“fundamentally flawed and will make New Zealanders poorer, the NZ economy weaker, and will not reduce the growth in the level of GHG emissions”* (New Zealand Parliament, 2009b, p 4).

In addition, the Labour Party suggested that *“the process adopted in respect of this Bill is the worst that anyone has experienced in the time in Parliament”*. Some of the processes demonstrated (New Zealand Parliament, 2009b, p 6):

- Insufficient timeframe for public submissions, or for official and independent advice;
- Withholding by the Government of essential information and analysis around the rationale for, and the fiscal cost of, the amendments;

- Amendments that in substance provide for the subsidisation of emitters that will mean increasing emissions at enormous fiscal cost, such that they cannot possibly be the subject of any enduring political consensus; and
- Significant errors in the calculation of the fiscal outcome, discovered only on the final day of the deliberations, showing the effect of the Bill if it proceeds to increase Government debt by 13 – 17 percent of GDP by 2050.

Numerous individuals and organisations supported the Labour’s opinion regarding the allocation of NZUs. Oram (2009, p 3) believed that the National-led Government's amendments to the NZ ETS are consistent with destroying an effective ETS, as it “*would drive up emissions, perpetuate old technology, necessitate ever-greater subsidies and reduce NZ’s international competitiveness and reputation*”. Ultimately, the Labour Party noted that weakening the scheme to an uncapped, intensity-based allocation would incentivise continuous release of GHG emissions, which would become a burden on taxpayers rather than the emitters (New Zealand Parliament, 2009b).

Greenpeace New Zealand (2009) also described the National’s modified-ETS as ‘pathetic’ because the amendments made by the National-led Government were overly generous in allocating emissions and overly-slow in phasing out from the transitional period, which would immensely increase the level of GHG emissions. Dr. Jan Wright, the Parliamentary Commissioner for the Environment, also agreed by commenting that modifications made by the National-led Government would cause the emissions to continuously rise without the presence of the carbon price, which would provide an indication to invest in less carbon-intensive technologies (Wright, 2009).

Moreover, Federated Farmers of New Zealand (2009, p 1) commented that “*there is no place for agricultural emissions in the ETS*”, and the New Zealand Business Council for Sustainable Development (NZBCSD) (2009) stated that there is a possible risk that generous allocations would leave NZ behind in terms of international standpoint, and therefore the proposed all-sectors, all-gases ETS is expected to have no impact on emissions-intensive industries facing international competition in 2015. For many years, the Green Party (the Greens) preferred a Carbon Tax based on several reasons (New Zealand Parliament, 2009b, p 18):

- Its simplicity;
- The price certainty on businesses, thus enabling investments in emissions reductions to proceed with confidence; and
- The opportunity for Governments to use the proceeds to reduce other taxes.

The Greens did not believe that the ETS is an overwhelmingly preferable substitute for a Carbon Tax, but were willing to accept that it is the current global trend and there are some advantages in “*aligning with international efforts*” (New Zealand, 2009b, p 18). Therefore, since 2007, the Greens are continuously attempting to influence the current National-led Government towards implementing the best ETS possible (New Zealand Parliament, 2009b).

However, the Greens were strongly against the notion of an uncapped, intensity-based allocation and a price cap. These characteristics will have negative effects on the economy, through a reward system to the creators of the climate change problem, and a punishment system for those providing solutions to such problem. This negative effect is contrary to the ultimate purpose of an ETS: “*to bring the international price of carbon into decision-making*

by firms and individuals” (New Zealand Parliament, 2009b, p 20). In addition, the commencement of the NZ ETS would certainly delay what NZ desperately needs – a transformation into a less carbon-intensive economy. Thus, the Greens preferred a Carbon Tax over the National’s modified-ETS, as they perceive that the Labour’s ETS, in its original form, was adequate and the modification is “*fiscally and environmentally reckless*” (New Zealand Parliament, 2009b, p 20).

Moreover, the Greens claimed that the late entry for agriculture will negatively impact on the forestry sector. It is highly likely that exempting the price of carbon for farmers would be exploited through increases in the value of land (Ministry for the Environment, 200b). Consequently, foresters would lose their purchasing power on land for foresting, which would reduce the probability of an increase in net removals. In addition, although the Greens welcomed proposals to address the ‘wilding pine problem’,³² it is considered to be “*chaotic*” and “*poorly thought out*” (New Zealand Parliament, 2009b, p 21). Ultimately, Fitzsimons (2009) confirmed the Greens’ perception by commenting that they expect the ETS to result in the NZ Government urging “*the biggest wealth transfer in NZ history from the taxpayer to the big polluters*” (Fitzsimons, 2009, p 1) instead of a reduction in the level of emissions.

The Māori Party perceived that as much as the climate change issue is a global problem, “*the challenges of, and answers to, climate change will only be met by collective responsibility — each business, community, and nation assuming responsibility for their interactions with the environment*” (New Zealand Parliament, 2009b, p 22). However, they are extremely conscious of its limitations, and are concerned of the incapability of current policies to

³² Wilding pines are invasive tree species in the high country of NZ. However, these wilding pines obscure scenic views, decrease production of pastoral farms, increase the risk of fire, reduce stream water yield in flow sensitive catchments, displace threatened habitats and species, and impact on cultural and historic sites (Environment Canterbury Regional Council, 2009).

promote ‘collective responsibility’ and deliver the relevant behaviour-change required for environmentally sustainable practice (New Zealand Parliament, 2009b).

The Māori Party preferred the imposition of a Carbon Tax pricing the carbon at a fixed rate, because this would be a simpler approach of monitoring emitters to be directly responsible for their actions. Moreover, limited resources of Papatūānuku³³ would result in a deprivation of the inheritance to future generations if badly-designed policies were to be implemented. However, it appeared that the focus was on designing a legislative scheme rather than on providing a physical solution to climate change. Therefore, in order for the Māori Party to support the amended scheme, four objectives must be met, which are as follows (New Zealand Parliament, 2009b, pp 22-23):

- Whānau – ensuring that vulnerable communities do not bear an unfair burden under the scheme;
- Whenua – delivering increased environmental sustainability across a number of policy areas;
- Te Tiriti o Waitangi/Treaty of Waitangi – Te Tiriti/Treaty must be provided for in the scheme so that it is fair for the people, no matter what future changes get made along the way and so that Treaty Settlements are respected; and
- Māori Economy – Māori people are heavily involved in fishing, farming and forestry, all of which are affected by the scheme. It is important that businesses are not the hardest hit by the scheme, so that the outcomes are fair and our [NZ] economy can grow.

³³ In the Māori world view, land gives birth to all things, including humankind, and provides the physical and spiritual basis for life. Papatūānuku, the land, is a powerful mother earth figure who gives many blessings to her children (Te Ara, 2010, p 1).

These objectives were not met in the proposed Labour's ETS Bill reported by the ETS Review Committee. Consequently, this resulted in continuous negotiations between the Māori Party and the National-led Government for further possible revisions and commitments to include these objectives in the National's modified-ETS Bill (New Zealand Parliament, 2009b). Recognising Te Tiriti o Waitangi/Treaty of Waitangi in the scheme is essential to the Māori Party, and therefore comprehensive clauses that contain the full extent of Treaty rights and interests, as well as clauses that allow the use of land and resources over future generations, had to be included before they agreed to the introduction of the ETS. The negotiations were successful, and the National-led Government secured the Māori Party's votes in introducing the Climate Change Response (Moderated Emissions Trading) Amendment Bill.³⁴ Another concern raised during the negotiations pertains to Iwi forest owners regarding deforestation liabilities. The Māori Party states that (New Zealand Parliament, 2009b, p 23):

Incentivising planting, particularly indigenous species, is an important aspect of meeting international obligations, as this bill does not create a framework that in and of itself sufficiently reduces carbon emissions — creating a potentially substantial future liability on the State (and hence taxpayers). This policy framework must provide effective and equitable outcomes for the Māori people and whenua, including targeted packages for householders, valuing biodiversity, promoting clean-tech innovation, and recognising that mātauranga Māori has significant contributions to make to a comprehensive and principled response to climate change.

Finally, the Māori Party commented that each individual has their own 'role' to play in sustaining the environment in this intergenerational, collective society. Thus, they are committed to supporting a scheme that promotes 'collective responsibility' through providing incentives for behaviour-change (New Zealand Parliament, 2009b).

³⁴ Appendix 12 provides an outline of the Māori Party's requests for amendments to the Bill, and the National-led Government's agreement with the Māori Party.

The ACT New Zealand (the ACT) Party does not support the notion of an ETS, as they endorse the scientific evidence that states '*dangerous human-induced warming is still uncertain*' (New Zealand Parliament, 2009b, p 24). Thus, the ACT Party perceived that appropriate amendments were necessary to the scheme for long-term effectiveness, and therefore they supported the National Party's decision to delay the commencement of the NZ ETS (New Zealand Parliament, 2009b).

Moreover, the ACT Party suggested that NZ should be a follower in implementing a policy as a response to climate change. The costs to both NZ consumers and producers outweigh the benefits of being a leader, as NZ is so small it does not have sufficient power to influence other industrial countries. In addition, as confirmed in a survey lately-published by the NZBCSD (New Zealand Parliament, 2009b, p 24), it appears that New Zealanders are unable to fully comprehend the implications of the NZ ETS in the economy, providing yet another reason for NZ to be a follower rather than a leader.

2.4.2. Other Substantive Political Criticisms

Supplementary to the overview of political perspectives, other political criticisms were gathered from various sources: the Treasury, the Parliamentary Commissioner for the Environment, and other submitters (New Zealand Parliament, 2009b). They all perceive the amended Bill to substantially weaken the effectiveness of the ETS, having significant negative impacts on NZ's economy and environment. Ultimately, critics advised that the National's modified-ETS should not proceed, based on following justifications (New Zealand Parliament, 2009b, p 7):

- Unclear policy and legislative objectives;
- No property rights to pollute;
- Invalidly assumed tradeoffs; and
- Inappropriate incentives.

Moreover, benefits and costs of undertaking an uncapped, intensity-based approach were critiqued by politicians and other submitters. In general, the intensity-based approach is considered to be an effective approach in incentivising businesses “*to achieve international good practice for energy efficiency*” (New Zealand Parliament, 2009b, p 11). Nonetheless, this allocation approach has its issues. It is probable that this approach will lead to a substantial increase in emissions, as a consequence of unjustifiably high levels of generous free allocation and very slow abatement levels. As a result, the level of carbon credits purchased for taxpayers and the government are also likely to increase (New Zealand Parliament, 2009b). Dr. Suzi Kerr³⁵ supported this criticism by claiming that “*the possibility that banking and trading free allocated credits, taken with price caps, could result in a positive incentive to increase emissions, or windfall gains to polluters*” (New Zealand Parliament, 2009b, p 11).

It is believed that an absence of a cap, in any shape or form, will weaken the ability to incentivise a behaviour-change to be less carbon-intensive, resulting in a substantial increase in both the government’s fiscal policy and policy uncertainties for businesses. Thus, many submitters prefer an alternative approach – an overall cap on emissions (New Zealand Parliament, 2009b). However, inability to conduct transparent options testing, sensitivity testing and regulatory impact analysis, as a result of the absence of any coherent cost-benefit

³⁵ An independent specialist advisor.

analysis on various types of caps,³⁶ consequently caused the NZ Government to choose an unjustified, *“highly distortive, environmentally unreliable, and economically inefficient, mechanism to control emissions”* (New Zealand Parliament, 2009b, p 11).

Furthermore, there are strong proponents of the delay of entry into the ETS for the agriculture sector. Although this sector contributes almost half of all NZ emissions, the Climate Change Response (Moderated Emissions Trading) Amendment Bill stated that of the agriculture sector is only required to be accountable for its respective four percent of the total cost of international obligations. NZ is already responsible and liable for the release of GHG emissions under the Kyoto Protocol, which proves that there is no valid reason for the delayed entry of the agriculture sector into the NZ ETS.

In addition, Kerr questioned the appropriateness of an intensity-based allocation for the agriculture sector by stating that *“there is likely to be very little production leakage from the agriculture sector”* (New Zealand Parliament, 2009b, p 12), denying the evidence on existing concerns surrounding agricultural production leakage. Furthermore, there remain non-encouraged opportunities for the emissions reduction in the agriculture sector. As Kerr advises (New Zealand Parliament, 2009b, p 13):

It would be administratively straightforward to establish a system to reduce N₂O emissions. Some of the revenue collected through this process could be used to fund the use of nitrification inhibitors. The increased deployment of nitrification inhibitors could provide a significant reduction in agricultural emissions.

³⁶ Global vs. Sectoral – A global cap refers to a price cap that is placed globally across all sectors, whereas a sectoral cap is only placed on each sector.

Furthermore, the Sustainability Council³⁷ (Bertram and Terry, 2009) offered to allow for emissions reductions close to five million tonnes per annum, at a sole profit to the farmer, along with several other measures. Effectively, the only outcome of its delayed entry would be a failure to provide economic incentives for NZ's single largest emitter to reduce as much emissions as possible. Ultimately, it is important for the agriculture sector to be responsible for its emissions through entering the NZ ETS at the earliest possible date. The burden of covering the cost of these emissions would be on the taxpayer if the largest emissions contributor fails to reduce their significant share of NZ's overall emissions, providing an unjustified and unfair burden on NZ taxpayers (New Zealand Parliament, 2009b).

In addition to these criticisms, several issues are further considered important from the officials' perspective. First, and foremost, treaty issues, as advised by the politicians, are a very important point of principle (New Zealand Parliament, 2009b, p 15):

The fundamental and underlying question facing the Government with regard to the impact of the ETS on the Ngāi Tahu Claims Settlement Act 1998 is whether the Crown considers that it has an obligation to protect the value of commercial assets distributed as part of the Treaty settlement process and, if so, to what degree and for how long after the settlement has passed. The Government's treatment of this settlement in relation to the emissions trading scheme is likely to create an implicit precedent for the treatment of other settlement in similar situations in the future.

The quotation stated above is arguable in two ways – the National-led Government's and the Māori Party's perspective. The National-led Government argued the impracticality of protecting private assets against the effects of future policy changes. On a contrary, the Māori Party argued that they should have the initial opportunity to 'value' the assets before the

³⁷ The document was prepared by members of the Sustainability Council, Simon Terry and Geoff Bertram. Terry is a founder of an economics consulting partnership, and a former financial journalist (Sustainability Council of NZ, 2002). Geoff Bertram was a Senior Lecturer in Economics at Victoria University of Wellington at the time of publication (Victoria University of Wellington, 2009).

National-led Government takes any action that may reduce the value of the assets (New Zealand Parliament, 2009b). As a result, the Māori requested for an advantageous treatment to settlement assets for several years subsequent to the settlement. Officials favour the Māori Party's perspective, in believing that the Crown should not act in any way that may result in significant decrease in the value of Treaty assets soon after settlement. However, it is unclear whether further assistance is guaranteed, since it has already been about a decade from the settlement date (New Zealand Parliament, 2009b).

The cancellation of the 'household fund' is another important issue to consider. Complementary measures are important in assisting households to reduce their share of GHG emissions (New Zealand Parliament, 2009b). In particular, the 'household fund' is an essential measure in achieving emissions reduction, as evident in the statement made by the Māori Party (New Zealand Parliament, 2009b, p 15): *"the rationale behind the fund was to assist households in adjusting to increased energy costs from the inclusion of the electricity sector in the NZ ETS, in part, by increasing the energy efficiency of their homes"*. Thus, this assistance is necessary upon expiration of the transitional phase, in order for the households to continue improving their energy efficiency. Ultimately, it is crucial that the 'household fund' remains in the legislation, as the increase in the households' awareness of the availability of energy efficiency technologies has a huge contribution to promoting and achieving the reduction in the level of GHG emissions (New Zealand Parliament, 2009b).

2.5. Australian Emissions Trading Scheme

2.5.1. Current State of the Australian ETS

Australia has always recognised its need for an emissions reduction, because of its competitive advantage on fossil fuel exports – resulting in emissions growth at a faster rate

than expected (Morton, 2011). As evident in an analysis conducted by the Climate Change Department, Australian emissions will be 24 percent above 2000 levels by 2020. Professor Garnaut also commented that Australia would need to link its carbon price to the international markets trading offsets or carbon credits to stabilise its emissions and achieve their 2020 target (Morton, 2011).

In response, the Australian Government proposed to introduce an Australian ETS by 2012 under the name of the 'Carbon Price Reduction Scheme' (CPRS) (Institute of Australian Chartered Accountants and Ernst & Young, 2008), but opposition parties argued the plan to be "*too little, too late*" (Farr, 2007), and it was postponed indefinitely subsequent to the general election held in June 2010. Nonetheless, the current Prime Minister Julia Gillard announced in February 2011 that the Australian Federal Government is considering pricing the carbon from July 2012. It will operate like a Carbon Tax for the initial two to four years, and it will be converted to an ETS regime around 2015 or 2016. Similarly to the NZ ETS, heavy-emitting industries such as coal and energy sectors will be compensated, and the level of compensation will correspond to that stated in the initial CPRS Bill proposed by the former Prime Minister, Kevin Rudd in 2009 (AAP, 2011).

Australia's initial response to climate change was through the establishment of the New South Wales (NSW) GHG Abatement Scheme in 2003. The NSW State Government implemented the scheme to reduce emissions through the use of electricity generators, requiring a large group of consumers to purchase NSW Greenhouse Abatement Certificates. Thereafter in 2007, a cap-and-trade ETS (CPRS) was proposed at the Federal level. The initial CPRS Bill was designed as a means of setting up an ETS, through providing economic incentives to achieve

GHG reductions (Commonwealth Government, 2008). The objectives of this Bill, according to Clause 3 in Part 1 of the CPRS Bill are (Deacons, 2009, p 6):

- To give effect to Australia's obligations under the UNFCCC and the Kyoto Protocol;
- To support the development of an effective global response to climate change; and
- To take action to enable the reduction of Australia's GHG emissions to meet its emissions reduction targets.

Prior to the introduction of the CPRS proposal, Professor Garnaut studied the mechanism of a potential ETS in 2007, with an aim to examine the prospective impacts of climate change on the Australian economy. The outcome was published in the Garnaut Climate Change Review (2008a, p xvii), illustrating that *"the costs of Australia playing its proportionate part in an effective global effort, while considerable, are manageable"*.

2.5.2. Australian Submissions on the 'Carbon Pollution Reduction Scheme'

The Australian Government requested submissions on the exposure drafts of the legislation to implement the CPRS. As a response, approximately 40 individuals and organisations provided their opinions. Of those respondents, 37.5 percent rejected the scheme, and 32.5 percent supported the scheme with modifications. The remaining 30 percent supported the current exposure draft of the scheme with no modifications required. Ultimately, just over 60 percent of the respondents agreed and recognised the need for an effective scheme to reduce the GHG emissions in Australia, but approximately half of them had doubts as to whether the proposed scheme was adequate for reducing carbon emissions.

2.5.3. Australian Debate on Climate Change Policies

The evidence of climate change was apparent in Australia, when the Senate referenced the climate data, which illustrated that Australia's temperature in 2009 was its second-hottest on record. Based on this evidence, the Federal Government confirmed the urgent need for an ETS, and suggested that the Senate should pass the CPRS, which is arguably the most effective tool. Furthermore, the Government stated that 'science' was on their side (Lewis and Cubby, 2010, p 1): "... with global warming happening as a consequence of human activities, it is in individuals' economic and environmental interest to arrest it". The Bureau of Meteorology's annual statement supported that of the Federal Government, by claiming that the global temperature is well above the long-term average, and it appeared to be accelerating at a constant level with global warming (Emissions Trading Scheme News, 2009).

Australia, along with many other developed countries, signed the 'Copenhagen Accord', an agreement negotiated by Brazil, China, India, South Africa and the US to reduce global GHG emissions. By ratifying to this agreement, Australia declared to maintain the increase in the temperature below two degrees through reducing the required percentage of GHG emissions by 2020 (UNFCCC, 2009a). Supporters of an ETS believed that the notion of the ETS system is credible based on their belief on its ability to reduce the level of GHG emissions in the most cost-effective way possible, as ratified under the 'Copenhagen Accord'. Chief executive of the investor group on climate change agrees by suggesting that (Cubby, 2009, p 1):

The direction has clearly been set by the 'Copenhagen Accord', and sooner or later substantial emissions reductions will be required. This means that there has to be a price on carbon. To investors, the best way to do this is by emissions trading because it offers least-cost abatement.

In order to effectively meet Australia's national interest and the global demand for responses on dangerous climate change is through a CPRS – the ultimate reason that over 30 countries, including members of the EU, Japan, NZ, and the US have either introduced or are in the process of planning to implement their own ETS, whether that be a CPRS or other types of ETSs (Emissions Trading Scheme News, 2009). One of the primary reasons for CPRS being effective is the confirmation of the assistance available to 90 percent of Australian households. The assistance and the CPRS's compensation package provided by the government would offer financial benefit to low-income earners of approximately \$190/year. Thus, the CPRS makes obvious 'social, economic and environmental' sense – it places the burden on the emitters rather than taxpayers and places a cap on emissions to incentivise a conversion to less carbon-intensive technologies, with an aim to lower emissions through less energy consumption for lower energy costs (Emissions Trading Scheme News, 2009).

Consequently, with reference to interviews conducted with 12,000 individuals, the Australian Government concluded that regardless of the increase in opposing views about implementing an ETS in Australia as a result of the failure of the 'Copenhagen Accord' to be a legally-binding agreement (Taylor and Maher, 2009), individuals are less concerned about climate change issues subsequent to the Copenhagen Conference. The primary reason for this relief is because the conference signalled the on-going process that 'something' is being done to tackle climate change.

Although the Copenhagen Conference is certainly perceived to be redundant by many, individuals are reliant on them for the fact that annual conferences are being held, rather than expecting a specific outcome from the conference (Emissions Trading Scheme News, 2009).³⁸

³⁸ Percentage of public concern about climate change: 79 percent in 2007 and 69 percent in 2009 (Emissions Trading Scheme, 2009).

In summary, if Australia was to support the ETS, the minimum 2020 commitment should be ‘to reduce 15 percent of its year 2000 carbon emissions levels’ in order for the accord to have any meaning. Furthermore, should Australia wish to honour the accord, the requirement should be a 25 percent reduction on its year 2000 levels by 2020 (Emissions Trading Scheme News, 2009).

However, oppositions argued that a “*great, big new tax*” (Packham, 2011, p 1) is the best way to tackle climate change. They suggested that the most effective approach is to penalise those individuals and businesses who are responsible for emissions, and having minimum impact on the cost of an ordinary, daily life. In addition, oppositions disputed the Treasury’s statement that the NZ ETS would have a minimum direct impact on individuals and households, by claiming that not only would households be unfavourably affected, but the CPRS will impose redundant costs on energy-intensive businesses. Indeed, the Australian Green Party (Greens) agreed and believed that more decisive actions are needed, which led to the Australian public having high expectations on the leader of opposition for a definitive climate change policy for the benefit of the Australian society (Emissions Trading Scheme News, 2009).

Thus, as a response to public opinion and the failure of the Copenhagen discussion to reach any legally-binding deal, Tony Abbott, the leader of the opposition party, claimed that “*new modelling needs to be done to show what the effect of it a ‘go-it-alone’ ETS would be on Australian industries and Australian jobs*” (Emissions Trading News, 2009, p 1). In addition, Abbott suggested that if Australia is to have a ‘go-it-alone’ emissions tax, Australian jobs and industries will be damaged, and the environment will not be helped. In support, the former Labour treasurer of Queensland stated that “*the coal in this country, the biggest exporter, cannot survive with a ‘go-it-alone’ emissions tax*” (Emissions Trading Scheme News, 2009).

The Australian Greens commented that they are ready to deliver the necessary amendments to the CPRS for Australia to play its fair role in the global climate effort: something they cannot see Australia doing as the CPRS currently stands. Moreover, Michael Hitchens, the Chief Executive of the Australian Industry Greenhouse Network, reported that the results of an analysis undertaken by the Treasury and a consultancy firm, Access Economics Pty Limited, suggested that given the difference in the size of the economy, the five percent reduction would incur greater economic costs in Australia (per capita basis) than the US and the EU under their greenhouse pledges (Emissions Trading Scheme News, 2009).

Agreeing with Hitchens, Abbott raised suspicions at the claim that the proposed CPRS is designed to be a 'Political Slush Fund' in economically and politically compensating low-income households, instead of providing a solution for the environment. In addition, Abbott also disputed that half of middle-income earners will be disadvantaged by higher electricity and gas prices costing \$1100/year – a claim the Australian Federal Government is accused of being fraudulent (Emissions Trading Scheme News, 2009). However, when the Environment Minister Peter Garrett argued that opposition cannot be run by simply conjuring figures and requested for evidence of Abbott's figures, Abbott rejected the call, claiming that the figures were based on the reporting of the Government's own modelling, but he declined to provide any more details (Emissions Trading Scheme News, 2009).

Dick Warburton, the chairman of the panel set up in 2009 to advise on EITE activities, claimed that the issue of implementing an ETS should be reconsidered as a result of the Copenhagen's failure. Consequently, a round-table of company executives, bureaucrats and experts was scheduled to be held at the end of January 2010, in order to discuss benefits and costs of introducing an ETS, and also to consider any definitive alternatives to a trading

scheme (Grattan, 2010). Through this discussion, some indications of post-Copenhagen movements of large organisations were expected. However, it is yet unknown whether the round-table was held as scheduled, as there are no specific information on the outcome of the discussion (Grattan, 2010). Dick Warburton, who believed that the climate change science is not settled, perceived (Solomon, 2010, p 1) that *“there should be a delay in whatever we do until we have a clear picture of the best course. We need to get it right”*. In effect, he favoured a Carbon Tax or any other alternatives to a trading scheme.

Supporting this view are many lobby groups and government agencies, suggesting that the CPRS is a poor example of an ETS. Oppositions perceived the CPRS to be *“extremely volatile, open to manipulation, and outright naughty – the very antithesis of certainty”* (Climaterealists, 2009, p 2), as the proposed CPRS is a defective, premature tax that is only operational as part of a properly-regulated and properly-audited global scheme that the US is involved in. This proved that without the support from the US, the CPRS *“would be an invitation to chaos”* (Climaterealists, 2009, p 2). Business lobby groups agreed with the opposition party, by claiming that the Australian Government is making a mistake in enforcing a twice-failed ETS (AAP NewsWire, 2009). In support, the Australian Chamber of Commerce and Industry commented that (AAP NewsWire, 2009, p 1):

It is a mistake for Australia to lock in an ETS design and timing before it sees the ‘colour of other nation’s money’. Circumstances have clearly changed after the Copenhagen Summit, which showed that there was only a limited scope for a meaningful global agreement including binding commitments by other nations.

One of the sources that the Australian Federal Government favoured is a tax or levy on aviation and shipping fuel. Consequently, domestic air travellers would face higher prices to cover the costs of airlines’ GHG emissions – estimated at \$100m or more – if the Australian

Federal Government's ETS was to be passed by Parliament in 2010, which is argued to be invaluable given that aviation only accounts for about two percent of overall GHG emissions in Australia (Heasley, 2009). In addition, Australian exports of minerals, primary industry and already struggling tourism industries will be penalised as a result of an increase in costs. Yet, there are advantages; the proposed ETS would put Australian tourism at a competitive advantage to close overseas destinations, as no tax is payable for emissions released from international flights over Australian skies, making international travel cheaper (Heasley, 2009).

In summary, despite all opposing views, including Prof. Kenyon's³⁹ statement (Cubby, 2009, p 1) that *"there are some strategic gains for Australia to get into Emissions trading early rather than late... It will also help international negotiations"*, the Australian Federal Government had planned to bring in the ETS legislation in February 2010 for the third time. However, the change of Government had an impact on this plan and the decision to implement the proposed ETS in Australia was delayed until 2013, if not indefinitely (Cubby, 2009; and Cooper, 2010) – although this may change if the current Prime Minister Julie Gillard's proposal to price the carbon is accepted.

2.5.4. Alignment of the NZ ETS and the Australian CPRS

It is desirable for any country to be linking their ETS with that of other nations and the international carbon market. For NZ, it is an especially important consideration, based on our competitive advantage on trade (Ministry for the Environment, 2009a). However, it can only be effective if individual principles are uncompromised. Concerns with globally and sectorally linking with the proposed Australian CPRS are evident, based on the assumption

³⁹ An Economics Policy Researcher at Curtin University of Technology, Australia.

that it had passed the legislation. The major concern is that it would eliminate the ability to link NZ with its three largest trading partners as a result of linking two relatively new markets in different situations (Ministry for the Environment, 2009a).⁴⁰ However, linking with the EU ETS would incur more benefits than costs, as the EU is a more established and experienced market in terms of emissions trading; however, it is suggested by Anger (2008) that no attempt should be made to link NZ ETS with other countries' regimes until global policies that can accommodate the principles are created.

In accordance with Jotzo and Betz's (2008) perception, the researcher believed NZ had an adequate ETS prior to the amendments, based on the evidence that it retained the process of marginal signalling the full carbon price, with no exception to 90 percent grand-parented firms, and that it allowed individuals and businesses to trade units at the full international price excluding Assigned Amount Units (AAUs) from other countries, unless the establishment of their environmental integrity allowed for special regulations to do otherwise. The proposed legislation is perceived by many submitters to be "*fiscally, environmentally, and morally reckless*" (New Zealand Parliament, 2009b, p 21), as the anticipated changes would abolish the marginal price signal. Without the price signal, large wealth transfers from households and SMEs to carbon-intensive firms would be uncapped, and there will be restrictions on the available price for emissions reductions by mitigators (New Zealand Parliament, 2009b).

The fundamental difference between the NZ ETS and the Australian CPRS is the inclusion of the agriculture sector. When the Australian CPRS was proposed to be implemented, the agriculture sector was excluded, as agriculture is only 15 percent of the total level of GHG

⁴⁰ The three next largest trading partners are: China, Japan, and the US.

emissions in Australia, as oppose to an approximate of 50 percent in NZ. In addition, if it was to be introduced, a review process was planned to be held in 2013 to consider the inclusion of agriculture sector in 2015 (Ministry for the Environment, 2009b). Australia has competitive advantage over coal-fired power stations, and therefore has a larger proportion of emissions from the energy sector compared to NZ's energy emissions, as 70 percent of the total electricity in NZ is generated through renewable energy sources. Therefore, the differing emissions profile suggested that harmonisation with Australia should be thoroughly considered before committing to such a goal (Ministry for the Environment, 2009b).

Certainly, from the NZ's perspective, harmonisation should only occur in NZ's own interests. According to the Parliamentary Commissioner for the Environment, if NZ is to harmonise with Australia, there are possible risks of failing to align the NZ ETS with that of other countries. For example, adopting an uncapped, intensity-based allocation would restrict carbon trading with the US, in addition to being incompatible with the US and EU ETS policies (Ministry for the Environment, 2009b). Ultimately, Australian CPRS was only a proposal at the time, and therefore there was insufficient time and advice to allow for a proper consideration of the costs and benefits associated with the level of alignment envisaged by the Bill (Jotzo and Betz, 2008), and as the Australian CPRS is on hold, it is indefinite whether any harmonisation would happen if Australia decides to implement the scheme in the future (Ministry for the Environment, 2009b).

However, as previously mentioned in Chapter 2.3.3.1, the current National-led Government amended the NZ ETS to intensity-based allocation from historical-based emissions, which Oram (2009, pp 1-2) perceived to be taking *"a giant step backwards... slavishly following the [proposed] ETS in Australia"*. This would provide further incentives to release more

emissions rather than reduce them, resulting in individual sectors being unable to sustain international best practice. While other countries continue to refine their climate change policies as international circumstances change, the proposed Australian CPRS appeared to have inflexible provisions (Oram, 2009).

Thus, impulsive and hasty harmonisation with Australia would create a risk of altering the NZ's climate change legislation to be inflexible to changes (Ministry for the Environment, 2009b). Based on Oram's (2009) statement, the National-led Government's decision to modify the NZ ETS to an intensity-based allocation system may possibly create difficulties in linking the NZ ETS with other countries' regimes, although it is still too early to comment on the actual effect of the NZ ETS on the NZ economy. A table comparing the NZ ETS and the AU CPRS is disclosed in Appendix 13.

2.6. European Union Emission Trading System (EU ETS)

The European Union Emission Trading System (EU ETS) was initiated on 1 January 2005, with 25 members⁴¹ of the European Union (EU) participating (Brussels, 2008). To date, the EU ETS is beyond doubt, the largest multi-national ETS currently under operation (Buchner and Ellerman, 2007). The basic notion of the EU ETS is to incentivise the members of the EU to be collectively responsible in reducing the GHG emissions. The EU ETS regulates large-emitting participants to regularly observe and notify their individual emissions released, and they are also liable to return to the government the emissions allowances equivalent to their annual CO₂ emissions (Buchner and Ellerman, 2007).

⁴¹ The members of the EU at the time include: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, and the UK. [Bulgaria and Romania joined the EU in 2007] (Brussels, 2008).

The EU ETS operates under ‘trading periods’, where emissions allowances are provided to the emitters as a lump sum, which may last for several calendar years. This is to regulate any possible annual irregularities in the level of GHG emissions as a consequence of unusual weather conditions, for example extremely cold winters or very hot summers. The first EU ETS Trading Period covered all EU emissions from January 2005 until December 2007. Following its expiration, the second Trading Period commenced in January 2008, is expected to terminate in December 2012 (EU Europa, 2008). The EU ETS operates similarly to the NZ ETS, receiving free initial allocations on a plant-by-plant basis from their individual state governments. Thereafter, an EU allowances can be freely traded from other installations, traders and the government, and any excess can be resold for profit (Bespertov *et al.*, 2009). At the beginning of the second trading period, the European Commission proposed several modifications to the scheme, including (Brussels, 2008, p 2):

- One EU-wide cap on the number of emission allowances instead of 27 national caps. The annual cap will decrease along a linear trend line, which will continue beyond the end of the third trading period (2013-2020);
- A much larger share of allowances will be auctioned instead of allocated free of charge;
- Harmonised rules governing free allocation will be introduced;
- Part of the rights to auction allowances will be redistributed from the Member States with high per capita income to those with low per capita income in order to strengthen the financial capacity of the latter to invest in climate-friendly technologies;
- A number of new industries (for example, aluminium and ammonia producers) will be included in the ETS; so will two further gases (N₂O and perfluorocarbons [PFCs]); and

- Member States will be allowed to exclude small installations from the scope of the system, provided they are subject to equivalent emission reduction measures.

These amendments are still at a draft stage, and it is only probable they will become effective under the EU ETS from the third trading period (post-2012). In addition, the airline industry has recently been included in the EU ETS, effective from 2012. With modifications, it is expected that, a 20 percent reduction in the overall EU emissions based on 1990 levels will be achieved, which is projected to be approximately 36 million tonnes (Million tonnes [Mt] CO₂) per annum (Committee on Climate Change, 2008).

As it currently stands, no carbon credits can be earned through CO₂ removals by tree plantations. This denial was strongly supported by Non-Governmental Organisations (NGOs) and the EU Commission, providing an argument that the durability of the sinks has numerous scientific uncertainties and that it is better to reduce emissions using industrial sources for the benefit of climate change issues in the long-term. However, despite its criticisms, some of the government and industry representatives are still lobbying for their inclusion under the ETS (Environmental Audit Committee, 2009a; 2009b; 2009c; and 2009d).

Yet, several design flaws exist limiting the effectiveness of the EU ETS (Jones *et al.*, 2007). During CP1, caps on the carbon price were insufficient for a substantial emissions reduction, resulting in the total allowance allocation to exceed actual emissions (Committee on Climate Change, 2008, p 140) and in the carbon being priced at zero in 2007, reflecting a difficulty in projecting prospective emissions, which is crucial in placing a cap on the price of carbon (Carbon Trust, 2009).

2.6.1. Commentary on the EU ETS

Various individuals and organisations commented on the EU ETS, providing supportive and opposing views from various aspects. Proponents of the ETS argued that the escalation in the electricity prices during CP1 is not the sole consequence of the introduction of the ETS, but it was primarily because of the instability in the world energy prices due to structural reasons in the electricity market (Betz and Sato, 2006). On that note, Seinen (Environmental Audit Committee, 2009b) and Committee on Climate Change (2008, p 155) agreed, that further research and development is necessary to support the implementation of technology policies to the EU ETS, in order to “*overcome market failures associated with delivering low-carbon technologies, for example, renewable energy*”.

However, critics argued that the EU ETS has several defects, including: failing to achieve its goals; price volatility; over-allocation; and windfall profits (Buchner and Ellerman, 2007; Mufson, 2007; and Ellerman and Joskow, 2008b). Moreover, Ellerman and Joskow (2008a) criticised that the EU ETS is the primary cause for the unsettling energy prices, and that there is no evidence to determine the ability of the EU ETS to influence longer-term investment decisions. Although it is perceived that there are substantial improvements in the third trading period (beyond 2012) scheme, major weaknesses are still existent, and therefore, as International Monetary Fund (2008, p. 24) suggested, further reforms are necessary in order for the EU ETS to “*achieve its full potential*”.

2.6.2. Comparison between the NZ ETS and the EU ETS

The amended NZ ETS took effect from 1 July 2010, affecting various sectors of the economy, including the agriculture sector, which is scheduled to enter the scheme in 2015 (New Zealand Parliament, 2009a). However, the EU ETS, which currently has 27 members of the

EU, inclusive of Switzerland and Norway, only applies to energy and industrial sectors,⁴² a small part of the economy imposing costs on a whole block of countries. Therefore, there is a vast difference in its effect, as 80 percent of the exports in Europe are domestic, with all participants consequently being equally disadvantaged. Nonetheless, 100 percent of the NZ exports are directed overseas, and three of NZ's major trading partners are currently trading without an ETS (Boscawen, 2010). Hence, according to Dr. Nick Smith, the current Minister Responsible for Climate Change Issues in NZ, the amended NZ ETS will be the most comprehensive scheme in the world (Bluegreens, 2009, p 2):⁴³

This Emissions Trading Scheme will be the first of any country outside Europe, and on 1 July 2010 will be the most comprehensive by including transport, industrial, and energy emissions. NZ is the first country in the world to include forestry and under these amendments will be the first country in the world to include agriculture.

However, whether this world-leading, comprehensive ETS is adequate in the NZ economy is questionable. This uncertainty is confirmed by the current Prime Minister of NZ, John Key's⁴⁴ statement that confirmed NZ's action(s) as a nation having little impact on the climate, and therefore NZ is not in any position to lead, but be a fast follower (Gluckman, 2009, p 5).

2.7. 2009 United Nations Climate Change Conference (The Copenhagen Summit)

In December 2009, the United Nations Climate Change Conference (the Copenhagen Summit) was held to negotiate a follow-on agreement to the Kyoto Protocol.⁴⁵ The conference was organised as a two-week discussion with 193 countries being represented, including a separate discussion among 110 national leaders (COP Copenhagen 2009, 2009).

⁴² The French Government proposed a Carbon Tax on Petrol early 2010; however, complaints from the French public led to abandoning the proposal upon losing the election (Saltmarsh, 2010).

⁴³ Part of a speech by Dr. Nick Smith made in Parliament on the 24 September 2009.

⁴⁴ Mr. John Key was elected as the Prime Minister of NZ in November 2008.

⁴⁵ Refer to Chapter 2.1 for its definition.

The Copenhagen Summit concluded with a final decision – the ‘Copenhagen Accord’. This was the resultant of ‘sealing the deal’, subsequent to a private negotiation between the leaders of Brazil, China, India, and South Africa and the US⁴⁶ to reach an agreement, which was then applied to 188 other countries. Although the result of the global climate negotiation, the ‘Copenhagen Accord’, did not produce a legally-binding action plan for the GHG emissions reduction, it is still at the early stages of the entire process to constitute a binding deal to reduce GHG emissions, which would have an immediate operational effect once it is legislated (COP Copenhagen 2009, 2009).

Currently, the agreement states that the parties to the Kyoto Protocol, including NZ and Australia, are committed to reducing their emissions individually as a nation, or jointly by ‘at least 80 percent by 2050’ (COP Copenhagen 2009, 2009). However, it is unsure whether Prime Minister John Key will agree to such an ambitious target. In addition, the agreement will also include targets for emissions reduction by 2020, but values had not been specified (COP Copenhagen 2009, 2009). An ‘annex’ is included in the accord for countries to define their individual reduction targets. The agreements are not enforceable under the law; however, these national actions will be subject to international consultations (COP Copenhagen 2009, 2009).

As Ban Ki-Moon, the United Nations (UN) Secretary-General, stated, the ‘Copenhagen Accord’ is definitely an essential beginning, although the Copenhagen Summit did not ‘turn out’ to be everything all nations hoped for (COP Copenhagen 2009, 2009). Ban’s statement above was supported by Yvo de Boer, UNFCCC Executive Secretary (COP Copenhagen 2009, 2009, p 2), where he commented that: “*We now have a package to work with and begin*

⁴⁶ In alphabetical order.

immediate action". Both Ban and Yvo de Boer agree that the challenge now is to convert the treaty into something real, measurable and verifiable document in order for its importance to be recognised (COP Copenhagen 2009, 2009).

However, the leaders of the nations requested for a review of the 'Copenhagen Accord' because of the scientific proof that agreements made at the Summit is ineffective in maintaining the global temperature increase to lower than two degrees Celsius. The review is scheduled to be completed by 2015, which will include considerations of long-term goals for limiting the global temperature increase to 1.5 degrees Celsius (COP Copenhagen 2009, 2009).

In support, Løkke Rasmussen, the Danish Prime Minister, expressed his satisfaction (COP Copenhagen 2009, 2009, p 3) by claiming that although not legal, an outcome was produced, which will have an immediate effect once the involved nations ratify and support the agreed provisions. As a result, the 'Copenhagen Accord' was accepted by Brazil, China, India, South Africa, and the US. Furthermore, the provision that stated the deadline (end of 2010) for producing a legally-binding treaty was deleted in the new draft, but still included the maximum two degrees Celsius limit on the global average temperature rise (UNFCCC, 2009b). UNFCCC Executive Secretary stated (COP Copenhagen 2009, 2009, p 1):

We have made the vehicle ready. Now it is up to the countries to decide if they want to ride it. I hope the many (countries) that supported the text this night (Friday night) will sign on, although many will probably be uneasy as to what that would lead to.

Moreover, Barack Obama, the current President of the US (COP Copenhagen 2009, 2009, p 3), emphasised the need for both developed and developing countries to take part in being responsible to reduce their own GHG emissions – assurance must be made on not 'dumping' released carbon on other countries. It may not be exactly at the same pace, but developed and

developing countries should co-operate by setting up a “*funding mechanism to help the most vulnerable countries, like Bangladesh, [which would] create a framework that would allow us to be effective in the future*”.

Ultimately, the final agreement was ‘empty of content’ and extremely weak on the level of ambition. According to Dave Martin⁴⁷ (Beyerstein, 2009), although the Summit anticipated a ‘Fair’, ‘Ambitious’ and ‘Binding’ deal, the ‘Binding’ nature was concluded with a non-transparent outcome, and the ‘Fair’ was lost early on in the process when Annex 1⁴⁸ countries could not agree to a financing package beyond the next three years, The ‘Ambition’ was also lost, when leaders could not even commit to a global goal of keeping global temperature rise below two degrees Celsius (Beyerstein, 2009).

With such a disappointing outcome, Key considered NZ to be a little isolated on the decision-making of its key Copenhagen issues, despite NZ being a developed country (Smellie, 2009). However, the NZ’s National-led Government announced that NZ is to submit its 2020 emissions reduction target to the Copenhagen Accord, joining other countries in reducing emissions with the existing 2020 “*emissions reduction target of 10 to 20 percent*” relative to the 1990 levels (Smellie, 2009, p 1).

2.8. Carbon Tax versus ETS

According to Nordhaus (2009, p 1), “*climate change involves a tale of two cultures – ‘natural sciences’ and ‘social sciences’*”. The first describes the geophysical aspects of climate change through the examination of scientific activities, for example, the carbon cycle; and the second involves “*analysing ways to harness economic and political systems to achieve climate goals*

⁴⁷ Greenpeace Canada Climate and Energy Coordinator.

⁴⁸ Refer to Appendix 1 for the list of countries included in Annex 1 parties.

effectively at low cost". In combining the two cultures, two distinct policy instruments were proposed as a means to enforce emissions reduction – a Carbon Tax and an ETS (Farrell, 2009). Since the initial development, the advantages and disadvantages of the two policies have continuously been debated (for example, Warren, 2008; ABC News, 2009; Carbon Tax Center, 2009a; Irish Times, 2009; and UK Department of Energy and Climate Change, 2009).

Consequently, an up-to-date, general consensus suggested that an ETS is a more favourable approach to a Carbon Tax, as it is supported by key politicians in the US, such as President Obama and other influential parliamentary leaders and large organisations including General Electric, Dow Chemical, Shell Oil, and Duke Energy (Yale Environment 360, 2009). Individuals and businesses in support of the ETS argued that there are two main strengths (Yale Environment 360, 2009, p 1):

- It sets a steadily declining ceiling on carbon emissions; and
- By creating a market that rewards companies or slashing CO₂, it uses the free enterprise system to wean the US off fossil fuels and onto renewable energy.

To obtain more variety of opinions, Yale Environment 360⁴⁹ (2009) asked several environmentalists, economists and academics for their preferences and their perceptions of the ETS and the Carbon Tax. The majority of the respondents preferred an ETS, and their supportive opinions are discussed in the following several paragraphs. Whilst a trading scheme allows for a set target to measure the accurate emissions reduction, a president of the Natural Resource Defence Council claimed that an ETS is a more effective tool in solving global warming issues than a tax, as it has a clear set of goals for reducing emissions. There is

⁴⁹ An online magazine published by Yale University's School of Forestry and Environmental Studies, offering opinion, analysis, reporting and debate on global environmental issues.

environmental uncertainty in the actual level of emissions reduction with the tax, and the estimates may not be accurate.

A director of the Earth Institute at Columbia University and the president of the Environmental Defence Fund also supported the ETS because of its market-based characteristics. Therefore, an ETS is an idealistic approach for politicians because it aims “*to truly transform our economy, to protect our security and save our planet from the ravages of climate change*” (Samuelsohn, 2009, p 1), without requiring to place taxes on businesses and households. In addition, ‘back-room negotiations’ can be arranged for special-interest groups (Yale Environment 360, 2009).

A professor of Business and Government at Harvard University and the director of the Harvard Environmental Economics Program agreed with the President of the Environmental Defence Fund, providing a reason for environmental NGOs being opposed to the Carbon Tax approach – a tax is not a guaranteed achievement of an emissions target, as a Carbon Tax is more politically controversial, allowing political and economic forces to redirect to less demanding targets, which the professor believed to be unacceptable (Yale Environment 360, 2009).

A president of the Pew Centre on Global Climate Change also believed that a cap-and-trade system allows for a set target for the anticipated emissions level, with minimum cost of living. The two fundamental characteristics of an ETS, ‘environmental integrity’ and ‘cost-effectiveness’ allowed for a correctly-implemented policy in tackling climate change in an economically responsible manner. Ultimately, although the arguments suggested that an ETS

is complex, there is one simple reason why an ETS is more favourable to a Carbon Tax – a Carbon Tax is less likely to reduce emissions than an ETS.

In contrast, a professor of Environmental Studies at the University of Colorado suggested that despite the possibility of a ‘cap-and-trade’ creating new and substantial government revenue, it is not the ‘correct’ policy for improving efficiency levels to minimise environmental damage and GHG emissions (Yale Environment 360, 2009). A professor of Social and Decision Sciences, and a Professor of Engineering and Public Policy at Carnegie Mellon University also supported a Carbon Tax approach, perceiving that a tax is simpler, more transparent, and trustworthy, with the ability to generate direct responses from a set of clear goals (Yale Environment 360, 2009).

In addition, Richard Denniss, from the Australian Institute, and John Humphrey, from the Centre for Independent Studies, claimed that (Jotzo, 2009, p 1): *“an emissions tax is better for the environment because under emissions trading individual action to reduce GHG is futile and a Carbon Tax is better for businesses than an ETS”*. They strongly supported six fundamental reasons for a Carbon Tax being superior to an ETS, as provided by the Carbon Tax Center (2009a, p 1):

1. A Carbon Tax will lend predictability to energy prices;
2. A Carbon Tax will provide quicker results;
3. A Carbon Tax is transparent and is easier to understand than an ETS;
4. The simplicity of a Carbon Tax inoculates it against the perverse incentives and potential for profiteering that will accompany an ETS;
5. A Carbon Tax addresses all sectors and activities producing carbon emissions; and

6. A Carbon Tax can produce a far more equitable result than an ETS.

Ultimately, despite disagreements on many issues surrounding two climate change policies, one issue received unanimous support by all. As Satche claims; *“imposing some sort of price on fossil fuels is a big improvement over the ‘do nothing’ status quo”* (Yale Environment 360, 2009, p 1). Nonetheless, it is worth investigating an adequate policy that provides the best result in achieving the initial aim of introducing mechanisms to reduce the level of GHG emissions. Therefore, this study aims to contribute to knowledge by investigating the effectiveness of each mechanism in order to recommend an adequate solution that best suits the NZ context, primarily through examining the behavioural-effectiveness of the policies on domestic producers and taxpayers. Chapter 3 explains the research approach and methods employed in conducting this study.

Chapter Three:

Research Approach

and Methods

3.0. Research Approach

3.1. Overview

Upon the initiation of any research project, a series of fundamental questions about the basic scope, structure and approach of the study must be explicitly considered and developed. There are three broad research approaches: qualitative, comparative, and quantitative. A qualitative research approach is “*a distinctive research strategy that usually emphasises words rather than quantification in the collection and analysis of data*” (Bryman and Bell, 2007, p 402). Furthermore, a qualitative research approach takes an inductive view, whereby a theory is generated through conducting research. There are several qualitative methods of data collection such as unstructured interviews, ethnography/participation observation, documentary collection analysis (Bryman and Bell, 2007).

On the contrary, a quantitative research approach is a “*distinctive research strategy that entails the collection of numerical data and exhibits a view of the relationship between theory and research as deductive*” (Bryman and Bell, 2007, p 154). A deductive research is a study that initiates with a theory to deduce a hypothesis, and is tested using quantitative data collection and analysis (Bryman and Bell, 2007, p 155). Some of the dominant research methods for a quantitative research are: structured interviews, surveys or questionnaires, and quantitative data analysis using statistics (Bryman and Bell, 2007).

The final approach is the comparative research approach, which incorporates both quantitative and qualitative data collection and analysis methods. Therefore, this research approach is neither as fluid as qualitative research nor as fixed as quantitative research (Ragin, 1994). As defined by Fairweather (1998, p 6), this approach “*starts with some particular topic, develops concepts and then revises them in the light of experience*”.

In comparison, the quantitative strategy favours generality and parsimony⁵⁰ examining “*general patterns of variation across numerous studies*” (Ragin, 1994, p 137), whilst the qualitative research strategy focuses on extracting comprehensive and in-depth knowledge from a handful of cases. In contrast, a comparative research strategy is concerned on the diversity of cases – studying the similarities and differences within a set of cases to analyse how cases are combined or contrasted to produce certain outcomes (Ragin, 1994). For the purpose of this study, the comparative approach was adopted.

3.2. Research Designs

According to Yin (1994, p 134), “*every type of empirical research has an implicit, if not explicit, research design*”. Essentially, a research design is a ‘step-by-step guide’ that provides a bridge between the initial research question and the empirical data analysis, ultimately leading to a profound conclusion. Essentially, a research design is “*an action plan for getting for the initial set of questions answered, to its set of conclusions about these questions, through a series of steps including the collection and analysis of relevant data*” (Yin, 1994, p 134).

In broad terms, there are five distinctive, yet overlapping types of research designs. Table 3.1 summarised the combination of these five research designs and its associated research strategies, outlining its typical form of use when combined. Although clear distinctions cannot always be made, in particular between qualitative and quantitative research in some cases and between case study and longitudinal research designs, these combinations have unique characteristics that are fit for different studies with different aims and objectives (Bryman and Bell, 2007, p 71):

⁵⁰ Parsimony is defined as an approach of “*using as few variables as possible to explain as much as possible*” (Ragin, 1994, p 137).

Table 3.1: Research Strategy and Research Design

Research Design	Research Strategy	
	Qualitative	Quantitative
Experimental	Typical form: Most researchers using an experimental design employ quantitative comparisons between experimental and control groups with regard to the dependent variable.	No Typical form. However, there is an example of experimental research design that gradually moved away from the ‘test room method’ towards use of qualitative methods.
Cross-sectional	Typical form. Social survey research or structured observation on a sample at a single point in time.	Typical form. Qualitative interviews or focus groups at a single point in time. Can also be based upon qualitative content analysis of a set of documents relating to a single event or a specific period in time.
Longitudinal	Typical Form. Social survey research on a sample on more than one occasion, or may involve content analysis of documents relating to different time periods.	Typical form. Ethnographic research over a long period, qualitative interviewing on more than one occasion, or qualitative content analysis of documents relation to different time periods.
Case study	Typical form. Social survey research on a single case with a view to revealing important features about its nature.	Typical form. The intensive study by ethnography or qualitative interviewing of a single case, which may be an organisation or an individual.
Comparative	Typical form. Social survey research in which there is a direct comparison between two or more cases, including cross-cultural research.	Typical form. Ethnographic or qualitative interview research on two or more cases where some comparison is sought between them.

Given the nature of the study, an embedded single case study research method was undertaken to examine individuals’ and businesses’ behavioural attitudes towards both a Carbon Tax and an Emissions Trading Scheme (ETS) regarding greenhouse gas (GHG) emissions reduction in the New Zealand (NZ) context. A case study approach is an encompassing method that covers “*the logic of design, data collection techniques and specific data analysis*” approaches (Yin, 2009, p 18). This is identified in the two-fold definition (Yin, 2009, p 18):

1. A case study is an empirical inquiry that:
 - Investigates a contemporary phenomenon (carbon tax and ETS) in depth and within its real-life context (NZ), especially when the boundaries between phenomenon and context are not clearly evident.
2. The case study inquiry:
 - Copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result;
 - Relies on multiple sources of evidence, with data needing to converge in a triangulation fashion, and as another result; and
 - Benefits from the prior development of theoretical propositions to guide data collection and analysis.

In an attempt to meticulously analyse climate change policies in a NZ context, an embedded single-case study approach was implemented, with an incorporation of the triangulation method. The use of multiple sources of qualitative and quantitative evidence within the embedded approach allowed for significant opportunities to obtain comprehensive knowledge of two sub-case structures, the Carbon Tax and the ETS, through extensively analysing a single case structure – the NZ context (Yin, 2009). Thus, an embedded single-case study research design is appropriate for this research to obtain in-depth information, providing enhancing insights about available climate change policies set in one context (NZ).

The ultimate advantage of the use of the embedded study approach over the holistic approach is the ability to redesign when the implemented design becomes inappropriate for the research question. On the other hand, the fundamental disadvantage is the possibility of the case study becoming narrow-focused, only focusing on the subunit level and failing to provide its

conclusions based on the larger unit of analysis. In addition, case studies are unsuitable for generalising outcomes, due to their in-depth research approach in a particular case or a context (Yin, 2009). This study will focus on the effectiveness of a Carbon Tax and an ETS in NZ, and thus conclusions drawn from this study will not have sufficient evidence to support the notion that research in other countries would generate the same outcome.

3.3. Research Methods

Bryman and Bell (2007) suggested that incorporating a triangulation method is the paramount approach to conduct a successful in-depth, longitudinal research examining a single case, using a combination of quantitative and qualitative sources. As Lamrek (Saunders *et al.*, 2009, p 6) explains, “*the case study is a research approach situated between concrete data taking techniques and methodological paradigms*”. Thus, data was collected from different sources of evidence to enhance the evaluation of sub case structures. Six most common sources of evidence that are used in case study research, including their comparative strengths and weaknesses, are provided in Table 3.2 (Yin, 2009, p 102):

Table 3.2: Six Sources of Evidence: Strengths and Weaknesses

Source of evidence	Strengths	Weaknesses
Documentation	Stable – can be reviewed repeatedly Unobtrusive – not created as a result of the case study Exact – contains exact names, references, and details of an event Broad coverage – long span of time, many events and many settings	Retrievability – can be difficult to find Biased selectivity, if collection is incomplete Reporting bias – reflects (unknown) bias of author Access – may be deliberately withheld
Archival records	Stable – can be reviewed repeatedly Unobtrusive – not created as a result of the case study Exact – contains exact names, references, and details of an event Broad coverage – long span of time, many events and many settings Precise and usually quantitative	Retrievability – can be difficult to find Biased selectivity, if collection is incomplete Reporting bias – reflects (unknown) bias of author Access – may be deliberately withheld due to privacy reasons
Interviews	Targeted – focuses directly on case study topics Insightful – provides perceived causal inferences and explanations	Bias due to poorly articulated questions Response bias Inaccuracies due to poor recall Reflexivity – interviewee gives what interviewer wants to hear
Direct Observations	Reality – covers events in real time Contextual – covers context of ‘case’	Time-consuming Selectivity – broad coverage difficult without a team of observers Reflexivity – event may proceed differently because it is being observed Cost – hours needed by human observers
Participant Observation	Reality – covers events in real time Contextual – covers context of ‘case’ Insightful into interpersonal behaviour and motives	Time-consuming Selectivity – broad coverage difficult without a team of observers Reflexivity – event may proceed differently because it is being observed Cost – hours needed by human observers Bias due to participant-observer’s manipulation of events
Physical Artifacts	Insightful into cultural features Insightful into technical operations	Selectivity Availability

Given that a Carbon Tax is not currently imposed in NZ, and that the National-led Government's (National's) modified-ETS was only recently implemented, only prospective behavioural effects of these regimes on individuals and businesses can be measured. Thus, in addition to information gathered from prior studies, a proxy of the behaviour-change was measured through partly adopting the notion of 'additionality',⁵¹ incorporating a combination of qualitative and quantitative data collection and analysis methods, in the form of interviews and statistical data analysis. Information obtained from employing these methods provided support in evaluating the effectiveness of a Carbon Tax and a NZ ETS on behaviour-change to reduce the level of GHG emissions in NZ. Details of each method are outlined in Chapters 3.2.2 and 3.2.3.

3.3.1. Analysing Political Literature

Analysing political documents and the associated literature is a key process when conducting a research from a political perspective. Although there is a vast difference between conducting a political science research and incorporating a political perspective in conducting a business research, methods of analysing political documents and literature are similar regardless of the characteristics of the research (Hindmoor, 2006).

There are several ways of analysing political documents including content analysis, discourse analysis and documentary analysis (Burnham *et al.*, 2008). Content analysis is a multipurpose technique that is used to collect and analyse the recorded content of written and electronic communications, through systematic counting, assessment and interpretation (Manheim and Rich, 1995; Carlson and Hyde, 2003). Discourse analysis focuses on "*the role that language, texts, conversations, the media and even academic research have in the process of creating*

⁵¹ For detailed information on 'Additionality', refer to Chapter 4.8.

institutions and shaping behaviour” (Burnham *et al.*, 2008, p 250). Lastly, documentary analysis is the systematic examination of documents and literature to study its content and structure of the documents (Instructional Assessment Resources, 2007).

For the purpose of this research, a method that incorporates elements of documentary analysis will be undertaken. Political literature, such as governmental reports, academic journals and Hansard, will be examined for their content. This is in order to obtain basic statistical information on the numerical changes in GHG levels, as part of evaluating the behavioural-effectiveness of a Carbon Tax and an ETS.

3.3.2. Quantitative Method

3.3.2.1. Overview

Quantitative research methods contrast qualitative methods, whereby a collection of statistical or numerical data is required, and the hypothesis is tested through an analysis of those collected data sets. However, as a consequence of being unable to gather relevant data first-hand, secondary analysis was conducted, whereby collected data was collated, examined and analysed. One limitation of this approach is that the quantitative analysis is premature given that the Carbon Tax is only a proposal, and the National’s modified-ETS only just commenced, constraining the availability of publicly-accessible resources. In some cases, necessary data are yet to be published, and in other cases, there are difficulties in obtaining those resources because of their unavailability. Subsequent subsections provide a detailed overview of the secondary analysis, followed by an in-depth discussion on the relevant statistical data collection in Chapter 4.

3.3.2.2. Secondary Analysis

The method of secondary analysis involves analysing data gathered from official statistics or documents by researchers with no direct involvement in the gathering of data (Bryman and Bell, 2007). According to Bryman and Bell (2007, p 328), *“most data that are used in the secondary analysis have rigorous sampling procedures, and have geographical, information and sample coverage that have been generated by highly experience researchers”*. Thus, conducting this type of analysis provides numerous advantages, but most importantly, the ability to obtain cost-effective, yet quality data within the limited timeframe.

The nature of this study requires a collection of official data prepared by several governing bodies: the Sustainability Council and several government agencies including the Ministry for the Environment, the Ministry of Agriculture and Forestry, and the Ministry of Economic Development. Through a process of secondary data analysis, relevant information from these official documents was extracted and analysed to provide a comprehensive conclusion in order to answer the fundamental research question.

The ultimate objective of implementing a climate change is to reduce emissions (Irish Times, 2009). As a result, statistical data analysis was conducted to examine the numerical effectiveness of an ETS and a Carbon Tax by observing the changes to the level of GHG emissions. Surprisingly, there is no official government documentation in NZ that anticipates the overall projection of the change in emissions. Hence, various documents were collated to analyse the changes in the emissions with and without the climate change policies.

The Business-As-Usual (BAU) emissions data gathered from ‘the Framework for a New Zealand Emissions Trading Scheme (NZ ETS)’ (Ministry for the Environment, 2007) formed the baseline in which other information gathered including the anticipated effects of climate change policies are compared to. Information extracted from the ‘Review of New Zealand’s Net Position’ report prepared by the AEA Technology Environment (2005) produced a document on the effects of a Carbon Tax, and was used to provide an estimate on the projected outcome on the level of GHG emissions, if the Carbon Tax policy was to be reintroduced. The information obtained will assist in examining numerical changes in the level of GHG emissions subsequent to the implementation of the Carbon Tax.

Statistical data projections illustrating quantitative effects of an ETS were gathered from ‘ETS: Bill to a Future Generation’ published by the Sustainability Council (Bertram and Terry, 2009). The information gathered was used to calculate the changes in GHG emissions, and make comparisons between the initial Labour-led Government’s (Labour’s) NZ ETS and the National’s modified-ETS. In addition, historical and projected emissions data from 1990 onwards, including estimates throughout CP1 and beyond, was gathered from ‘New Zealand’s Fifth National Communication’ (Ministry for the Environment, 2009e). This document was prepared by the Ministry for the Environment, conjoined with other government agencies; the Ministry of Agriculture and Forestry and the Ministry of the Economic Development, provides actual figures from 1990 to 2004 and the projected figures from 2005 to 2020, based on the current climate change policy at the time of publication – the Climate Change Response (Emissions Trading) Amendment Act 2008.

Moreover, the ‘net position’ report prepared by the Ministry for the Environment (2006), in conjunction with the Ministry of Agriculture and Forestry and the Ministry of Economic Development, provided information on the projected balance of emissions units during CP1 (2008-2012). In connection, it should be noted that the ‘Net Position Report’ is an annual document, and as such, each publication was based on the climate change policy implemented at that time. For example, the 2006 publication was based on no climate change policy, as it was prepared after the NZ Government abandoned the Carbon Tax policy, and the 2010 publication was based on the ETS – the Climate Change Response (Emissions Trading) Amendment Act 2008.

Once all relevant data was collected from diverse sources, a quantitative analysis was conducted to predict potential behaviour-change, and evaluate the effectiveness of two policies, comparing and contrasting the changes in the ‘projected’ and ‘actual’ emission reductions, without the imposition of a tax or the implementation of an ETS. In addition, a comparative analysis was carried out with statistical data gathered on the level of GHG emissions prior to the implementation of any climate change policies, in order to evaluate its effect on the expected behaviour-change of the emitters.

However, one noticeable limitation within the data collection process is that the data was collected from various sources, and different methods were used to calculate the statistics. As explained further in following chapters, the ‘Net Position Report’ prepared by the NZ Government may have a different basis for their figures compared to the ‘New Zealand’s Fifth National Communication’ (Ministry for the Environment, 2009e), which calculated their figures based on the UNFCCC regulations. Thus, an immense effort was required to gather all

data calculated on the same basis; however, it was impossible to collate all data with the same measurement base due to limited publicly-available resources.

Based on the nature of secondary data analysis, the statistical data was not calculated but instead, it was analysed using pre-existing emissions data because of the limited availability of information from the public domain, as well as the complexity of the policies in deriving the projected figures. Impacts of the Carbon Tax and the NZ ETS using Supply And Demand Energy Model (SADEM) can only be derived by a small number of specialists in practice (Bertram and Terry, 2009). Thus, an adaptation of the ‘Additionality’⁵² method is employed to analyse the data gathered from the various reports, including the Net Position Reports (AEA Technology Environment, 2005; and Ministry for the Environment, 2006), ‘New Zealand’s Fifth National Communication’ (Ministry for the Environment, 2009e); and the documents prepared by the Sustainability Council (Bertram and Terry, 2008; and 2009).

3.3.3. Qualitative Method

3.3.3.1. Overview

To enhance and provide evidence of the statistical data analysis, a qualitative research was conducted as a means of obtaining further information about individuals’ and businesses’ perspectives on climate change issues and policies. As previously mentioned in Chapter 3.1, the qualitative research method is a way of developing, collecting, and analysing data through interactions with individuals, expressed in ‘words’ rather than ‘numbers’ (Bryman and Bell, 2007). In particular, this research consisted of collecting information in respect to individuals’ and businesses’ perspectives toward NZ’s climate change policies. Thus, it was necessary to incorporate a qualitative method to obtain insightful information from individuals with

⁵² ‘Environmental Additionality’ represents a physical reduction or avoidance of emissions over what would have occurred under a business-as-usual scenario (Baumert, 1998).

professional knowledge in the field of climate change. To achieve this, semi-structured interviews were chosen (Bryman and Bell, 2007). Chapter 3.3.3.2 outlines details on semi-structured interviews.

3.3.3.2. Survey Research Method – Semi-Structured Interviews

A survey-style research method is a very popular method in the organisational, accounting and social science context because of its high level of external validity (Bryman and Bell, 2007). Survey research has been defined as (Scribd, 2010, p 4):

... the systemic gathering of information about individuals and collectivities, using interviews or mail questionnaire methods to elicit information directly and interpreting their resulting data by means of statistical analysis.

Upon choosing the sample to conduct the research, the researcher must choose the appropriate sample that produces generalisable results. These findings should generate conclusions that can be generalised to the whole population with a certain level of confidence. The use of random sampling and appropriate statistical techniques enables a researcher to do so, resulting in a less biased data collection process. There are two major types of surveys – a direct method via interviews, or at a distance, via mail questionnaires. Ultimately, the most difficult challenge faced by the researcher in any survey setting is constructing a set of questions to be asked that are suitable to develop concepts upon, or to analyse data in order to answer the fundamental research question (Bryman and Bell, 2007).

In order to obtain general, yet in-depth knowledge about the climate change policy issues, as well as individual perspectives about the on-going debate regarding the effectiveness of the two regimes, semi-structured, face-to-face interviews were chosen over the self-completion questionnaires. Overall, there are many similarities between the self-completion

questionnaires and the structured/semi-structured interviews; however, there are fundamental differences between two methods, and for these significant differences semi-structured interviews were chosen for this research. Some of the advantages of semi-structured interviews include (Bryman and Bell, 2007, pp 242-243):

- Ability to prompt – The interviewer can assist in enhancing respondents' ability to comprehend the question;
- Ability to probe – Interviews allow for open-ended questions, as the interviewees can elaborate their responses, whereas there are no opportunities to do so with self-completion questionnaires;
- Ability to collect additional data – The interviewer has some latitude to ask additional questions in response to what is seen as significant points to consider; and
- Higher response rates – Especially with postal questionnaires, in comparison to interviews, there is a higher risk of non-responses and refusals. Even if responses were able to be obtained, there is uncertainty of the 'actual' respondents.

In addition, examples of other general benefits for conducting semi-structured interviews are that semi-structured interviews are reasonably flexible, providing interviewees with freedom that allows them to respond and explain, illustrating their own thoughts and understanding on the issues raised; and that semi-structured interviews have higher reliability of an interviewee's responses as opposed to a self completion survey. A respondent is less likely to falsify their answers to questions if asked directly in an interview situation, whatever their motives; and interviews are conducted in a more relaxed manner, allowing the researcher to gather relevant information while having a conversational discussion (Bryman and Bell, 2007).

However, several concerns exist regarding the use of interviews, such as difficulties in recording and processing (transcribing) responses, and interviewees' memory. Moreover, an interviewee may feel pressured to alter their opinions from truth if face-to-face with a person, whilst a self-completion survey is done in privacy and/or anonymity (Smith, 2003). The Carbon Tax proposal is a good example of this, as the review committee considered the issue of implementing Carbon Tax over five years ago, which may result in the interviewee's initial response being unreliable.

In designing semi-structured, face-to-face interviews, prior consents from all interviewees were received for audio recordings of interviews to enable transcription. Information sheets, and consent forms including the researcher's agreement were attached and posted to the interviewees. Follow-up emails were sent to those participants that did not respond, and further telephone calls were made to follow-up on emails sent. The interview consisted of asking a series of questions regarding climate change policies, each lasting approximately 30 minutes, due to the limited time interviewees had available, although it was largely dependent on the topics discussed. As the nature of the interview suggested, relevant topics were initially identified by the researcher and any other necessary matters were discussed freely. Relevant topics under consideration include developments in the Carbon Tax/ETS, a need for modification, and future implications and perspectives of the participants on issues surrounding the Carbon Tax and the ETS.⁵³

⁵³ A template of the letter sent to the interviewees with the interview questions included can be found in Appendix 14.

As a means of obtaining relevant information about the ETS and the Carbon Tax in NZ, interviews with Hon. Dr. Nick Smith,⁵⁴ the ETS Review Committee⁵⁵ and the Carbon Tax Review Committee,⁵⁶ were intended. These interviews were conducted with the aim of obtaining information on the behavioural effects of climate change policies from the political perspective. The intended interviewees are politicians directly involved with the implementation and the review of the NZ ETS and the Carbon Tax, and thus, their opinions on the current, National's modified-ETS and its future implications will likely provide a relatively accurate reflection of New Zealanders' behaviour-changes with respect to the implementation of these two regimes. In addition, these interviewees were chosen as a fair representation of individuals and businesses in NZ. This assumption was made with a relatively high level of confidence because of the NZ's Mixed Member Proportional (MMP) voting system, where the NZ public has the right to vote for the most favourable politician to represent their region in Parliament (New Zealand Parliament, 2006).

Nevertheless, due to the unavailability of some of the intended interviewees, it was impossible to obtain opinions from the entire group of interviewees. As a result, face-to-face interviews with seven individuals were conducted: Hon. John Boscawen, Hon. Charles Chauvel, Hon. Peter Dunne, Ms. Jeanette Fitzsimons, Hon. Pete Hodgson, Ms. Rahui Katene, and Ms. Nicky Wagner. Initially, an interview with Hon. Rodney Hide was requested however, it was passed onto Hon. John Boscawen, a newly-appointed Minister of the Consumer Affairs, and a member of the ACT Party, who was delighted to express his opinions on this matter.

⁵⁴ The current Minister Responsible for Climate Change Issues.

⁵⁵ Hon Peter Dunne (Chairperson), Jeanette Fitzsimons, Craig Foss (Deputy Chairperson), Charles Chauvel, Hon Rodney Hide, Dr. Paul Hutchison, Rahui Katene, Moana Mackey, Hekia Parata, Hon David Parker, and Nicky Wagner.

⁵⁶ Hon Pete Hodgson and Hon Dr. Michael Cullen.

In addition, special arrangements were made with those individuals unable to conduct face-to-face interviews – a telephone interview was conducted with Mr. David Parker, and Hon. Dr. Nick Smith sent a written letter expressing his opinions as the current Minister Responsible for Climate Change Issues and on behalf of Mr. Craig Foss. Unfortunately, no contact was able to be made with Hon. Dr. Michael Cullen, as he has retired from the Parliament, and is currently working as a chairperson of the Board at NZ Post.

Interviews were conducted in accordance with prior University of Canterbury Human Ethics Committee approval so as to enable collection of relevant information from politicians. This was to ensure that appropriate ethical and cultural standards are met upon conducting the research (Human Ethics Committee, 2009). Chapters 4 and 5 respectively discuss the results from analysing quantitative and qualitative data collected.

Chapter Four:

Quantitative Data

Analysis

4.1. Overview

The aim of this Chapter is to examine the quantitative-effectiveness of an Emissions Trading Scheme (ETS) and a Carbon Tax by evaluating numerical changes to the level of greenhouse gas (GHG) emissions, in order to analyse the ‘actual’ reduction of emissions as a result of implementing climate change policies. Statistical information, including gross carbon dioxide (CO₂) emissions and removals by sinks,⁵⁷ thereby ‘net’ CO₂ emissions were used as input data to facilitate the analysis. The analysis is classified in the following three categories:

- Historical figures for the period 1990 – 2008;
- Current estimates for the first commitment period (CP1); and
- Significant issues and projections of emissions and removals for the periods beyond 2012.

The ‘current estimates for CP1’ category will be further divided into 3 subsections, ‘emissions without any policy implementation’, ‘emissions with a Carbon Tax’ and ‘emissions with an ETS’. This was to show differing emissions levels with the implementation of different policies, in comparison to the ‘Business-As-Usual’ emissions level without any policy implementation, which allowed for some conclusions to be drawn on the numerical-effectiveness of either policy. In addition, underlying uncertainties in each set of projections were also examined to provide intuitive information on how these projections were derived. Table 4.1⁵⁸ provided an outline of the different types of emissions, including net removals:

⁵⁷ Carbon Sinks refer to forests that accumulate biomass (total volume) and absorb carbon (WOGOCOP, 1996, p 55). Gross CO₂emissions – Net removals = Net CO₂

⁵⁸ Information contained in this table was extracted from ‘Climate Change and CO₂ Policy: A Durable Response’ (WOGOCOP, 1996, p 52), and ‘NZ’s Fifth National Communication’ (Ministry for the Environment, 2009e).

Table 4.1: Definition of Emissions and Net Removals

CO ₂ is emitted during the combustion of fossil fuels, from certain industrial chemicals processes and from land use changes. CO ₂ is absorbed ⁵⁹ (or sequestered) through photosynthesis and the growth of biomass. By convention, absorption and emissions from plant materials (such as annual crops and garden waste) including combustion of organic waste are not counted because the two are assumed to occur in balance within a short timeframe. Forests and soils are treated differently because of the potential for significant measurable net emissions or absorption over much longer timeframes.	
Measure	Description
Gross Emissions	Comprise emissions from the combustion of fossil fuels, chemical reactions in certain industrial processes and waste incineration. By convention, total GHG emissions counted under the Kyoto Protocol, excluding land use change and forestry.
Net Emissions	Gross emissions from energy sources, industrial processes and waste incineration, less any net removals by forestry and land-use changes.
Net Removals	Emissions absorbed from afforestation.
Kyoto Accounts (2008 to 2012)	Uses a gross figure for 1990, and a net figure for the Kyoto Period
Kyoto Accounts including Liabilities	Uses a gross figure for 1990 and a net figure for the Kyoto period, but includes liability for harvesting of forests providing credits in CP1.

The ‘Gross’ and ‘Net’ emissions figures described in Table 4.1 were measured under the compliance of the international reporting methodology – United Nations Framework Convention on Climate Change (UNFCCC). However, the ‘Net Position Report’ prepared by the Government uses ‘Kyoto Accounts’ which may possibly be different to emissions measured under the Kyoto basis. According to the members of the Sustainability Council (Bertram and Terry, 2009, p 3) *“the New Zealand (NZ) Government has consistently chosen to report the most favourable version in its accounting, which influences the ‘Kyoto Accounts’ to give a misleading impression of NZ’s emissions position that far understates the urgent need to reduce emissions”*. The types of Kyoto Accounts include (Bertram and Terry, 2009, p 3):

⁵⁹ The terminology used to describe the level of GHG emissions absorbed from the forestry sector is called ‘Net Removals’.

- Kyoto Accounts (2008 – 2012): uses gross figures for 1990, and a net figure for the Kyoto Period; and
- Kyoto Accounts (including liabilities): uses a gross figure for 1990 and a net figure for the Kyoto Period, but includes liabilities for harvesting of forests providing credits in CP1.

For the purposes of this study, gross emissions figures were examined, coupled with net removals from the forestry sector, to provide an overview of ‘net’ GHG emissions⁶⁰ figures. This allowed the analysis to be consistent with the UNFCCC climate change policies; however, where publicly-accessible data is unavailable, figures from the government’s ‘Net Report’ have been referred to, which may be a fundamental limitation of this analysis.

The aim of the statistical analysis is to observe, examine and compare the projected level of emissions with and without policy intervention from 1990 (the base year) to CP1 and beyond. To achieve this, two distinct analyses was conducted using ‘Supply and Demand Energy Model’ (SADEM), an energy model that estimates the level of CO₂ emissions through calculating the energy usage (WOGOCOP, 1996, p 53):

- A Business-As-Usual (BAU) analysis: analysis using data as per normal business operations to avoid capturing changes in behaviour that are the result of Government intervention (policy implementation); and
- An Assumption Analysis: analysis using estimated data to develop the projections of the effects of Government measures that can be currently identified (incorporating policy intervention).

⁶⁰ Net emissions include emissions from the energy, industrial processes, solvent and other product use, and waste sectors and emissions and removals from the LULUCF sector (Ministry for the Environment, 2009e).

As mentioned in Chapter 3.2, above analyses are based on the notion of the ‘Environmental Additionality’. This process of ‘additionality’ is dealt with in the Article 12.5 of the Kyoto Protocol (UNFCCC, 2010a, p 1):

Emissions reductions resulting from each [Clean Development Mechanism]⁶¹ project activity shall be certified... on the basis of... reductions in emissions that are real, measurable, and additional to any that would occur in the absence of the certified project activity.

‘Financial Additionality’⁶² and ‘Environmental Additionality’ are two main types of ‘additionality’. The notion of ‘Environmental Additionality’⁶³ was adopted for this research as this measures the reduction in the overall level of GHG emissions relative to the baseline (1990 levels), expressed in quantitative terms (Baumert, 1998, p 2). Whilst this research incorporated an adaptation of an ‘Environmental Additionality’ to make comparisons between the overall amount of GHG emissions abated by the project (Carbon Tax/ETS) relative to a baseline (BAU figures without policy implementation), several methodological challenges exist on accurate and consistent computation. This is because of having different models that are appropriate for individual sector, and therefore mitigation measures, for example, offsets averaging or discounting, are required to prevent any leakages or uncertainties in computing projected emissions. However, this is a technical issue and this particular research assumed that consistent methodology is used to derive different models for simplicity reasons.

⁶¹ Clean Development Mechanism (CDM), as defined in Article 12 of the Protocol, allows a country with an emissions-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) to implement an emission-reduction project in developing countries. Such projects can earn saleable Certified Emission Reduction (CER) credits, each equivalent to 1 tonne of CO₂, which can be used towards meeting Kyoto targets. The mechanism stimulates sustainable development and emission reductions, while giving industrialised countries some flexibility in how they meet their emission reduction or limitation targets (UNFCCC, 2010a).

⁶² ‘Financial Additionality’ refers to whether project investment would have taken place in the absence of the credit-gaining CDM provisions, expressed in ‘yes/no’ category (Baumert, 1998).

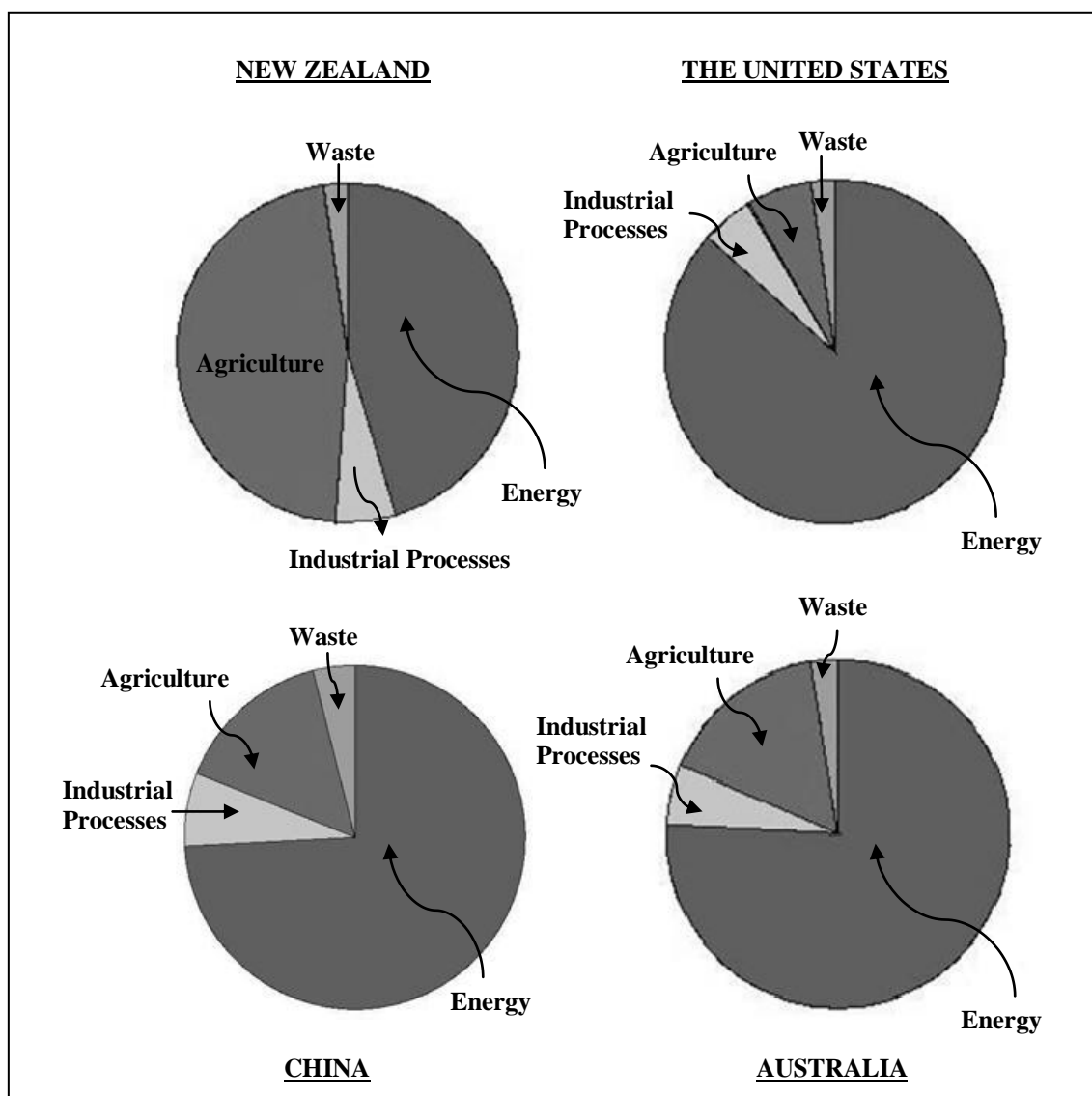
⁶³ Used as a quantitative basis in order to obtain CER credits (Baumert, 1998, p 2).

Upon implementing a scheme to enforce an emissions reduction, it is crucial to research the emissions environment that a country is operating in, in order to introduce a regulation that is well-suited and fit for purpose. Likewise, in order to examine the statistical data for GHG emissions in NZ, it is important to consider NZ's emissions profile, in comparison to other industrialised countries (major trading partners) to ensure that comparisons and contrasts were made in an accurate and adequate manner.

NZ's emissions profile is unique in comparison to fellow Kyoto-ratifying, industrialised countries, such that the economy is heavily reliant on agriculture. NZ's GHG emissions are dominated by methane emanating from ruminant animals, nitrous oxide from fertiliser applications and animal waste. Whilst the last inventory year for Australia, NZ, and the US were in 2008, China's last inventory year was in 1994, creating some difficulties in making informed comparisons. Figure 4.1⁶⁴ compared the emission profiles of NZ and its major trading partners, Australia, China and the United States (US), on a sector-by-sector basis (UNFCCC, 2010b). For simplicity reasons, the proportion of each sector is not included as the focus is on the comparative size of each sector, which can be determined by the graph.

⁶⁴ Data gathered to prepare the pie graphs were extracted from GHG Inventory Data – Comparisons by Category section of the UNFCCC website – <http://unfccc.int/di/DetailedByCategory.do>.

Figure 4.1: A Comparison of the Emissions Profiles among NZ and its Major Trading Partners



NZ's unique emissions profile influences the changes in total emissions⁶⁵ to be less predictable in comparison to other countries, through year-to-year fluctuations as a result of two main factors (Ministry for the Environment, 2010, pp iv – v):

⁶⁵ Total emissions include those from the energy, industrial processes, solvent and other product use, and waste sectors, but do not include emissions and removals from the land-use, land-use change and forestry (LULUCF) sector. Reporting total emissions excluding the LULUCF sector is consistent with the reporting requirements of the Climate Change Convention (UNFCCC, 2006).

- The change in proportion of non-renewable energy used in electricity and heat production affecting CO₂ emissions; and
- The effect of droughts on agriculture productivity and livestock numbers affecting nitrous oxide (N₂O) and methane (CH₄) emissions.

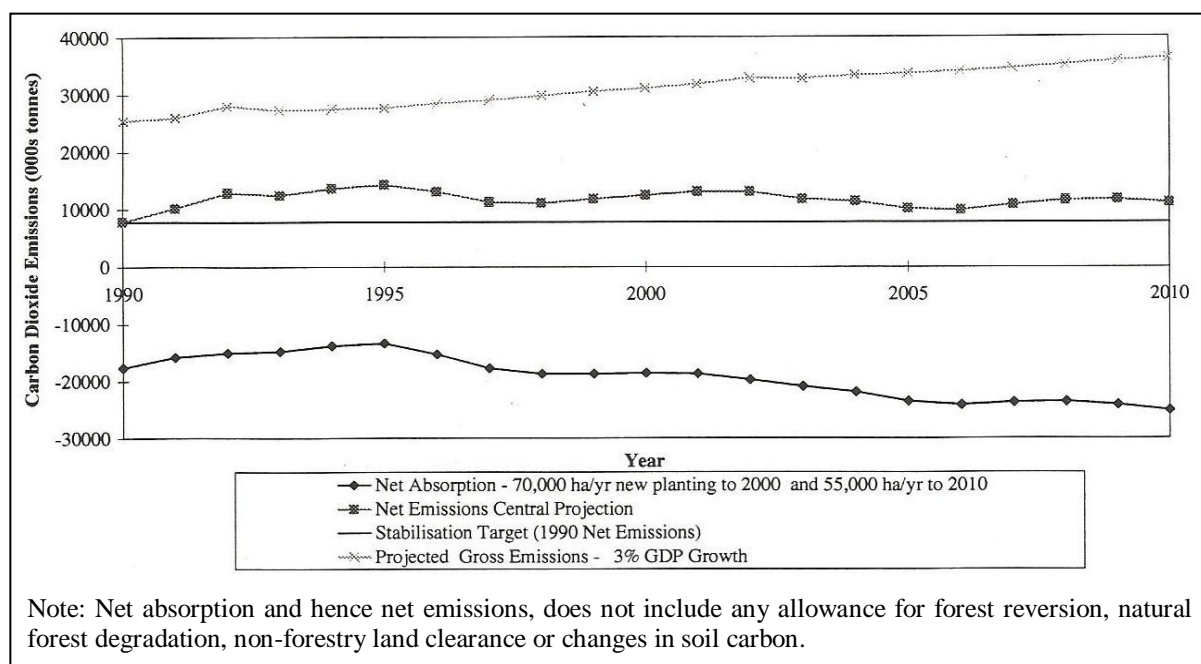
4.2. Estimates and Projections from WOGOCOP

A discussion document, 'Climate Change and CO₂ Policy' (WOGOCOP, 1996), provided a summary of analyses that provided anticipated gross CO₂ emissions for the period 1990 to 1994, and projections of emissions and removals for the period from 1995 to 2000 and beyond in NZ. Although the document provided statistics for 'gross' emissions, 'net' emissions figures, taking into account any net removals from forests, were used to evaluate and analyse the cost-effectiveness of the policies. The projection for net emissions in NZ is based on several assumptions (WOGOCOP, 1996, p 59):

- the medium GDP growth scenario of three percent per annum;
- the central new planting projection of 70,000 hectares per annum until 2000; and
- 55,000 hectares per annum until 2010.

Fig 4.2⁶⁶ outlines the Net CO₂ emissions over time – actual emissions between 1990 and 1994, and estimates from 1995 to 2010 (WOGOCOP, 1996, p 60):

⁶⁶ A table illustrating the statistical data used to prepare Figure 4.2 can be found in Appendix 15.

Figure 4.2: Projected CO₂ Emissions: Sources and Sinks

Based on the above assumptions, revised projections were made along with a comparison with the 1994 forecast. In 1994, it was projected that net emissions would decline by 54 percent, whilst the most recent central projection estimated an increase in net emissions of 61 percent between 1990 and 2000. In the absence of the policy intervention, it was projected that net removals would not increase above 1990 levels and that it would offset steady growth in gross emissions until the next century (WOGOCOP, 1996).

Ultimately, WOGOCOP (1996) summarised that as it was foreseen in 1994, the emissions were projected to continuously increase, whilst insufficient CO₂ emissions were expected to be absorbed from existing forests, resulting in an increase in net emissions over time. Subsequent subsections (Chapters 4.3, 4.4 and 4.5) examined and analyse emissions data in three broad categories: Historical Emissions (1990 – 2008), Projected Emissions during CP1 (with and without Policy Intervention), and Projected Emissions post-2012.

4.3. Historical Emissions (1990 – 2008)

4.3.1. Overview

The statistical data showing the historical emissions from 1990 to 2008 (the current inventory year) were gathered from the 2010 ‘New Zealand’s GHG Inventory 1990 – 2008’ (Ministry for the Environment, 2010).⁶⁷ This document is the official document that annually publishes all anthropogenic (human-induced) emissions and removals of GHG emissions in NZ. Only emissions and removals of the direct GHGs: CO₂; CH₄; N₂O; Hydrofluorocarbons (HFCs); and Sulfur Hexafluoride (SF₆) are accounted for in the Kyoto Protocol,⁶⁸ and are included in the calculation of NZ’s total emissions in accordance with the Climate Change Convention (CCC). The gases are reported under all six sectors of the NZ economy: energy; industrial processes; solvent and other product use; agriculture; Land-Use, Land-Use Change and Forestry (LULUCF); and waste.⁶⁹ During CP1, it is mandatory for the LULUCF sector to report their afforestation, reforestation and deforestation activities since 1990 under the Kyoto Protocol (Ministry for the Environment, 2010).⁷⁰

4.3.2. Projected Business-As-Usual Emissions Level

The anticipated BAU emissions level in NZ for several upcoming decades without any government intervention was overviewed. The NZ Government conducted an analysis to effectively manage future emissions. For the purpose of this study, the results from this analysis was overviewed to examine actual emissions during the last inventory year, and to make comparisons with future forecasts on GHG emissions with and without climate change policies. This comparison measured the anticipated change in the level of GHG emissions,

⁶⁷ The document was prepared by the Ministry for the Environment, with contributions from various ministries and sectors – Ministry of Economic Development, Ministry of Agriculture and Forestry, Industrial Processes sector, Agriculture sector, and Land-Use and Land-Use Change and Forestry sector.

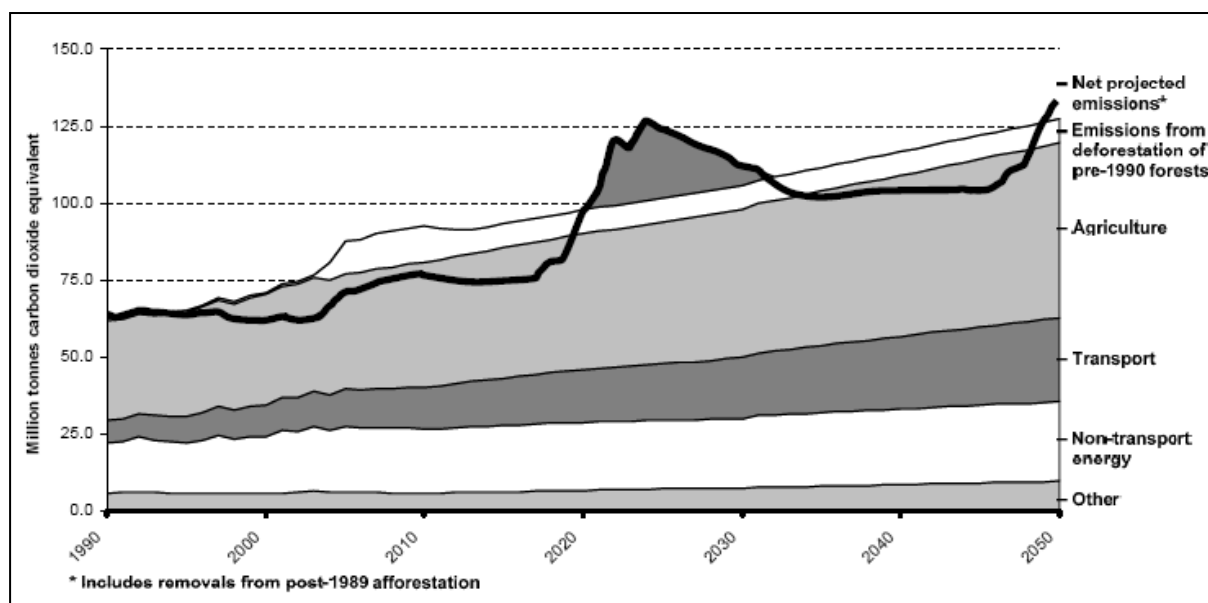
⁶⁸ A list of all gases included in Annex A to the Kyoto Protocol is specified in Article 3.1 of the Kyoto Protocol, which can be found in Appendix 16.

⁶⁹ The sectors of the economy that are accountable under the Kyoto Protocol are also set out in Article 3.1, disclosed in Appendix 16.

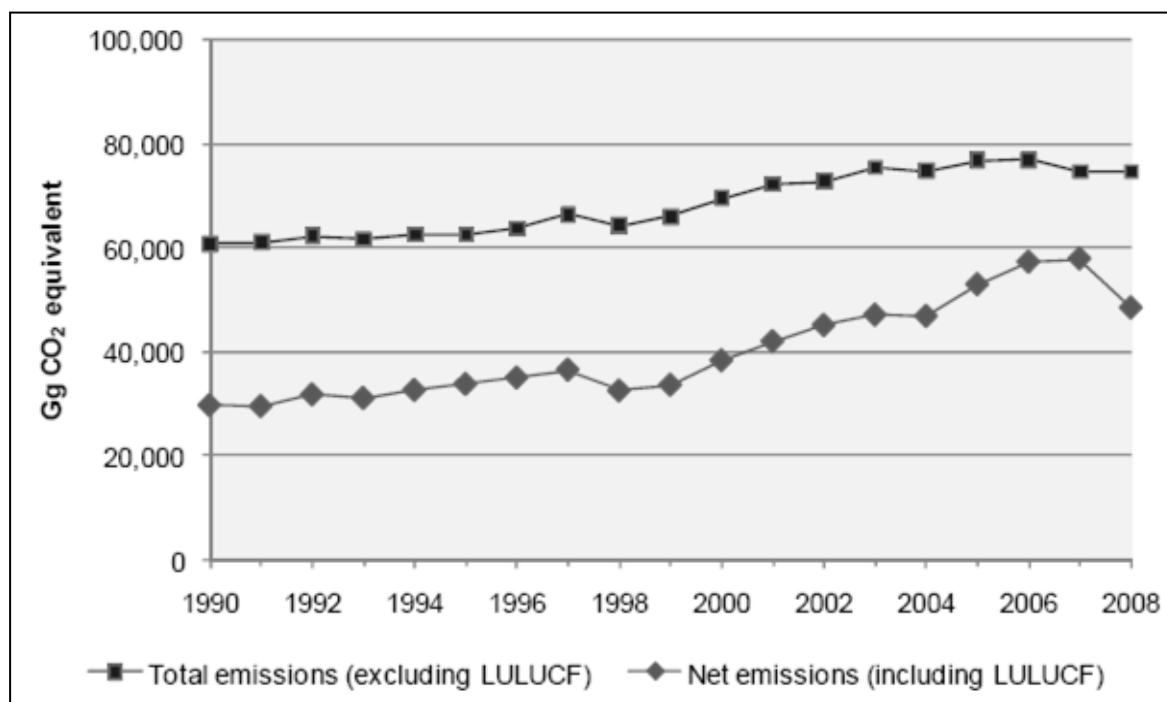
⁷⁰ Refer to Appendix 17 for Article 3.3 of the Kyoto Protocol.

evaluating the expected numerical-effectiveness of climate change policies. Figure 4.3 (Ministry for the Environment, 2007, p 21) illustrated the total annual BAU emissions from 1990 to 2050 with an assumption that no policies were implemented.

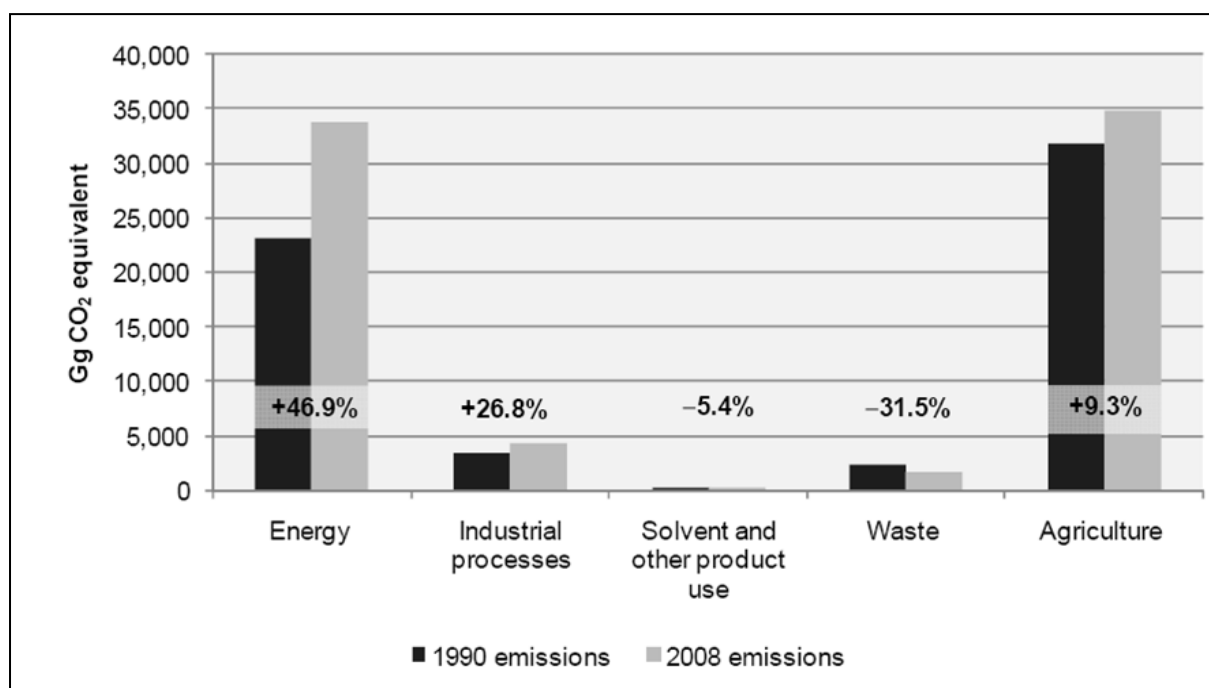
Figure 4.3: Total Annual Business-As-Usual Emissions in New Zealand



Ultimately, without any government intervention, NZ's BAU emissions are expected to continuously increase at a constant rate to unsustainable levels. Although there are many other factors that affect the significant emissions increase, there is clear evidence that this escalation in the level of emissions at the current rate would result in an urgent need to implement an adequate policy to manage emissions growth and to achieve the goal of stabilising it below 1990 levels. Figure 4.4 (Ministry for the Environment, 2010, p 19) illustrated a steady, constant increase in the level of GHG emissions between 1990 and 2008. NZ's total GHG emissions in 1990 were 60,773.6 gigagram (Gg) carbon dioxide equivalents (CO₂-e). During an approximate period of two decades, total GHG emissions had increased by 22.8 percent, averaging the annual growth rate to 1.3 percent.

Figure 4.4: NZ's Total and Net Emissions (under the Climate Change Convention) from 1990 to 2008

The net emissions trend is also portrayed in Figure 4.4. In 1990, NZ's net GHG emissions were reported to be 29,707.3 Gg CO₂-e. Net GHG emissions in 2008 were measured to be 48,482.3136 Gg CO₂-e, which is an increase in emissions by 63.2 percent relative to 1990 levels. It is apparent that during two decades, from 1990 to 2008, the level of net emissions increased approximately three times more than that of total emissions. This is a result of greater net removals from LULUCF sector in 1990 than in 2008. Sectoral analysis of GHG emissions in NZ between 1990 and 2008 are illustrated in Figure 4.5 (Ministry for the Environment, 2010, p 25).

Figure 4.5: Change in NZ's Emissions by Sector from 1990 - 2008

The energy sector is not the largest emitting sector in NZ, constituting 45.3 percent of NZ's overall GHG emissions in 2008. However, it is noticeable that since 1990, the largest growth in emissions was from this sector, accounting for about 46.9 percent increase from the 1990 level. Largest contributing sources of the emissions growth include electricity generation, transport, and heat production. NZ's main source of electricity generation is hydroelectric generation, providing 52 percent of NZ's electricity in 2008. Over the years, fluctuations in the level of GHG emissions from the energy sector were apparent, influenced by several factors (Ministry for the Environment, 2010):

- Switch between thermal and hydroelectricity generation;
- Low hydro inflows in 2008 as a result of a drought;
- Increase in the use of coal in electricity generation;
- High petrol and diesel prices in 2008; and
- Beginning of the global recession.

The agriculture sector is the single largest emitting sector in NZ, contributing 46.6 percent of NZ's overall GHG emissions. The growth in emissions over two decades is approximately 9.3 percent relative to the 1990 level. The agriculture sector contributed 96.0 percent of NZ's total N₂O emissions and 90.6 percent of total CH₄ emissions in 2008 (Ministry for the Environment, 2010). Between 2007 and 2008, agriculture sector faced an unexpected decrease in emissions. The primary reason for this emissions reduction is because of the major drought that had an enormous impact on most regions around all of NZ throughout 2008, decreasing the population of animals (Ministry of Agriculture and Forestry, 2009): sheep (11.4 percent); deer (12.4 percent); and non-dairy cattle (5.8 percent).

The industrial processes sector is one of the least-affecting sectors in NZ, consisting for 5.7 percent of total emissions in 2008. Over the period, the growth in emissions was accounted to be 26.8 percent of 1990 levels, primarily from the increase in the consumption of HF_c. Reduction in the production of steel and aluminium during the inventory year resulted in the largest decrease of 8.1 percent (Ministry for the Environment, 2010). The solvent and other product use sector is the least-contributing sector in terms of emissions, being responsible for 0.04 percent of NZ's overall emissions.

Waste sector is another small contributor in terms of emissions, accounting for 2.2 percent of overall emissions in 2008. The level of emissions released in 2008 was 31.5 percent lower based on 1990 levels, primarily because of the establishment of new initiatives to enhance solid waste management practices (Ministry for the Environment, 2010). In the LULUCF sector, several factors were responsible for the decrease in net removals of 15.7 percent based on 1990 levels (Ministry for the Environment, 2010, p vii):

- Lower average age and the CO₂ absorption capacity of planted forests in 2008 from the harvesting and replanting of plantation forests in the five years prior to 2008; and
- Increase in emissions from deforestation

4.4. Current Estimates for CP1

4.4.1. Projected Emissions without any Policy Implementation

4.4.1.1. Overview

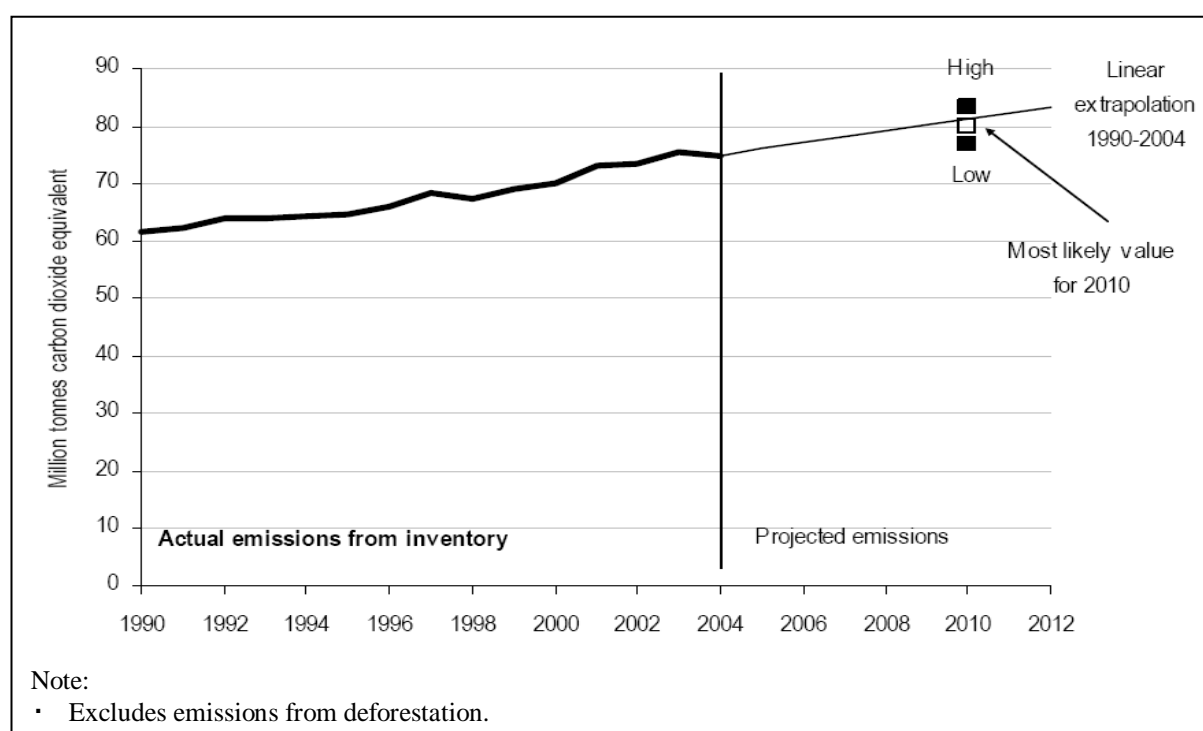
The statistical data illustrating the projected level of emissions during CP1 was gathered from a technical document, the ‘Projected Balance of Emissions Units during the First Commitment Period of the Kyoto Protocol’ (Ministry for the Environment, 2006). This document provided a true reflection of climate change policy settings at the time of publication – then Labour-led Government’s decision to abandon the Carbon Tax regime in December 2005, prior to introducing the NZ ETS proposal (Ministry for the Environment, 2006). As noted earlier in Chapter 4.3.1, the document provided projections for CP1, consisting GHG emissions from all sectors as specified in ‘Annex A’ section of Article 3.1 of the Kyoto Protocol.⁷¹ An average level of GHG emissions was projected from the mid-point of CP1 (2010), to assess uncertainty in the projection in three scenarios – an upper, a most likely, and a lower scenario. Detailed statistics on the anticipated emissions of gases and sources listed in Annex A of the Kyoto Protocol over CP1 are disclosed in Appendix 18.

One important issue that needs to be noted is the difficulty to relate the statistics with the graphs provided in the ‘2006 Net Position Report’ (Ministry for the Environment, 2006). Economic models and methodologies used to calculate statistical data were disclosed in the Appendix of the document, but it is difficult for readers to understand the information with

⁷¹ Article 3.1 of the Kyoto Protocol is disclosed in Appendix 16.

limited technological knowledge in this area. Other sources of data were sought to gather information that may assist in comprehending the statistics, but the researcher could not find any information within the scope of publicly available resources. Therefore, extra care should be taken when interpreting results illustrated on graphs as the information is inconsistent with the statistics provided. Essentially, the focus should be on the trends as the graphs and statistical data tell the same ‘story’ about the trends over the years. Figure 4.6 (Ministry for the Environment, 2006, p 16) portrayed NZ’s overall emissions trend from 1990 to 2012, using actual emissions from 1990 – 2004, and aggregated projections for CP1.

Figure 4.6: Projected Emissions for 2010, Total Emissions Reported in the National Inventory from 1990-2004 and a Linear Extrapolation of Previous Emissions (Million Tonnes [Mt] CO₂-e)



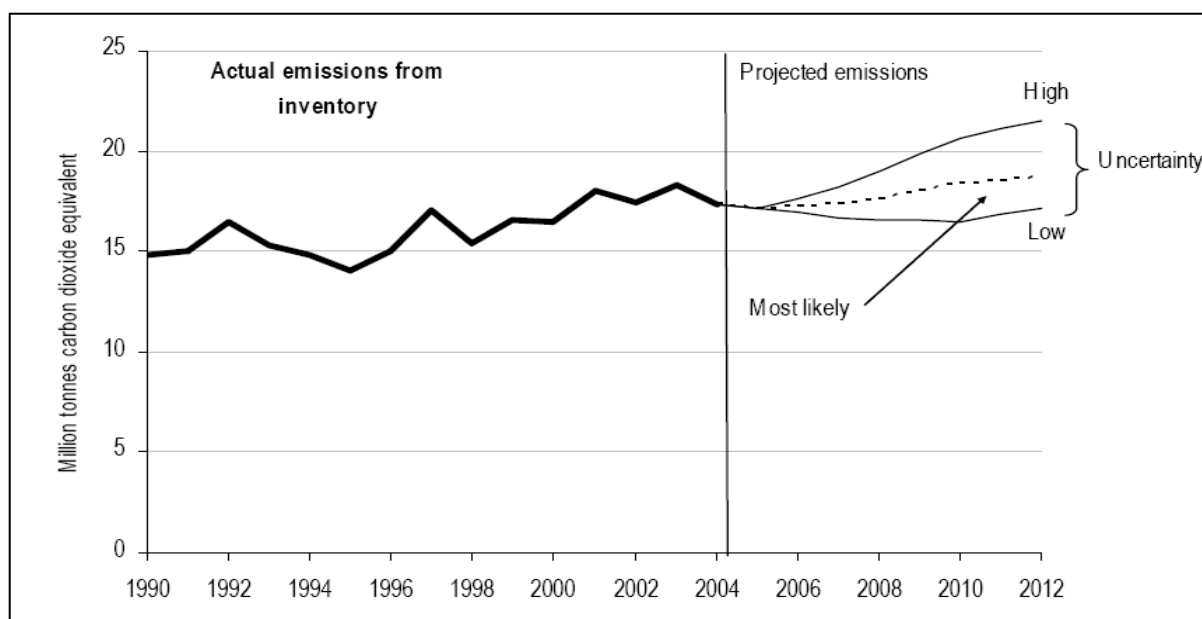
During CP1, aggregate level of GHG emissions, excluding deforestation, are most likely to be 398.5 Mt CO₂-e, whilst the upper scenario is expected to be 420.3 Mt CO₂-e, and 382.7 Mt CO₂-e for the lower scenario. Emissions from deforestation are most likely to be 79.7 Mt

CO₂-e, ranging between the upper scenario of 84.1 Mt CO₂-e and lower of 76.5 Mt CO₂-e (Ministry for the Environment, 2006, p 16).

4.4.1.2. Projected Emissions by Sectors

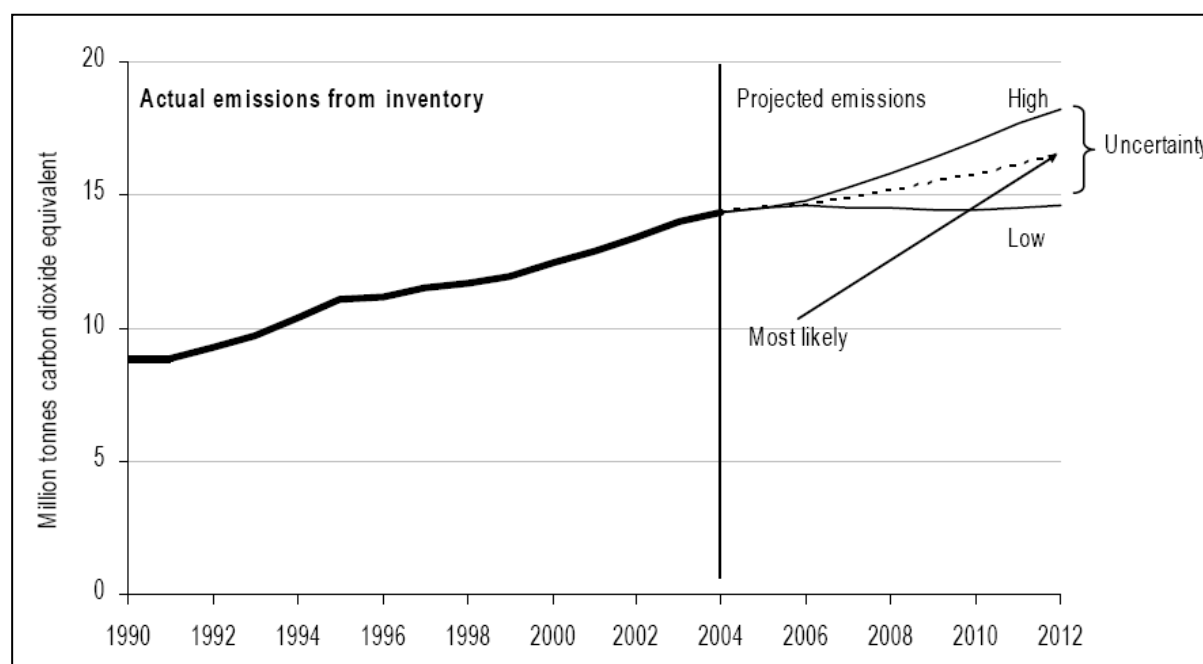
This section provides a sector-based analysis on the projected total GHG emissions without any policy implementation. By dividing emissions on a sector-by-sector basis, a more in-depth analysis was able to be conducted to examine the history of sectoral emissions and its respective future projections. For the energy sector (excluding transport), the most-likely scenario is projected to generate 91.3 Mt CO₂-e of aggregate emissions, while the upper scenario is anticipated to be 102.1 Mt CO₂-e, and the lower scenario is expected to be 83.7 Mt CO₂-e, during CP1 (Ministry for the Environment, 2006). Figure 4.7 (Ministry for the Environment, 2006, p 19) reflected the increasing trend of the projected level of GHG emissions from the energy sector.

Figure 4.7: Projected Annual Emissions from the Energy (excluding Transport) Sector (Mt CO₂-e)

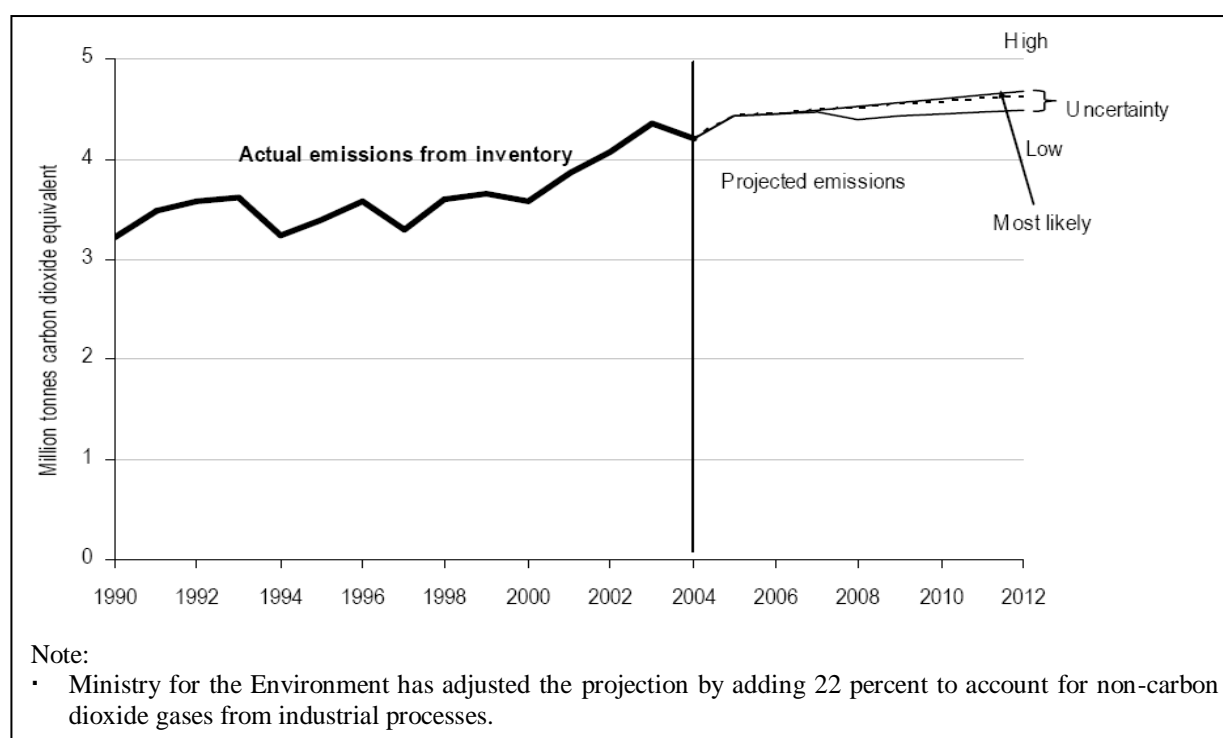


Emissions from the transport sector include fuel sources used from road transport, and international sea and air transport. Quantitatively, transport emissions are estimated to range between 72.5 and 85.1 Mt CO₂-e, with the most likely scenario of 78.8 Mt CO₂-e. The trend for the anticipated GHG emissions in the transport sector is represented in Figure 4.8 (Ministry for the Environment, 2006, p 20).

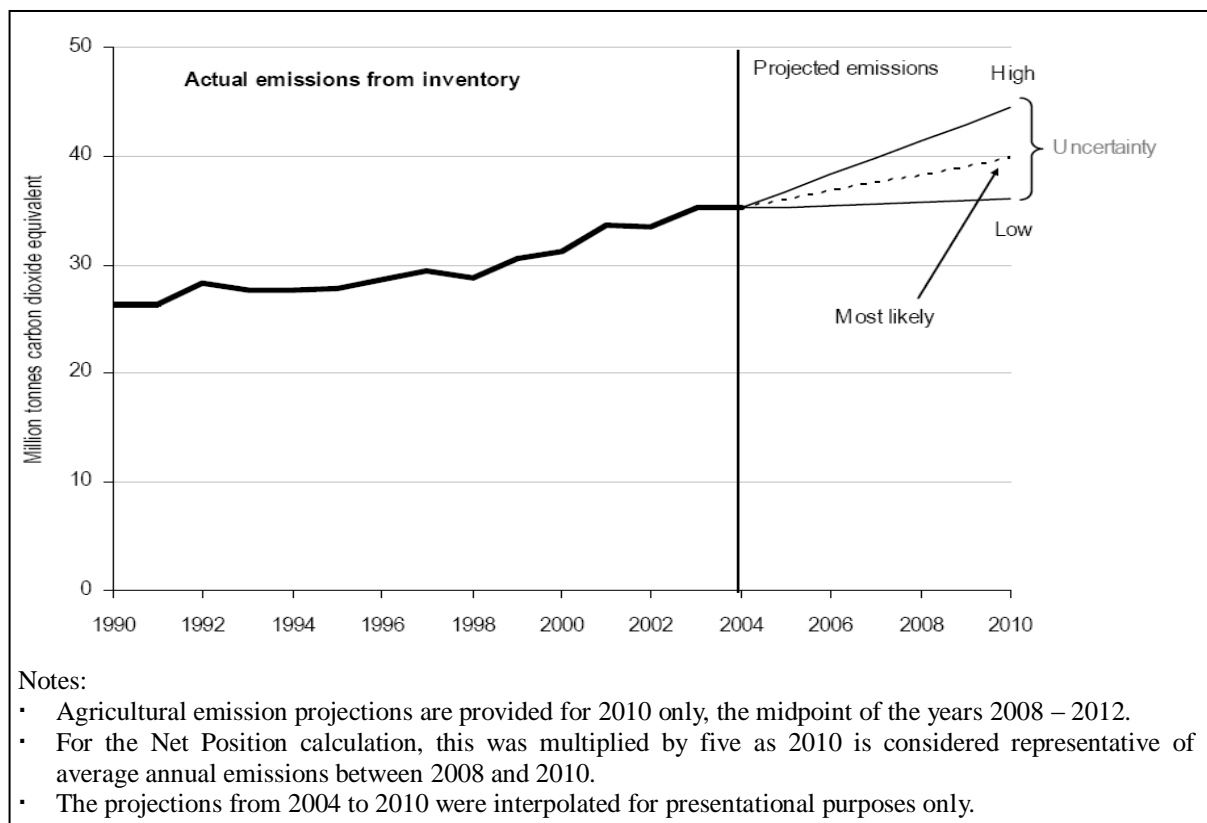
Figure 4.8: Projected Annual Emissions from the Transport Sector (Mt CO₂-e)



Primary sources of emissions in the industrial processes sector in NZ are from the production of: iron and steel; aluminium; urea; cement; lime; and hydrogen, and stable prospective level of output from these productions are anticipated. Figure 4.9 illustrated actual emissions from 1990 – 2004, and aggregated projections during CP1 for the industrial processes sector. The most-likely scenario is that projected emissions during CP1 are 22.9 Mt CO₂-e, while the expected upper scenario is 23.0 Mt CO₂-e, and the lower scenario is predicted to be 22.2 Mt CO₂-e (Ministry for the Environment, 2006, p 20):

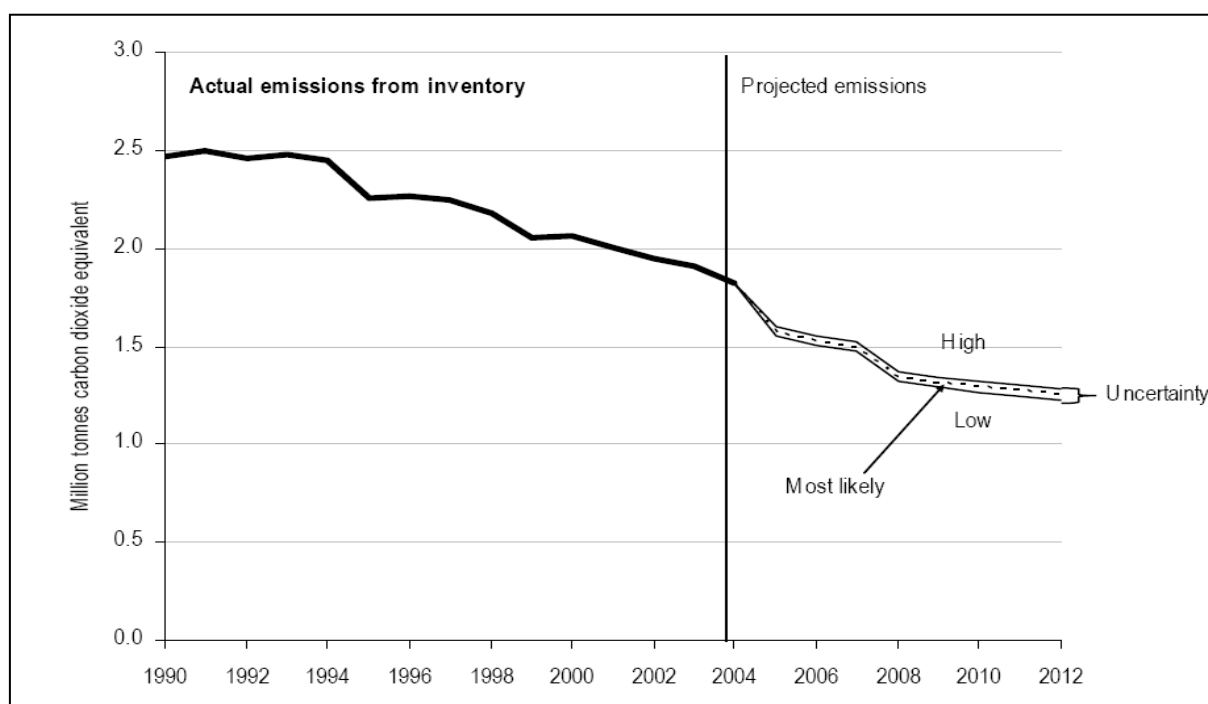
Figure 4.9: Projected Annual Emissions from the Industrial Processes Sector (Mt CO₂-e)

The Ministry of Agriculture and Forestry used their own model to calculate estimations for aggregated emissions from the agriculture sector. The maximum prospective aggregate emissions over CP1 are projected to be 222.2 Mt CO₂-e, while the minimum is estimated to be 180.3 Mt CO₂-e, with the most likely value at 198.8 Mt CO₂-e. The agriculture sector has accommodated the recommendation by the '2005 Net Position Report' (AEA Technology Environment, 2005), and the basis for their lower and upper scenarios in 2006 was on livestock projections using the Pastoral Supply Response Model, considering potential risk of price volatility (Ministry for the Environment, 2006). The emissions trend from the agriculture sector, using actual figures from 1990 to 2004 and projections for CP1, is highlighted in Figure 4.10 (Ministry for the Environment, 2006, p 24).

Figure 4.10: Agricultural Emissions Projected for 2010 and Emissions from the Agriculture Sector as Reported in the National Inventory (Mt CO₂-e)

Major sources of waste emissions are from solid waste disposal sites and wastewater treatment plants. Total waste emissions included impacts of the NZ Waste Strategy and the National Environmental Standard for landfill gas collection (Ministry for the Environment, 2006). The most probable scenario for aggregate emissions from the waste sector over CP1 is expected to be 6.5 Mt CO₂-e of emissions, with a high of 6.6 Mt CO₂-e and a low of 6.4 Mt CO₂-e. By 2010, estimated emissions are most likely to be 1.2 Mt CO₂-e, ranging between a minimum of 1.2 Mt CO₂-e and maximum of 1.3 Mt CO₂-e per annum (Ministry for the Environment, 2006). Figure 4.11 (Ministry of Agriculture and Forestry, 2009, p 25) illustrated a downward trend of emissions released by the waste sector.

Figure 4.11: Waste Sector Emissions Projected for 2010 and the Inventory Time Series of Emissions from the Waste Sector (Mt CO₂-e)



“... Removals of CO₂ emissions via forest sinks are a key component in how Parties can meet their commitments under the Kyoto Protocol” (Ministry for the Environment, 2006, p 28). Since 1990, forestry became one of NZ’s strengths, with a distinguishable emissions profile compared to that of other countries through planting a significant area of forests. Ensis, formerly known as Forest Research, undertook the modelling of carbon monitoring system for the forestry sector. A simulation model of the Kyoto forest estate was used to project forest sink, based on carbon emissions per hectare at different harvesting ages of typical Kyoto forests (Ministry for the Environment, 2006).⁷² Table 4.2 represented estimated net removals from the LULUCF sector. The effects of the anticipated NZ Carbon Accounting System (NZCAS) are included in these scenarios and the gradual introduction of the NZCAS would likely revise and replace all values previously reported in Table 4.2 (Ministry for the Environment, 2006, p 29):

⁷² Refer to Appendix 25 for detailed information on the underlying assumptions for net removals from the LULUCF sector, based on each of typical harvesting ages.

Table 4.2: Calculation of Projected Removal Units during CP1

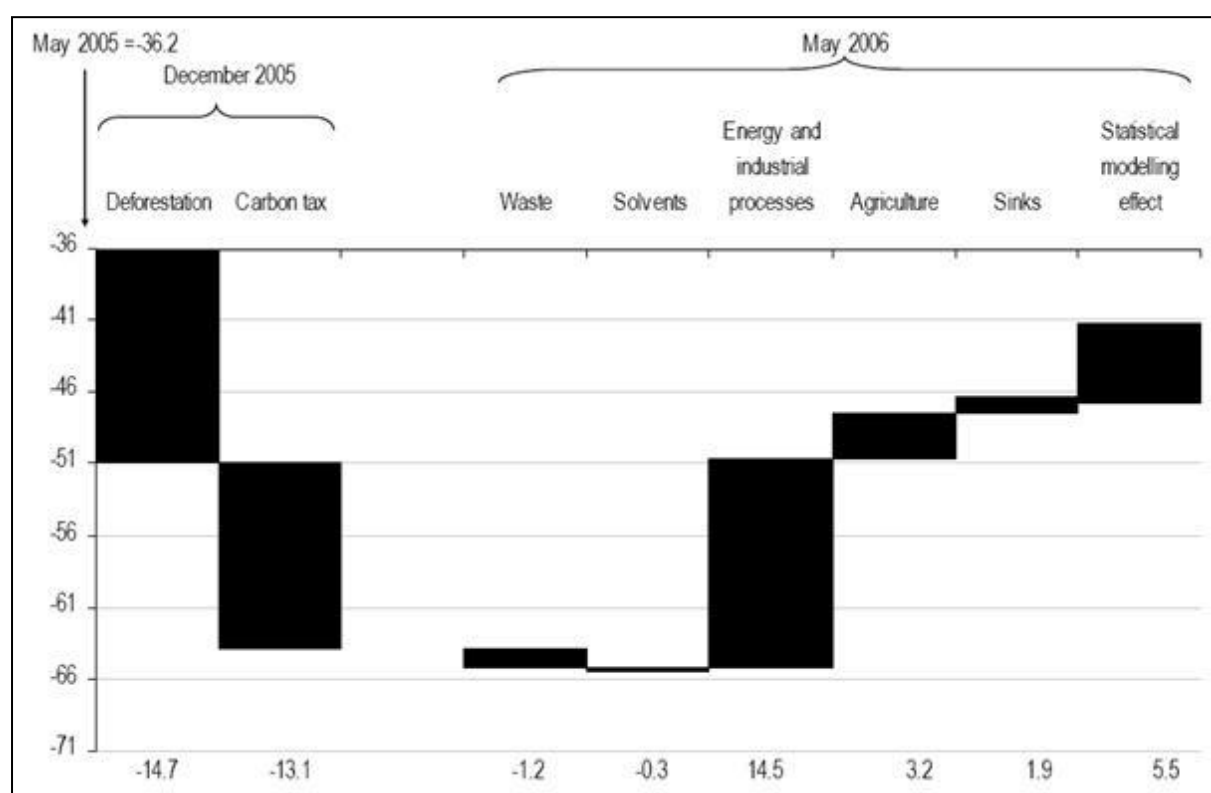
Projected Removal Units	Mt CO ₂ -e		
	Upper	Base	Lower
Total removals from simulations combined in model	60.4	78.2	114.5
Projected deforestation emissions	38.5	21.0	6.3
Net removals (RMUs)	21.9	57.2	108.2

4.4.2. Projected Emissions with the Imposition of a Carbon Tax

The initial response of the NZ Government on the climate change issue was the imposition of a Carbon Tax. The fundamental reason behind this decision is on the simplicity of this approach and the ability to provide certainty of carbon price. A detailed discussion on reasons for imposing a Carbon Tax is set out in Chapter 5.8.1. However, as a result of strong oppositions from farmers and other businesses, this approach was abandoned in 2005 before its scheduled enforcement date (AEA Technology Environment, 2005).

Under the assumption that the Carbon Tax was imposed in 2007, AEA Technology Environment (2005) produced the 'Net Position Report' that reported the statistical data on the projected emissions reduction during CP1. The Carbon Tax was proposed to be imposed on CO₂ emissions from fossil fuels⁷³ and from industrial processes, such as cement manufacture. As mentioned in Chapter 2.2, the tax would have priced the carbon at NZ\$15 per tonne of CO₂, with a cap at NZ\$25 per tonne of CO₂ during CP1, with the revenue planned to be refunded to the economy through other tax changes. Figure 4.12 reflected anticipated effects of a Carbon Tax as projected in 2006, based on the assumption that it was imposed as planned (Ministry for the Environment, 2006, p 35):

⁷³ Emissions from fossil fuels include: coal, gas, diesel, petrol and heavy fuel oil (AEA Technology Environment, 2005).

Figure 4.12: Changes to the Net Position by Sector (Mt CO₂-e)

The impact of the Carbon Tax was apparent through an increase in the price of fuel for all sectors except for emissions-intensive industries. The effect was modelled by SADEM and the emissions from heavily-emitting industries are assumed to be covered by Negotiated Greenhouse Agreements (NGAs). Based on SADEM, the loss from the decision to abandon the proposed Carbon Tax regime resulted in approximately 13.1 Mt CO₂-e. This includes the impact of Negotiated Greenhouse Agreements (NGAs), and the consideration of different price elasticities in various sectors.

Nonetheless, it is noted that the impact of the tax may have been slightly under-estimated in some sectors, such as other industry and commercial sector, because of the exclusion of a possible fuel-switching element in the model used. The reasonableness of the outcomes are indisputable, unless detailed report states otherwise, as the results of SADEM was backed-up

by the Australian Bureau of Agricultural and Resource Economics (ABARE) (AEA Technology Environment, 2005). One fundamental limitation of this analysis is the unavailability of publicly-accessible information on the implications of the proposed Carbon Tax in NZ during CP1 and beyond, as a consequence of the decision to abandon the Carbon Tax before the policy passed the law. This restricted the ability to compare and contrast its effects throughout various time periods (Ministry for the Environment, 2006).

4.4.3. Projected Emissions with the Implementation of an ETS

4.4.3.1. Overview

This section provided projected data on GHG emissions during CP1 and beyond, including the effects of the NZ ETS. The statistical data gathered consisted of actual emissions for 2007 and prior, and emissions forecasts from CP1 and beyond. The data was gathered from the report ‘New Zealand’s Fifth National Communication’ (Ministry for the Environment, 2009e).

A ‘cross-government technical group’⁷⁴ estimated the statistics for the prospective level of GHG emissions in NZ ‘with policy implementation’, under the supervision of the Ministry for the Environment (Ministry for the Environment, 2009e). The Ministry of Agriculture and Forestry is solely responsible for reporting prospective emissions data for the agriculture sector and estimated net removals data from the LULUCF sector. Projected emissions from SEIP and transport sectors were provided by the Ministry of Economic Development. Lastly, the level of GHG emissions from the waste sector were projected and reported by the Ministry for the Environment. The methodology used to project emissions in NZ is consistent with the UNFCCC standards, which is linked to the methodology used to estimate emissions for the ‘New Zealand’s Greenhouse Gas Inventory’ documents (Ministry for the Environment,

⁷⁴ Cross-government technical group is a group of technical experts from each of the government agencies: Ministry of Agriculture and Forestry, Ministry for the Environment, and Ministry of Economic Development (Ministry for the Environment, 2009e).

2009e). Table 4.3⁷⁵ outlined the key assumptions used for emissions projections for individual sectors (Ministry for the Environment, 2009e, p 99):

Table 4.3: Key Assumptions for Projections

Assumption	2010	2015	2020
GDP (2007 NZ\$ billions)	164.6	196.0	220.2
Carbon price NZ\$/tonne CO ₂ -e	25	50	50
Oil price (2004 US/barrel)	70.39	79.09	89.17
Coal price (2004 NZ\$/GJ)	4.5	4.5	4.5
Exchange rate (NZ\$/US\$)	0.52	0.54	0.60
Gas discoveries (PJ/year)	0	0	100
Population (thousand)	4,352	4,550	4,735

The above assumptions are consistent across all sectors of the NZ economy. Short-term economic assumptions were extracted from the Budget Economic and Fiscal Update (BEFU) 2009, and longer-term projections were extracted from the Treasury's 'Long Term Fiscal Model'. Statistics NZ provided the population figures, assuming medium fertility and mortality rates, and net migration of 10,000 people per year. In virtue of the inability to separate *"the effects of policy induced energy efficiency improvements from the effects of autonomous energy efficiency improvements"*, historical rates of energy efficiency improvements would consistently be included in both 'with' and 'without' NZ ETS emissions projections (Ministry for the Environment, 2009e, p 99).

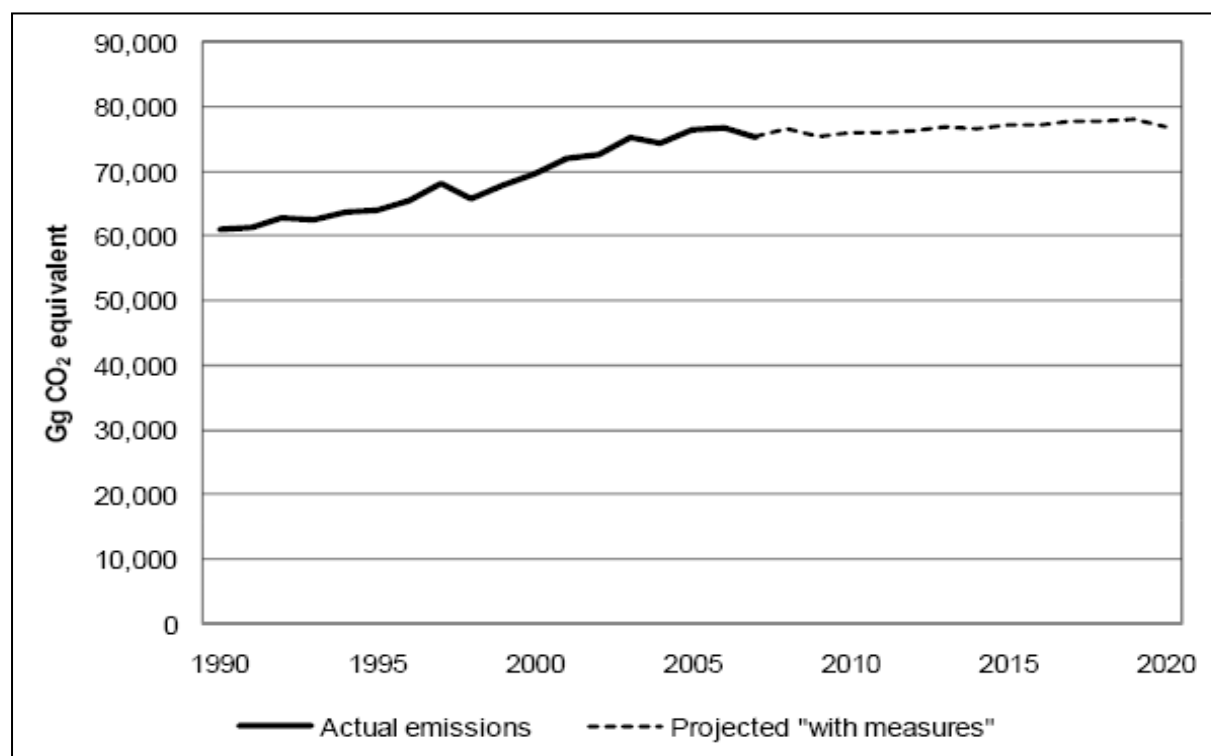
4.4.3.2. Emissions Post ETS Implementation

Total level of GHG emissions were projected by collating a series of analysed data from all sectors of the NZ economy. Figure 4.13 provided an overview of total emissions in NZ from

⁷⁵Table 4.3 was prepared by the Ministry for the Environment using data collated from various sources, including the Treasury, Ministry of Economic Development, and Statistics NZ.

1990 to 2007, and total projected emissions until 2020 as a result of implementing the NZ ETS (Ministry for the Environment, 2009e, p 89):

Figure 4.13: Total Actual and Projected Emissions [1990 – 2020]

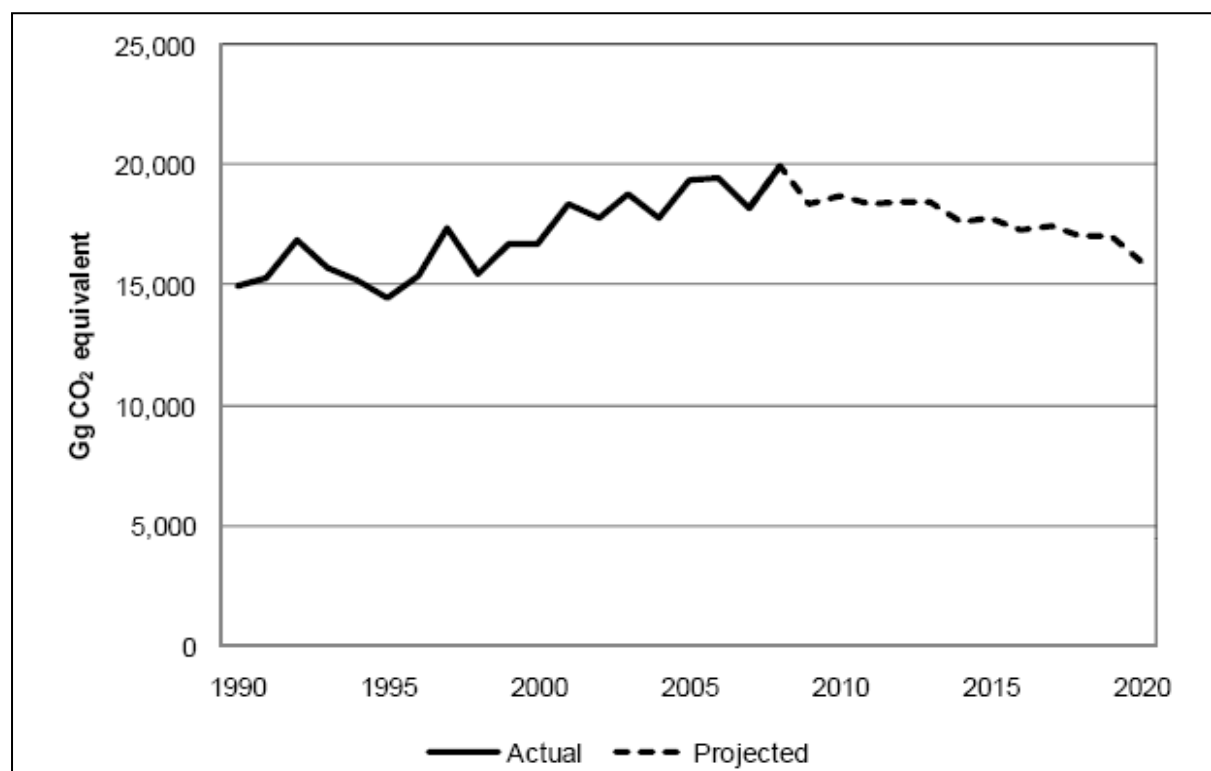


Under the ‘with ETS’ scenario, NZ’s overall net emissions are forecasted to increase to 76,085 Gg CO₂-e by 2010, and 76,895.7 Gg CO₂-e by 2020, equating to an increase of 25 percent and 26 percent based on 1990 levels respectively. In order to obtain more in-depth information, changes in the level of GHG emissions were analysed on a sector-by-sector basis. With the implementation of the NZ ETS, anticipated GHG emissions released from the energy sector (excluding transport) are to be six percent above the 1990 levels by 2020. Contributing sources of energy include: electricity generation; other stationary energy; industrial and commercial use of energy; and fugitive emissions.

These figures were sourced from projections produced by the Ministry of Economic Development. Emissions from energy-intensive industries are primarily from sources such as metals (primarily aluminium and steel), refining, petrochemicals (primarily methanol and urea), forestry processing (primarily pulp and paper milling), as well as ‘other industrial and commercial’ (Ministry for the Environment, 2009e). Due to the characteristics of the industry, the heavy industrial sector in NZ is dominated by oligopolies. One of the fundamental limitations of oligopolies is that immaterial changes in one firm will have substantial effect on others, which creates a high level of risk for fluctuations in emissions projections (Ministry for the Environment, 2009e).

As defined by the Ministry of the Economic Development (2006, p 7), fugitive emissions are *“those that arise from the production, processing, transmission, storage and use of fuels, and from non-productive combustion, for example, the flaring of natural gas at oil and gas production facilities”* Reported energy emissions projections are inclusive of these fugitive emissions, that consists of approximately 10 percent of the overall projected energy emissions. In NZ, CH₄ emissions from geothermal electricity generation are also included. Figure 4.14 (Ministry for the Environment, 2009e, p 90) illustrated actual and projected emissions from the energy sector.⁷⁶

⁷⁶ Refer to Appendix 19 for the detailed statistics on the actual and projected level of GHG emissions in the energy sector.

Figure 4.14: Actual and Projected Emissions from Energy [1990 – 2020]

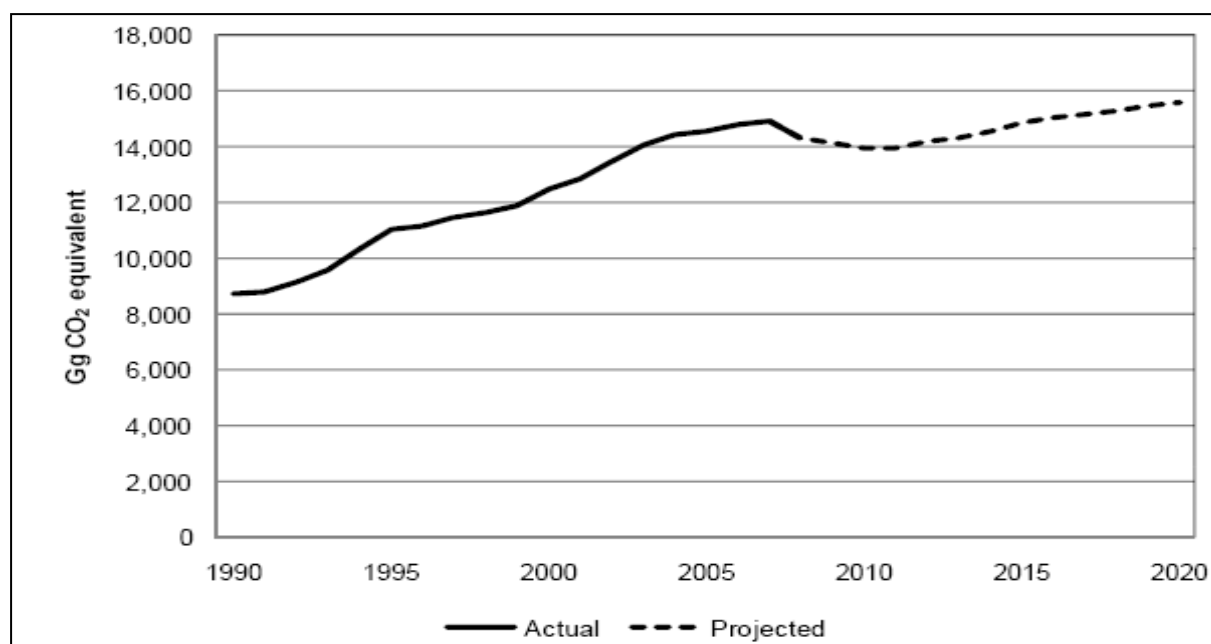
Despite the six percent increase in emissions from energy sources since 1990, the level of emissions is estimated to decline by approximately 12 percent between 2008 and 2020. This is believed to be the result of the introduction of the NZ ETS, assuming all other factors are constant. All energy sources subsequent to 2015 are expected to be geothermal and wind generated, based on the current trend towards these renewable energy sources assuming this is the most economic sources available. The price of carbon is expected to be in the range from NZ\$25 to NZ\$50 per tonne of CO₂-e over the medium-term depending on the source, and as a result, a relatively constant level of emissions from thermal electricity generation is predicted until 2015 (Ministry for the Environment, 2009e).

Emissions from the transport sector consist of various sources, including road, sea and air transport. Road transport accounts for 91 percent of NZ's overall transport emissions. Emissions from the transport sector were expected to result in a 78 percent increase based on

1990 levels by 2020. Being the major source of contribution, road transport is responsible for over 95 percent of the emissions growth between 1990 and 2007. Figure 4.15 provided an overview of the transport emissions in NZ from 1990 to 2007, and total projected emissions until 2020 as a result of implementing the NZ ETS (Ministry for the Environment, 2009e).

However, there are other factors that affect the level of GHG emissions in the transport sector. Higher crude oil prices and the beginning of the global economic recession slowed the growth in emissions since 2006. NZ economy is expected to recover from the global recession from 2010, and this is reflected in Figure 4.15,⁷⁷ where the graph illustrated rapid increase up until 2005, decelerated from 2006, and re-accelerated from 2010. However, NZ economy is still in the early stages of recovering from the recession, and therefore the prospective growth rate is anticipated to be lower than the actual growth between 1990 and 2005 (Ministry for the Environment, 2009e, p 92):

Figure 4.15: Actual and Projected Emissions from Transport [1990 – 2020]



⁷⁷ Statistics for Figure 4.15 is disclosed in Appendix 20.

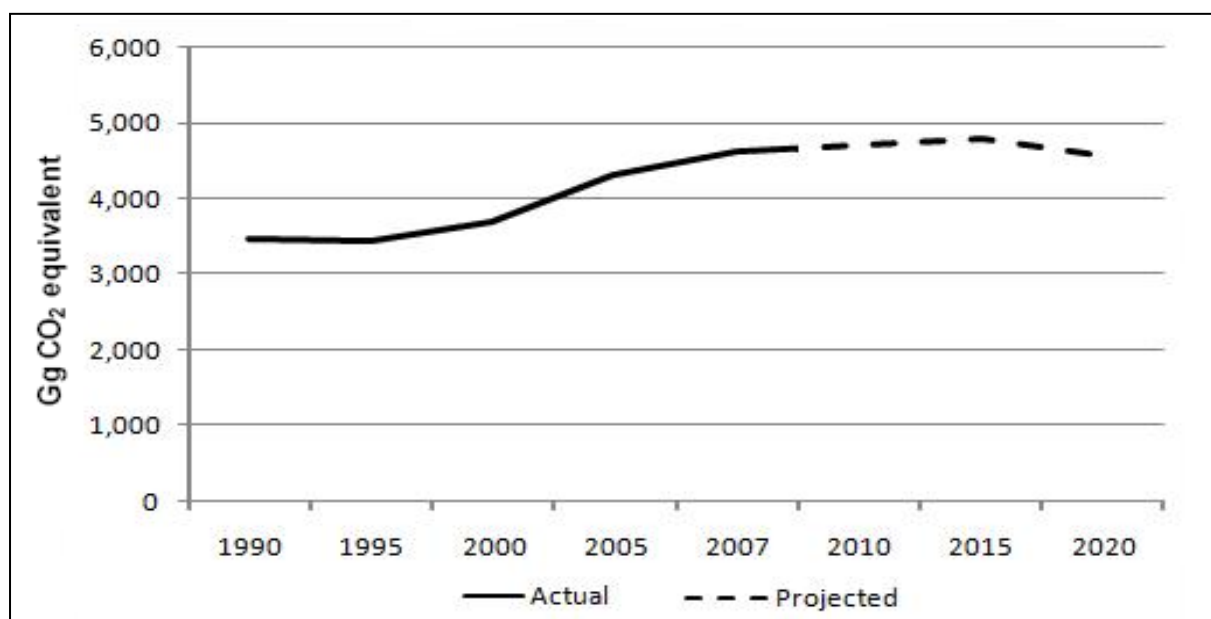
Despite the increase in fuel prices as a result of the introduction of the NZ ETS, the level of GHG emissions from transport are expected to increase by approximately 11.7 percent since the implementation of the NZ ETS. This may be because of several reasons, but most importantly, it is too early to observe the effects of the introduction of economic-friendly cars operated by the use of bio-fuels or electricity (Ministry for the Environment, 2009e).

One major limitation on the use of data from 'New Zealand's Fifth National Communication' (Ministry for the Environment, 2009e) is that the historical or projected totals do not include emissions from fuel used in international air and sea transport. The exclusion of is due to its difficulty in projecting emissions as international sea carriers have the flexible option of purchasing fuel elsewhere other than NZ and it is indeed believed that most of the fuel used for international shipping departing and arriving from NZ is purchased overseas. Thus, these emissions are disclosed separately. Between 1990 and 2005, emissions from international air transport have consistently increased. From 2005, the surge in fuel prices caused emissions from international sea and air transport to 'flatten'. Similarly to emissions from domestic transport, it is expected that the recovery of the global recession would increase international travel demand from 2010. Refer to Appendix 21 for tables illustrating imputed emissions from fuel sold in NZ for use in international air and sea transport (Ministry for the Environment, 2009e, p 92-93).

Emissions from the industrial and processes sector were estimated to be 4,572.2 Mt CO₂-e by 2020. This is 32.5 percent above the 1990 levels, and 2.3 percent reduction since the implementation of the NZ ETS (Ministry for the Environment, 2009e). Despite the introduction of the NZ ETS, the level of output from industrial and processes are assumed to be relatively constant, which is reflected in the barely noticeable projected decrease over CP1

and beyond. Figure 4.16 provided the trend of industrial processes emissions in NZ from 1990 to 2007, and total projected emissions until 2020 as a result of implementing the NZ ETS. Data used to illustrate Figure 4.16 was extracted from ‘New Zealand’s Fifth National Communication’ (Ministry for the Environment, 2009e), and it can be found in Appendix 22.

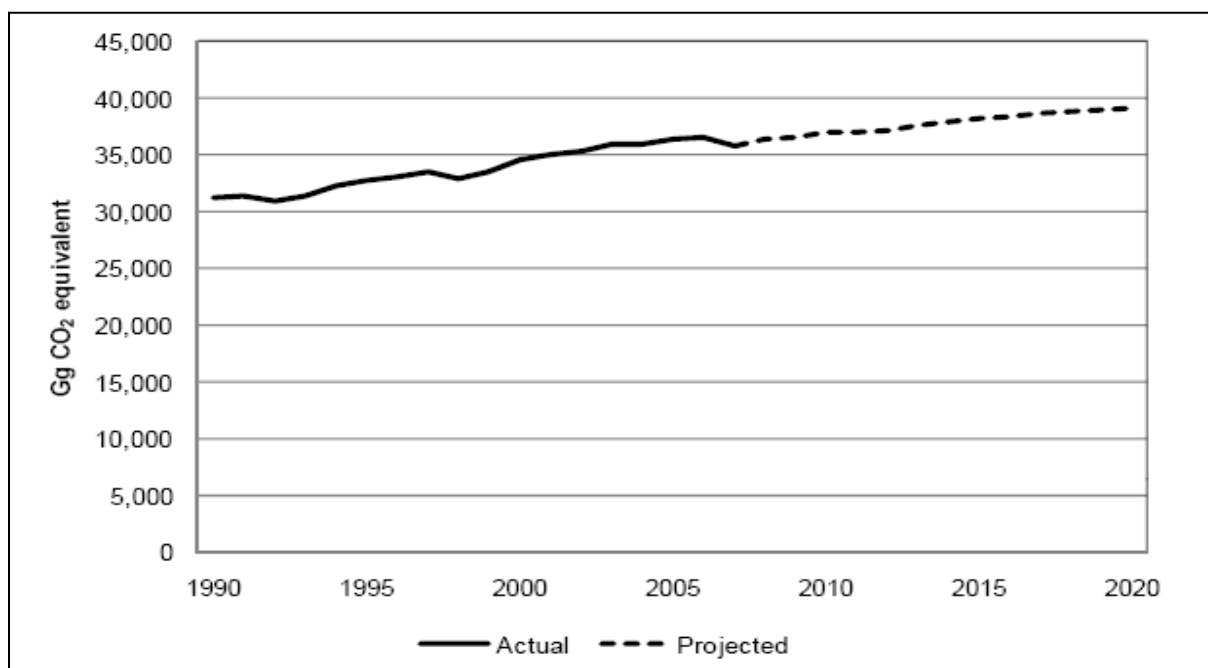
Figure 4.16: Actual and Projected Emissions from Industrial Processing [1990 – 2020]



Emissions from agriculture are comprised of sources from animal production and fertiliser use. These activities are foreseen to continuously increase until 2020, anticipating an emissions growth of 25 percent above 1990 levels (Ministry for the Environment, 2009e). It is apparent in Figure 4.16 that there was a slightly less growth in emissions between 2007 and 2009, as a consequence of a decrease in global dairy products, and a drought that had a huge impact across all of NZ over 2007/2008. However, as NZ recovers from the global economic recession, the level of GHG emissions from the agriculture sector is expected to increase. In addition, an expected continuous growth in emissions over CP1 and beyond reflects the implication of the delay in the entry of agriculture sector into the NZ ETS – that agriculture sector would be least affected by the introduction of the scheme in July 2010 (Ministry for the

Environment, 2009e). Figure 4.17⁷⁸ provided an overview of the agricultural emissions in NZ from 1990 to 2007, and total projected emissions until 2020 as a result of implementing the NZ ETS (Ministry for the Environment, 2009e, p 94):

Figure 4.17: Actual and Projected Emissions from Agriculture [1990 – 2020]



At the time of publication, the Ministry for the Environment (2009e) reported the Ministry of Agriculture and Forestry's indication that the forestry sector currently has a negative emissions balance – a net sink of carbon – meaning that more CO₂ emissions are absorbed than released. In 2007, the forest sector contributed 25 percent of NZ's gross emissions as net removals. This includes removals from various activities (Ministry for the Environment, 2009e, p 95):

⁷⁸ Statistics for Figure 4.17 can be found in Appendix 23.

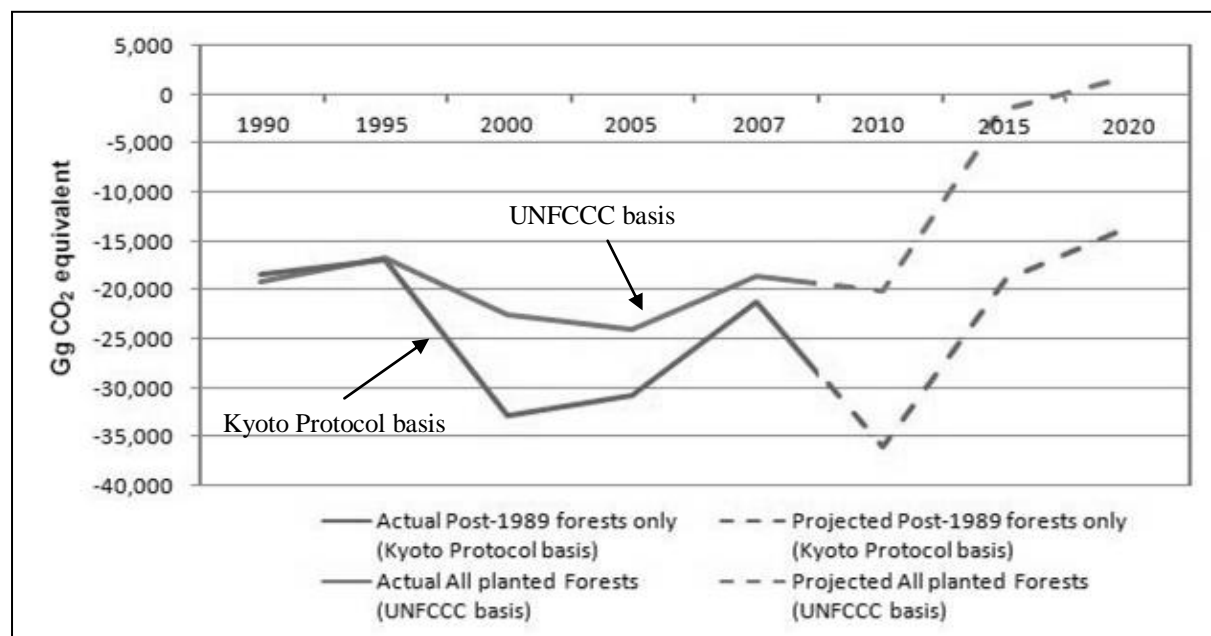
- The growth of planted forests;
- Emissions from the conversion of land to planted forest; and
- Emissions from harvesting and deforestation.

In 2008, the New Zealand Carbon Monitoring Programme (NZCMP) was incorporated into the Land Use and Carbon Analysis System (LUCAS) to measure and monitor NZ's natural forests. The initial measurement between 2002 and 2007 indicated that NZ's natural forests were carbon sink over the period 1990 – 2004 (Ministry for the Environment, 2009e). Although unspecified, forests will be remeasured in the near future, which would determine the status of NZ's natural forests – carbon neutral, a source of CO₂ emissions, or a sink of carbon. Until it is confirmed, natural forests are reported as carbon neutral and therefore only emissions and removals from plantation forests are included in these projections of GHG emissions. It is expected that the forestry sector will generate emissions in 2020, as large proportion of forests planted in the 1990s are due to be deforested in 2020 (Ministry for the Environment, 2009e).

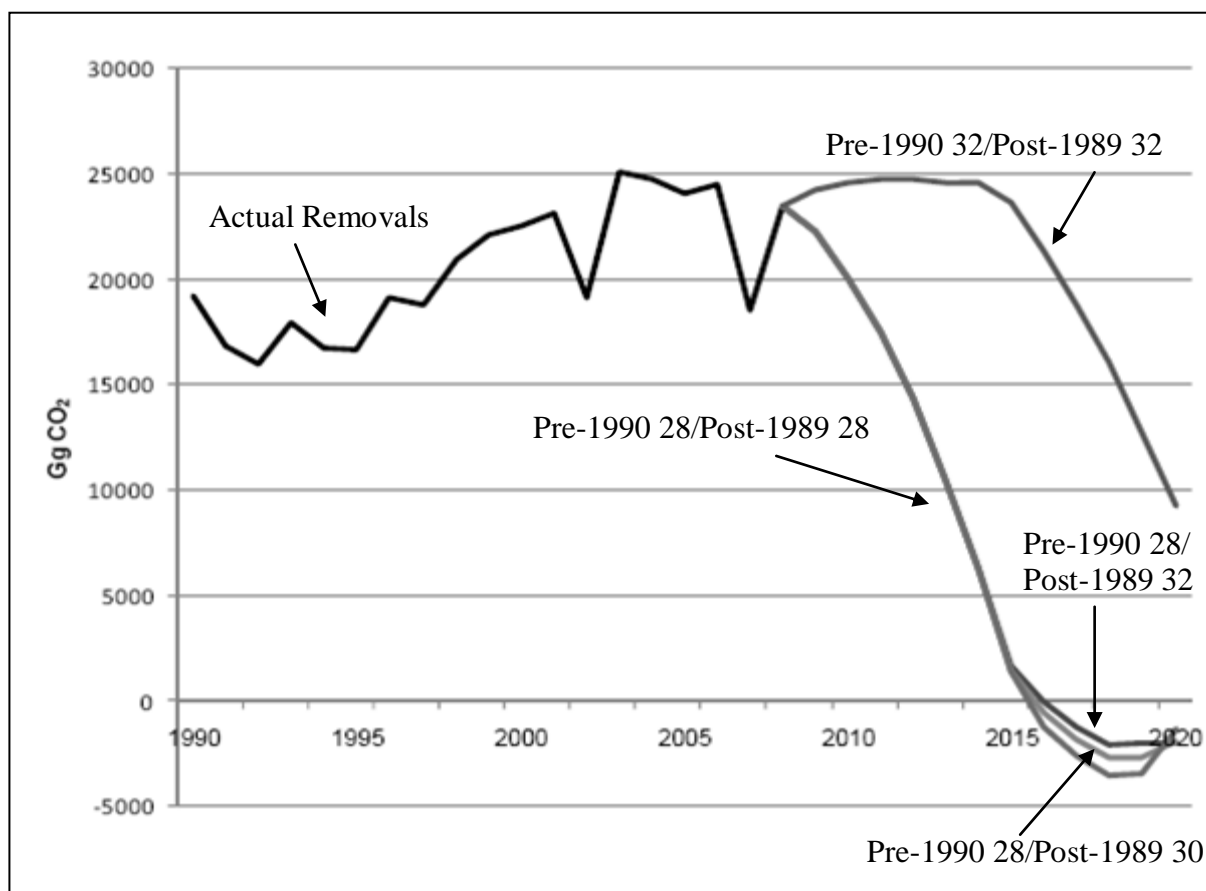
Figure 4.18 illustrated the actual and projected net emissions and removals from the forestry sector between 1990 and 2020. UNFCCC and the Kyoto Protocol figures were compared, as UNFCCC figures take account of emissions and removals from both pre-1990 and post-1989 forests, while the Kyoto Protocol figures only include post-1989 forests. These sets of data were used to examine emissions and removals from pre-1990 forests, calculated as the difference between UNFCCC and Kyoto Protocol figures, which can be found in the discussion section of this Chapter (Chapter 4.9) together with the evaluation of net emissions and removals data from post-1989 forests. Statistical data used to prepare Figure 4.18 was

extracted from ‘New Zealand’s Fifth National Communication’ (Ministry for the Environment, 2009e), disclosed in Appendix 24.

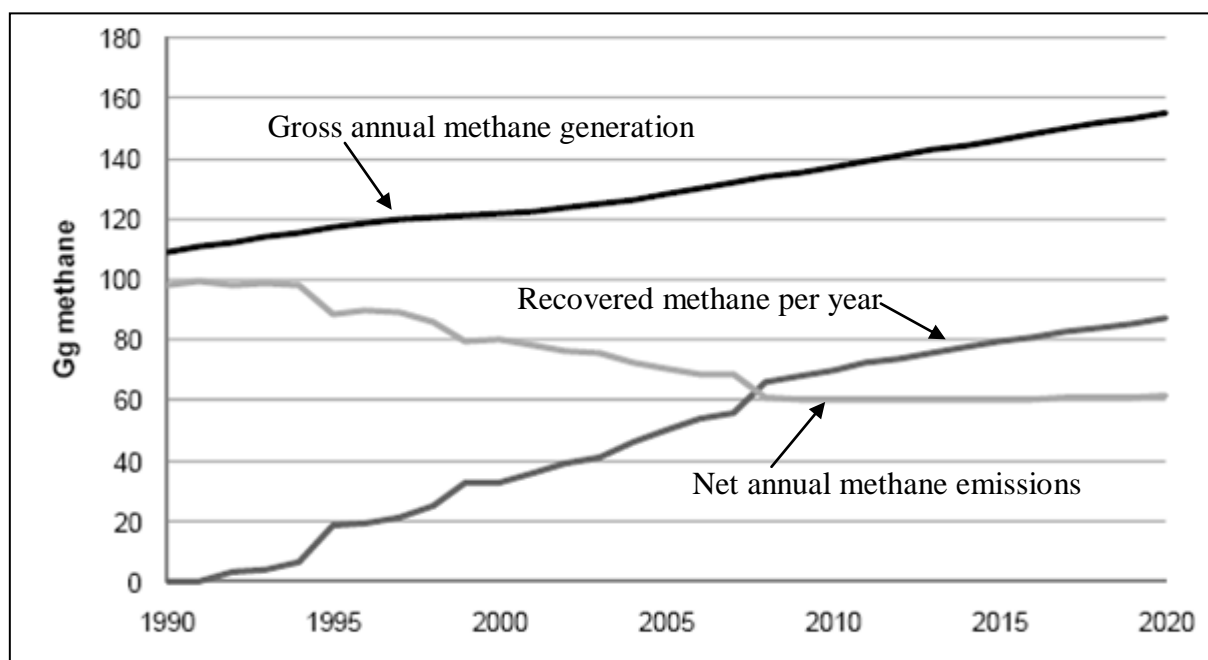
Figure 4.18: Actual and Projected Net Emissions and Removals from Forest [1990 – 2020]



An ‘extended’ comparison was conducted to examine the impacts varying harvest ages have on pre-1990 and post-1989 forests. The underlying assumption for this analysis is that pre-1990 forests have the harvest age of 28 years, whereas post-1989 forests are harvested after 30 years. Figure 4.19 (Ministry for the Environment, 2009e, p 97) shows that “*projections of emissions and removals from forestry are not very sensitive to changes in the rotation length of post-1989 forests, but are sensitive to variations in the rotation length of pre-1990 forests*”. Refer to Appendix 25 for statistics used to prepare Figure 4.19, which was extracted from ‘New Zealand’s Fifth National Communication’ (Ministry for the Environment, 2009e).

Figure 4.19: Removals by Forestry under Different Assumptions for Harvesting Rates for Pre-1990 Forests and Post-1989 Forests

Prospective waste emissions are substantially lower, estimated to be 29 percent below 1990 levels by 2020. The primary reason for this reduction is because of the “*increasing capture and destruction of landfill gas (methane)*” (Ministry for the Environment, 2009e, p 98). Figure 4.20 (Ministry for the Environment, 2009e, p 98) provided an overview of projected CH₄ emissions from the waste sector (landfills) from 1990 – 2020, considering the effects of the NZ ETS.

Figure4.20: Gross Methane Generated from Landfills, Methane Recovery and Net Methane Emissions [1990 – 2020]

It is expected that CH₄ emissions from landfills will continue to be on a downward trend, maintaining its emissions level significantly below 1990 levels during and post CP1. Since the introduction of the NZ ETS in the waste sector, it is foreseeable that CH₄ emissions will decrease 2.4 percent by 2020 (Ministry for the Environment, 2009e).

4.5. Emissions Beyond 2012

Projections of emissions post-2012 were made with the impacts of both ‘with’ and ‘without’ the implementation of the NZ ETS by various sources, including documents prepared by the Ministry for the Environment (2006; and 2009e) using information collated from the Ministry of Economic Development, the Ministry of Agriculture and Forestry, and the Sustainability Council (Bertram and Terry, 2009). It was estimated that without any policy implementation, the level of emissions would continue to rise to unsustainable levels beyond CP1. However, projections illustrated that with the effect of the NZ ETS, the level of emissions in NZ would be relatively steady and constant throughout the years beyond 2012.

Regardless of the attempt to estimate future emissions, inherent uncertainty of projections of emissions and removals create difficulties in determining future levels of GHG emissions beyond 2012 (Ministry for the Environment, 2009e). Numerous economic variables have significant impact on projecting future emissions (Ministry for the Environment, 2009e, p 7):

- Commodity and oil prices;
- The assumed carbon price;
- The assumed rate of afforestation and deforestation; and
- The harvest age of forests have significant effects on projected emissions and removals.

Furthermore, a great level of uncertainty of future research and development in NZ also had substantial effect in determining the actual impact of the climate change policies, and therefore the level of emissions to be released beyond CP1 are yet to be quantified. In order to ensure that the implemented scheme is operating effectively and in full potential, the ETS Review Committee members are holding annual meetings to review and revise the NZ ETS. The first ETS review meeting post implementation is to be held at the end of 2011. This gathering will provide great opportunities to review the effect of the NZ ETS in the NZ environment using statistical data published over the previous year. In addition, its adequateness is able to be evaluated through discussing international perspectives surrounding the notion of the ETS, including the current global status of the policy. Ultimately, resulting recommendations on ways of enhancing and improving the structure and the content of the scheme will be provided, in order to produce a customised policy that would potentially benefit individuals and businesses in NZ (Bertram and Terry, 2009).

4.6. Discussion of Statistical Results

Upon obtaining statistical data from diverse sources of information, a comparative analysis was conducted by the researcher to examine the numerical-effectiveness of climate change policies – the statistical change of the level of emissions in NZ. The ultimate aim of this analysis was to compare the anticipated behavioural-effectiveness of the Carbon Tax and the ETS in various periods. However, an additional analysis of comparing two different versions of the NZ ETS were carried out to evaluate and provide relevant evidence on an adequate policy in a NZ context.

One fundamental limitation to this analysis is the inconsistency of available resources. For the analysis to be fair and unbiased, the statistical data has to be derived from the same source. Yet, unavailability of certain sources of information made the unbiased evaluation to be difficult. Thus, whilst the initial aim was to compare the emissions level ‘with’ and ‘without’ the policy implementation for three different scenarios (1990–2008/CP1/beyond 2012), the uncertainty or unavailability of information limited the ability to carry out the comparisons to such depth. In the end, possible comparison was on the level of emissions during CP1 ‘with’ and ‘without’ the proposed policies: the effect of the Carbon Tax imposition could not be measured as the Carbon Tax proposal was abandoned even before its commencement; and whether the ETS would survive in the NZ environment beyond 2012 is yet uncertain.

No comparison can be made among different policies for statistical data gathered for the period 1990 – 2008, as there is no history of any climate change policy being implemented. In addition, data obtained during these years are historic figures, and thus they portrayed factual information rather than anticipated outcome. Effectively, the only possible conclusion from analysing this set of quantitative data is that the level of emissions increased substantially

without any climate change implementation over the last two decades, and it is beyond doubt that it will continue to rise in the future without any climate change policies, evidenced by the increase in emissions-intensive, human-induced activities (Staudt *et al.*, 2008).

CP1 is the transitional period where an introduced policy goes through a phase of implementing, reviewing and settling process in NZ. During this period of time, NZ ETS was legislated in order to lower the level of emissions released. However, nearing the expiration of a transitional period, a review process is currently underway in order to discuss the future of NZ's climate change policies. Thus, only an anticipated outcome was able to be obtained, and only a predicted comparative analysis was conducted. It is estimated that over CP1, there would be a rise in the emissions level by 26.4 percent based on 1990 levels without any policy implementation. However, as illustrated in Table 4.4,⁷⁹ the level of emissions is predicted to decrease with the introduction of a climate change policy – the Carbon Tax would lower emissions by 3.37 percent and the 2008 NZ ETS would decrease emissions by 1.48 percent, and the National-led Government's (National's) modified-ETS would result in emission reductions of 0.67 percent.

Table 4.4: A Comparison of the Projected Change in the Level of Emission with and without Policy Intervention in Different Situations

Change in Emissions	Emissions without Government Intervention	Emissions with Carbon Tax	Emissions with Labour's ETS	Emissions with National's ETS
1990 – 2008	+ 22.8	N/A	N/A	N/A
CP1 (2008-2012)	+ 26.4%	- 3.37%	- 1.48%	- 0.67%
Beyond 2012	approx. + 108%	N/A	Uncertain	Uncertain

⁷⁹ Statistical data used in Table 4.4 was extracted from various reports and documents, including 'NZ's fifth National Communication' and 'Projected Balance of Emissions Units during CP1 of the Kyoto Protocol' (Ministry for the Environment, 2009e).

The impacts of each policy were compared to the BAU emissions level without any government intervention. Effectively, the difference between the level of emissions prior to, and subsequent to the reintroduction of a Carbon Tax is 29.77 percent. In comparison, the effects of introducing the Labour-led Government's (Labour's) NZ ETS and the BAU emissions level have a difference of 27.88 percent, and 27.07 percent for the National's modified-ETS.

The sole consideration of the quantitative outcome suggested a Carbon Tax to be more effective than an ETS. Nevertheless, other factors, such as changes in other tax rates and the status of the economy should also be considered in order to examine the adequateness of a Carbon Tax in NZ economy. However, due to the limited scope of the thesis, the consideration of these factors was excluded, assuming all other relevant factors were constant. Furthermore, it should be noted that comparisons are only made for emissions during CP1, and that these projected figures may not necessarily represent the actual outcome during CP1 nor may they represent projections for emissions beyond 2012.

Restricted availability of information limited the ability to sectorally compare climate change policies. However, the resulting trends can be compared and contrasted to examine the overall change in the level of emissions. Each sector projected its future emissions level using its own customised economic model derived by their respective government agencies. The Ministry of Economic Development used SADEM model for the energy, transport, and industrial processes sector, and agriculture and forestry sectors used a modelling based on the methodology applied by the Ministry of Agriculture and Forestry. Lastly, the projections of emissions from the waste sector were based on the waste strategy used by the Ministry for the Environment. Different models designed by different government agencies may create some

inconsistencies throughout producing projections of emissions for each sector. Nonetheless, as it currently stands, this is the preferable, and most reliable method available to collect data, based on projections calculated by a group of professionals in each government agencies.

The anticipated trend⁸⁰ for the energy sector is expected to rise without any policies in place, whilst with the introduction of the ETS, the level of emissions from the energy sector are estimated to decrease with the introduction of the NZ ETS. This implies that assuming all other factors are constant, the increases in the energy prices are expected to have an impact on incentivising individuals and businesses to change their behaviour and reduce emissions. Similarly, the SEIP sector also expected to have a contrasting result; that this sector does not consist a huge proportion of the NZ's overall emissions profile, and does not make a huge difference in the emissions level over the decades, and yet there appeared to be a definite change in the trend with respect to the implementation of the ETS.

On the other hand, emissions released from the transport sector will continue to increase notwithstanding increases in fuel prices. This suggested that raising fuel prices will not incentivise individuals and businesses to change their forms of transport, and therefore other activities or events should be introduced that will enforce businesses to insist households and individuals to change their behaviour; for example, 'walk to work day', or provide incentives to workers who use public transport.

A similar trend is illustrated in the agriculture sector, where emissions are anticipated to increase regardless of the implementation of the policies. The reason for this outcome is that the agriculture sector is not planned to enter the scheme until 2015, and thus the effect of the

⁸⁰ Anticipated sectoral trends were evaluated from data analysed using various documents – refer to Chapters 4.3 and 4.4.

ETS on reducing methane emissions will not be relevant during CP1. From the researcher's perspective, the agriculture sector entering the scheme in 2015 would not be of any benefit in reducing the overall level of emissions in NZ. The agriculture consists of about half the overall emissions in NZ, which entails the need for this sector to be one of the first sectors to enter the scheme. However, politics behind this procedure resulted in agriculture entering the scheme as late as possible. This was confirmed by Katene, such that the reason for this belated entry was due to the National Party wanting to win seats for the general election. Thus, looking solely from the environmental perspective, this circumstance actually delayed NZ in achieving its goal as a signatory to the Kyoto Protocol.

The trend illustrates a decline in emissions released in the waste sector in both circumstances. This is a result of the impact of the NZ waste strategy, emphasising the need for recycling, reducing waste volumes, and less organic waste in the landfill. This impact will continue throughout CP1 and beyond, which is projected to have a consistent effect on reducing emissions in the waste sector in the future.

One recommendation that is worthy of consideration from the researcher's perspective is equalising the waste system implemented in different cities across NZ. As it currently stands, each regional council regulates the waste system. For example, the Auckland City Council has two bins: one for recycling and the other for landfill and organic/garden waste; whereas the Christchurch City Council regulated to have three bins: one for recycling, one for landfill and one for organic and garden waste. This suggested a possibility that Auckland citizens may be decomposing more organic waste in landfill sites than Canterburyans, which can easily be amended by having a homogeneous system across the country as a means of encouraging all NZ citizens to work towards minimising their personal emissions.

In contrast to other sectors of the NZ economy, the forestry sector has a different emissions portfolio. Forests absorb CO₂ upon releasing Oxygen (O₂), reducing the amount of CO₂ in the atmosphere. However, trees will release CO₂ upon deforestation. For this reason, the National-led Government decided to provide remuneration to forestry owners to plant more trees to continue the cycle of CO₂ absorption by providing the forestry owners with free carbon credits. The age of harvesting averages around 30 years, and therefore the treatment of the ETS on trees planted pre-1990 and post-1989 differ. The anticipated level of emissions for pre-1990 forests ‘with’ and ‘without’ climate change policies are almost indifferent. It is expected that pre-1990 forests will generate an average of 15,859.7⁸¹ Gg CO₂ of net removals with the implementation of the NZ ETS, and approximate 15.5 Gg CO₂ of net removals without an ETS as stated in Table 4.3.

The Government required pre-1990 forest owners to surrender NZUs upon deforestation; however, by the end of CP1, most pre-1990 forests would already be deforested. Hence, it is expected that the ETS will not have a huge impact on pre-1990 forests. Nevertheless, post-1989 forest owners can voluntarily enter the scheme if they wish, in order to receive carbon credits as forests grow. Therefore, as illustrated in Figure 4.18, post-1989 forests created net emissions of 816.8 Gg CO₂ in 1990, but by the end of CP1, the forest owners will be continually planting trees in order to earn carbon credits, which is anticipated to result in net removals of 15, 938.5 Gg CO₂.

Furthermore, projections of total and net emissions ‘with’ and ‘without’ the NZ ETS were compared to obtain insights into the impact of an ETS in a NZ context. Respectively, Figures 4.21 and 4.22 summarise projections for emission ‘with’ and ‘without’ the NZ ETS. As

⁸¹ The figure of 15.859.7 was calculated using data in a table from ‘NZ’s Fifth National Communication’ (Ministry for the Environment, 2009e), which can be found in Appendix 24.

previously mentioned in Chapter 3.2.2.2, ‘with NZ ETS’ projections were calculated using specific models from individual government agencies, for example, the Ministry of Economic Development used SADEM, and the Ministry of Agriculture and Forestry used their own anonymous model. In order to analyse and examine the contrasting impact, ‘without NZ ETS’ projections excluded the modelled effects of the NZ ETS across all sectors. Whilst the effect of applying the nitrification inhibitor dicyandiamide in the agriculture sector was included, the implications of the ‘Landfill Gas Standard’ on waste emissions are yet to be modelled. It should also be noted that as the SEIP sector is a tiny contributor in terms of NZ’s overall emissions, this sector will not be hugely affected by the implementation of the NZ ETS, resulting in an insignificant change in the projected level of emissions (Ministry for the Environment, 2009e, p 103-104):

Figure 4.21: Actual and Projected Total Emissions, ‘with NZ ETS’ versus ‘without NZ ETS’ [1990 – 2020]

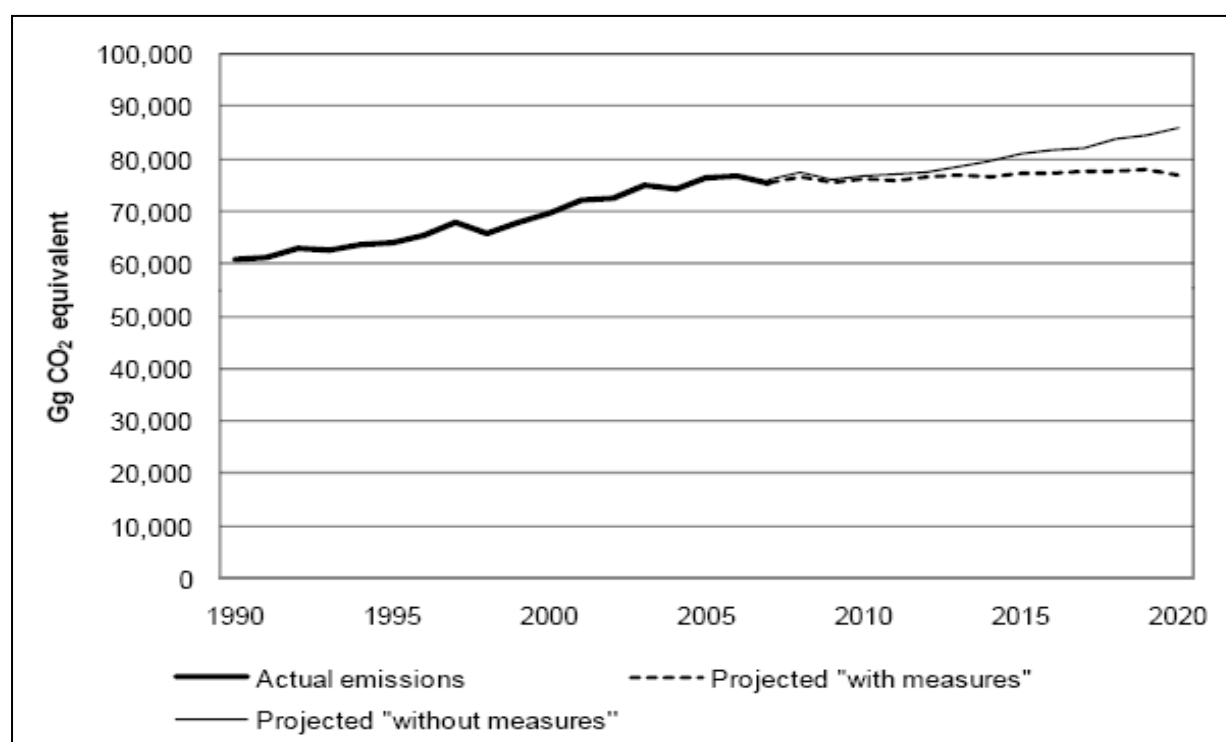
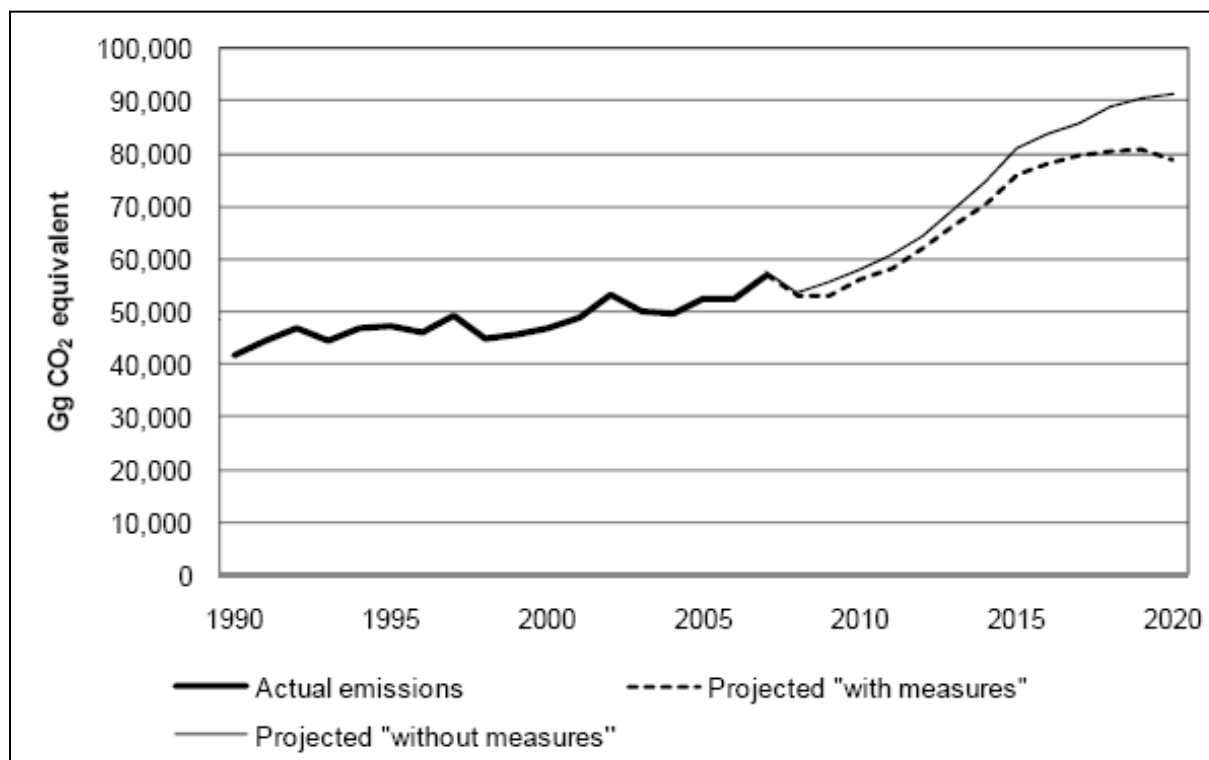


Figure 4.22: Actual and Projected Net Emissions, ‘with NZ ETS’ versus ‘without NZ ETS’[1990 – 2020]

4.6.1. Comparison of Statistics between ‘2008 Labour’s NZ ETS’ and ‘2009 National’s Modified-ETS’

In addition to the comparative analysis on the impact of the Carbon Tax and the ETS, two different versions of the NZ ETS were compared. Over the past several years, NZ went through various phases of modification – proposing a Carbon Tax regime, introducing an initial Labour’s NZ ETS in 2008, and introducing the National’s modified-ETS in 2009. The National’s modified-ETS was implemented and enforced by legislation in July 2010. Table 4.5 compared the level of GHG emissions for CP1 under BAU/2008 ETS/2009 ETS (Bertram and Terry, 2009, p 4):

Table 4.5: Order-of-Magnitude Changes in CP1 Gross Emissions due to ETS

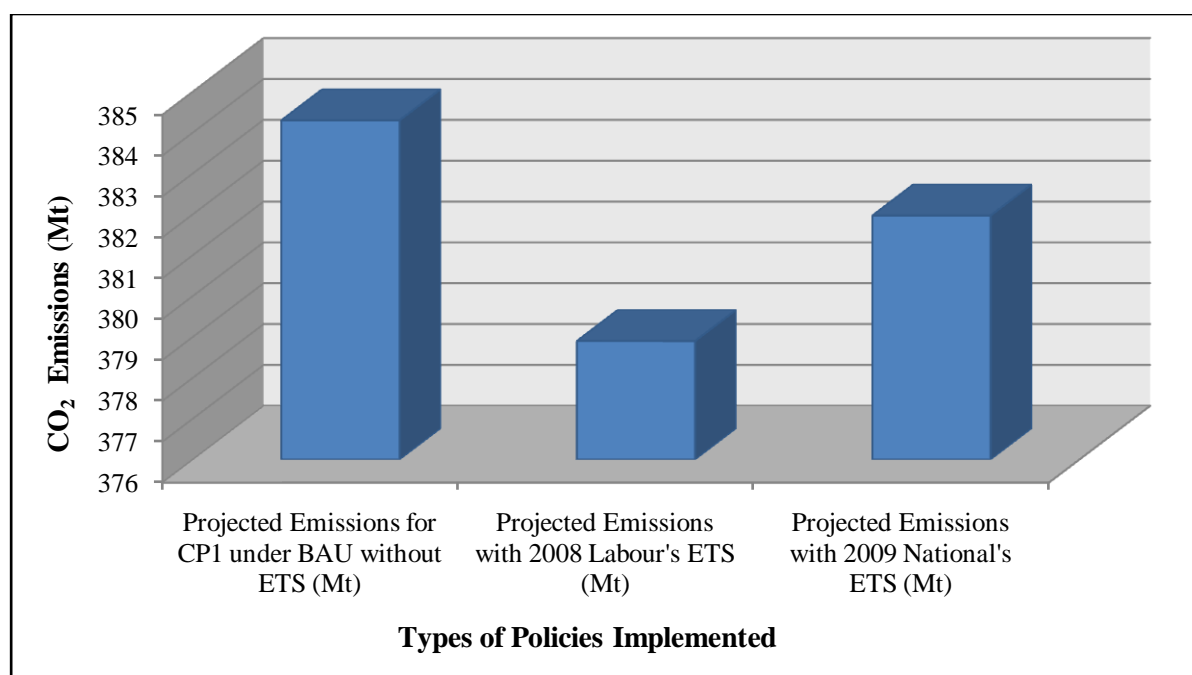
Sector	Projected Emissions for CP1 under BAU without an ETS (Mt)	Reduction due to 2008 ETS (Mt)	Reduction due to proposed 2009 ETS (Mt)
Agriculture	184.0	0	0
Transport Fuels	72.1	0.2	0.1
Non-transport Liquid Fuels	14.0	0.2	0.1
Electricity	36.2	3.3	1.5
Stationary Energy from non-liquid fuels	37.2	1.1	0.5
Industrial Processes	21.4	0.6	0.3
Waste, Solvent and Other	9.0	0	0
Fugitive emissions	10.7	0.3	0.13
Total	384.3	5.7	2.6

The Sustainability Council (Bertram and Terry, 2009) provided a table comparing the emissions reduction between the Labour's ETS and the National's modified-ETS. One factor that needs to be considered is that the document was prepared in November 2009, so the National's modified-ETS was only a proposed policy at the time of publication. In comparison, the likely effect of the Labour's ETS was projected to reduce emissions by about 1.5 percent of projected gross emissions,⁸² whereas the National's modified-ETS, was estimated to reduce approximately 0.7 percent of gross emissions calculated using the same BAU projections (Bertram and Terry, 2009).⁸³

Ultimately, it is estimated that, in consideration of the expected effects of the existing Labour's ETS, the projected change in emissions between 1990 and CP1 is a 22 percent overshoot – 60 Mt excess. Figure 4.23 compared the actual gross emissions produced during CP1. Data used to illustrate this graph were extracted from 'ETS: Bill to a Future Generation' (Bertram and Terry, 2009):

⁸² This estimate is similar to the one percent reduction estimate [provided in Aug 2008 by then-Minister Responsible for Climate Change Issues, Hon. David Parker].

⁸³ As stated in 'ETS: Bill to a Future Generation' (Bertram and Terry, 2009), these estimates of emissions reductions were produced using generous assumptions.

Figure4.23: Total Projected Emissions during CP1 (2008 – 2012)

It is apparent that projected emissions with the 2008 Labour's ETS would reduce more emissions than the National's modified-ETS. According to Wagner, a National MP, the reason for the larger decrease in emissions with the implementation of the Labour's ETS is because this scheme costs more than the National's modified-ETS. Effectively, it is predicted that the more expensive scheme would place more burden on individuals, households and businesses, providing a higher incentive to reduce emissions (Bertram and Terry, 2009).

Nonetheless, despite the low level of emissions reduction, Wagner added that the fundamental reason for implementing the modified version is to protect the local economy and NZ exporters. An ETS with a lower cost will place less burden on individuals to maintain their standard of living. NZ, similarly to the rest of the world, is currently in a recession, with numerous businesses bankrupting or making unsustainable losses and households struggling to 'feed their kids'. Thus, the National-led Government decided to cut the ETS costs by about

50 percent in order for NZ to be able to afford their living. In addition, exporters frequently have to maintain their competitiveness in overseas markets (Bertram and Terry, 2009).

While the researcher believed that ‘taking little steps at a time’ may benefit low-income earners, the majority of the NZ population will not notice a change in their spending patterns. The increase in petrol prices will not restrict individuals and businesses from using fuel, and the small increase in energy prices will not limit energy use in households and businesses. Only in the case of substantial, and incremental increases in prices, are individuals and businesses going to realise their over-consumption, and thereby reduce or change their spending patterns to less emission-intensive resources.

Ultimately, despite its criticisms, the National Party wanted “*something off the ground, and in place at a level that people could afford, and then make our way through, making sure we do our bit*”,⁸⁴ which achieved the primary objective of ‘taking the first step to make something happen’. It is illustrated in Figure 4.23 that the National’s modified-ETS will do its job of reducing emissions, even if it may only be a small percentage. Therefore, it can be concluded that although not completely effective, the ETS represents NZ, taking its first step to reach its Kyoto Protocol goal of reducing emissions to 1990 levels by 2020.

4.6.2. Comparison with WOGOCOP

WOGOCOP (1996) conducted a similar research in 1996, producing a discussion document examining the best approach to stabilise the CO₂ emissions in NZ. However, a different methodology was used, and circumstances surrounding the climate change issues changed

⁸⁴ This comment was made by Wagner during the interview.

drastically over the last 15 years. Hence, the statistical outcome of the two studies were compared to evaluate the changes.

As stated in Table 4.2, WOGOCOP (1996) predicted that by 2010 the emissions level will increase by 44 percent based on 1990 levels without any government intervention. However, according to figures recorded in the 'National Inventory' the actual increase by 2008 was 22.8 percent based on 1990 levels, and it was expected to increase by 33 percent based on 1990 levels without any policy implementation. If a Carbon Tax was to be imposed, it is expected that the emissions level would decrease by 21.6 percent during CP1, and if an ETS was implemented, the expected reduction in emissions would be 25 percent based on 1990 levels during CP1.

A limitation of solely comparing the statistical outcome from this study and the outcome from WOGOCOP (1996) is that there were numerous developments over the intervening 15 years. Although the notion of a Carbon Tax and an ETS were present in 1996, various aspects of the policies were modified. In addition, NZ implemented an ETS in 2010, with its effects beginning to appear; and a more definite sense of international direction is now known in comparison to 15 years ago – a probable ETS future. Thus, although the statistical predictions made by WOGOCOP (1996) can be a valuable reference for future research, its relevance and reliability are somewhat lost as NZ starts to take some action against climate change issues.

4.7. Chapter Summary

This chapter examined actual and projected numerical changes in the emissions level in NZ, as a result of introducing climate change policies. A detailed analysis on the level of GHG emissions were conducted, under three categories:

- Historical figures for the period 1990 – 2008;
- Current estimates for CP1; and
- Significant issues and projections of emissions and removals post-2012.

Historical emissions proved that emissions in NZ will constantly increase to unsustainable levels without any climate change policy, and it was predicted that at the current rate, emissions would increase by 33 percent by the end of CP1. However, with the introduction of the climate change, emissions would decrease – the imposition of a Carbon Tax would result in a decrease of 21.8 percent and the implementation of an ETS would result in an emissions reduction of 25 percent. These outcomes suggested that an ETS is more effective in reducing the level of GHG emission than a Carbon Tax.

Another factor that needs to be considered is the fact that NZ, and the rest of the world, have been in a recession for the last few years, which hugely affected the level of GHG emissions. This was confirmed by comments made by politicians that it is highly likely that the reduction in level of the GHG emissions that is apparent over the last few years is the resultant of the recession rather than the effect of the ETS. In addition, other policy changes including tax cuts and the increase in the GST rate would also influence the projected level of GHG emissions in the future, which will create difficulties in evaluating the sole effect of the NZ ETS in reducing GHG emissions.

Another way to effectively measure the reduction in emissions is the emissions intensity – emissions per dollar's worth of economic output. There are three possible approaches to create an emissions intensity indicator – emissions as a proportion of: gross output; intermediate consumption; and value added. However, the emissions intensity measurement is

not relevant for this study specifically, as the focus is on the behavioural-effectiveness of the policies, through analysing the changes in the total/net GHG emissions level.

Further research concerning the effects of the NZ ETS by evaluating the changes in the level of GHG emissions using the emissions intensity would be beneficial. Although it is confirmed that no official documents are published for the statistics on the emissions intensity by the Ministry for the Environment, simple measures of emissions intensity (per capita and per \$m of GDP) are not difficult to calculate – there are publicly available documents containing statistics on total and net GHG emissions, in terms of Ggs, and information on the NZ population and GDP data can be obtained from governmental agencies, for example, Statistics NZ, and the Ministry of Economic Development.

However, despite the accessibility of the information, an essential limitation is that currently, ‘emissions intensity’ usually only refers to the measure used as part of the criteria for establishing eligibility for industrial allocations in the NZ ETS, which are given to ‘Emissions Intensive Trade Exposed (EITE)’ activities.⁸⁵ This suggested that until further information is disclosed about the effects of the NZ ETS on the ‘emissions intensity’, in terms of GHG emissions per capita and per \$m of GDP, the use of ‘emissions intensity’ as a method of measuring reductions in the level of emissions is neither adequate nor practical.

Moreover, there were some limitations on finalising the collection and the analysis process. One of the most fundamental limitations is the current existence of the policies. The Carbon Tax policy was proposed, but never applied, and the modified NZ ETS was only implemented in July 2010. Therefore, the effects can only be projected, limiting the accuracy of the results.

⁸⁵ This information was obtained from an email received from a Senior Adviser in the ETS Operational Policy division, Ministry for the Environment.

In addition, the limited availability of public documents containing projected figures restricted the ability to obtaining consistent and accurate data sets. Another limitation is the ability to comprehend the information disclosed in ‘Projected Balance of Emissions Units during the First Commitment Period of the Kyoto Protocol’ (Ministry for the Environment, 2006). Although it can be assumed that methods used to illustrate the statistics provided in tables on graphs are included in the appendix of the published document, a direct reflection of the results are not apparent, and it requires in-depth, technical knowledge to understand the explanation of the methods.

Quantitatively speaking, it is evident that the Carbon Tax is a more effective approach in reducing emissions. However, it is still premature to comment on whether a Carbon Tax is a more effective approach than an ETS, in incentivising a change of behaviour to reduce emissions. Evidence provided from the statistical analysis is not sufficient for speculation and for answering the research question. To enhance the evaluation of the quantitative analysis through statistical data collection, qualitative data were also gathered. Chapter 5 provides a comprehensive discussion on the qualitative analysis conducted through a series of semi-structured interviews.

Chapter Five:

Qualitative Analysis –

Interviews

5.1. Overview

This section provides a discussion of the information obtained from interviews conducted in a semi-structured manner. The discussion is thematic-based in no particular order, transcribed without the aid of any software. Although the nature of the interviews required a pre-indication of the topics to be discussed, opinions on various topics were able to be obtained, as individual respondents had different perceptions about the global issue of climate change. In addition, because of the occupation of interviewees, most of their opinions were based on their political backgrounds and professional knowledge, although some of the comments were made from their personal perspectives. This was clearly stated during the interviews. Several fundamental points agreed by the majority of the respondents, were:

- Climate change is a global problem that needs to be solved in the near future, and New Zealand (NZ) should be responsible for its share of this global problem;
- NZ should be a ‘fast follower’ not a leader; and
- Whether in support of the notion of an Emissions Trading Scheme (ETS) or not, there needs to be changes to the current National-led Government’s (National’s) modified ETS.

5.2. Perspectives on Climate Change Policies

The foremost point discussed with the respondents was their perspectives on two distinctive climate change policies, the current economic status of NZ, and future developments and implications of policies. The aim of this discussion was to obtain general and in-depth information about two climate change policies, the Carbon Tax and the NZ ETS, in addition to perspectives from politicians directly, involved in the development and/or review process

of either or both policies. Various opinions on climate change issues were provided by the respondents due in part to their different political standpoints.

Hon. Peter Dunne, a member of United Future, and the chairperson of the Emissions Trading Scheme Review Committee, and Ms. Nicky Wagner, a member of the National Party, favoured an ETS. Fundamental reasons for favouring an ETS over a Carbon Tax as perceived by the interviewees were:

- A Carbon Tax policy is ‘too blunt’ of an instrument in terms of defining the carbon price and its appropriate tax treatment; and
- An ETS is more flexible than a Carbon Tax, as it has the same process as a normal ‘supply and demand market’.

Dunne provided his opposing perspective to the notion of a Carbon Tax as a member of United Future, stating that the proposed Carbon Tax regime was ‘*too blunt*’. This approach may seem like a better policy than an ETS given the certainty on the price of carbon, but defining the appropriate tax treatment was “*too difficult and too blunt*”.⁸⁶ Wagner supported Dunne’s argument, and provided more evidence on the reason for her preference on the ETS over the Carbon Tax approach – an ETS is a trading tool where the price of carbon is dependent on the characteristics of the policy. For example, if an ETS is considered to be a ‘merit good’, the price of carbon would decrease, resulting in less exchange between traders, and vice versa. Effectively, under the ETS, the carbon market is equivalent to a normal ‘supply and demand market’, with foresters supplying carbon credits through sequestering carbon emissions and companies produce carbon, demanding carbon credits. However, with a

⁸⁶ Reasons for opposing the Carbon Tax regime were stated by Dunne in his own words.

tax, government has the controlling and regulating power: *“An ETS allows for more flexibility as it allows for fluctuations in the carbon credits, reflecting what the economy and the environment really needs.”*⁸⁷

However, on the other side of the spectrum, there were respondents who were strongly opposed to the notion of an ETS. Mr. John Boscawen, a newly-appointed Minister of Consumer Affairs and the member of the ACT Party, Ms. Jeanette Fitzsimons, a retired Member of Parliament (MP) representing the Green Party, and Ms. Rahui Katene, a member of the Māori Party, favoured a Carbon Tax policy.

Boscawen was strongly opposed to the concept of an ETS, as he believed that there is still no need for any climate change policy: *“... [Boscawen] still refuses to accept the idea of climate change and that there is a need to deal with it”*.⁸⁸ He emphasised the fact that the NZ ETS is the most comprehensive one in the world, as per Hon. Dr. Nick Smith’s comment, and that NZ should not be leading the world. Moreover, he claimed that none of NZ’s four major trading partners (Australia, China, Japan, and the United States [US]),⁸⁹ currently have an ETS, therefore NZ should not be penalising its citizens. However, Boscawen perceived that, *“only **IF** NZ had to do anything **AT ALL**”*,⁹⁰ a Carbon Tax should be imposed, due to its fiscally neutral characteristics, so that there is a possibility of using the additional tax to reduce other forms of tax, for example, income tax.

⁸⁷ Opinion from Wagner, paraphrased for simplicity reasons.

⁸⁸ During the interview with Katene, she mentioned that Boscawen is still not willing to accept the need for a policy to overcome the global crisis.

⁸⁹ In alphabetical order.

⁹⁰ Emphasised comment made by Boscawen in his own words.

According to Boscawen, his fundamental reason for opposing the implementation of the NZ ETS lie around overly-generous subsidies that place surcharges on all consumptions, including electricity, petrol and food, which are transferred to ‘smart’ individuals who are willing to collect the subsidies and *“purchase land, plant forests and get a one-off windfall gain that covers that cost”*.⁹¹ Therefore, the ACT Party is against the notion of implementing, and extending the NZ ETS: *“if it was to come in effect with agriculture, we will be the first and the only country in the world to have an ETS in agriculture, and in any event, it was the most comprehensive ETS in the world... those are Nick Smith’s words, not mine.”*⁹²

In addition, Fitzsimons explained her perspective, providing a rationale for the need to differentiate between a regime that is best in theory and the one that is best in practice. Theoretically, an ETS gives certainty of the environmental outcome – the estimation of emissions reduction, but it does not give certainty around the price of carbon. Contrastingly, a carbon tax provides a certainty of the price but not an environmental outcome. Thus, theoretically speaking, it is expected that Fitzsimons, as an environmentalist, would prefer an ETS; however, she favours a carbon tax instead, based on the primary reason that she is well aware of how businesses operate.

Evidently, businesses are unwilling to invest if the price is uncertain. Thus, in order for businesses to invest in carbon-reduction technologies, there has to be certainty over the return on the investment, which requires certainty of the carbon price. Ultimately, Fitzsimons concluded that whilst it is best to implement an ETS theoretically; in practice, it is best to impose a Carbon Tax. Furthermore, she criticised the current National’s modified-ETS, by claiming that the National-led Government weakened it substantially to get elected, as that is

⁹¹ Part of the comment made by Boscawen.

⁹² A statement made by Boscawen, in his own words.

what they promised farmers and big businesses – the Labour’s ETS was not an expensive regime, but the National-led Government weakened it further, not expecting to reduce much emissions but appear to be ‘doing something’ as a response to climate change. Fitzsimons also expressed her opinion that the current National-led Government made an ‘*appalling mess*’ of the NZ ETS and that NZ is better without it – the decline in the emissions over the last year is because of the reduction in the economic activity due to the global recession, which would outweigh the impact of the NZ ETS.

Katene, also in favour of a Carbon Tax over an ETS, believed that a Carbon Tax ‘gets right into the emitters’. An ETS actually encourages more emissions rather than less because NZ does not have a good balance between different groups of individuals. According to Katene, nobody is willing to take responsibility for their share of the emissions, but instead, they are pleading for the tax to have no major impact on them – especially the agriculture sector, where they are *saying ‘do not tax us or do not put an ETS on agriculture because if you do, we are going to go out of business, and NZ is going to go out of business basically’*.⁹³

Yet, a few respondents provided a neutral opinion, commenting that ‘it is not the tool, but it is the design that matters’, and the choice of the tool used should depend on the global trend – especially on NZ’s major trading partners. Mr. Charles Chauvel, a member of the Emissions Trading Scheme Review Committee and a member of the Labour Party, was one of the respondents to provide a neutral opinion:

I do not really think there is much of a difference between a Carbon Tax and a trading system in terms of what you ought to achieve – either is an economic instrument to price the use of greenhouse gas (GHG) [emissions] at the margin (the use and production at the margin) and presumably they are also revenue generating mechanisms that you would use ideally to fund what we all know as

⁹³ This statement was made by Katene in her own words.

the ‘necessary move to lower carbon economy’... the distinctions of the two are the distinctions of design, and you can design either one of them well, or you can design either one of them badly.’⁹⁴

Although Chauvel believed that the NZ ETS is a badly-designed regime, he considered that an ETS should be retained in NZ, unless the rest of the world predominantly supports the tax approach and only then, should NZ re-examine its support for its ETS. Nonetheless, as it currently stands, the European Union (EU) has an ETS, and therefore Chauvel perceived that for compatibility reasons with NZ’s major trading partners, NZ ETS should be retained. NZ should link sectorally with the EU ETS, and not being linked with them already is a major lost opportunity. China also hinted their desire to implement an ETS through the preparatory work in their next five-year plan, which is another influential reason for retaining the NZ ETS.

Whilst perceiving that the design of the instrument was important, Mr. David Parker, a member of the ETS Review Committee and a member of the Labour Party, provided a detailed overview of the Carbon Tax, implying his support for the notion of an ETS: *“these two (mechanisms) are similar instruments, [which] often gets lost in the debate. Depending on rules for either of them you can design them in a way which operates quite similarly.”⁹⁵* In addition, Parker advised of the disadvantages of the Carbon Tax:

A fundamental disadvantage of a Carbon Tax is that there will effectively be a political controversy every time the price of carbon changes because people who are paying it jump up and down and say that it should not be any higher than it is, and that means that you will have a lot of pressure from those who are major emitters, for example, steel, aluminium or farming industry.⁹⁶

⁹⁴ Opinion provided by Chauvel in his own words with some modifications for clarity.

⁹⁵ A statement made by Parker in his own words with corrections made.

⁹⁶ Criticism by Parker in his own words.

Finally, Parker personally perceived that most countries prefer an ETS because its market-based characteristics would provide more political durability and less political controversy once implemented. On the other hand, although a Carbon Tax is universal, and it influences behaviour-change by pricing carbon, Parker conceived that “*setting a price for a Carbon Tax is no less controversial than setting income taxes or GST rates*”.⁹⁷ Mr. Pete Hodgson, a member of the Labour Party and a Minister responsible for the Energy and Climate Change Portfolio at that time, was another respondent with a neutral perception, although he had more of an ETS preference. During his time as the Minister responsible for the Energy and Climate Change Portfolio, he developed the policy for the introduction of a Carbon Tax.

Although Hodgson was one of the primary members responsible for developing the Carbon Tax policy, his perspectives were somewhat different – despite the inherently difficult allocation for an ETS, he distinguished the ETS to be a more pure policy response, while the Carbon Tax has “*rather little attraction amongst political allies*”.⁹⁸ Ultimately, he believed that the effectiveness of the chosen climate change policy would depend on the design and the implementation process that matters, rather than the tool. His perspectives on the climate change policies were reflected in the following quote:

*An ETS [can be recognised as] the better tool because it inherently has a cap, it inherently makes more sense than a Carbon Charge. It requires trading, it sets up a market in carbon, [and] it means that the forces of capital used to develop markets in carbon as though you have to develop markets in everything else.*⁹⁹

He further explained that the current NZ ETS, which has an extremely slow transitional process period may result in a relatively worse response when measured against a better-designed Carbon Charge, despite the fact that the NZ ETS covers all sectors, all gases, as the

⁹⁷ A statement by Parker in his own words.

⁹⁸ Distinction of policies made by Hodgson in his own words.

⁹⁹ Comment by Parker with some alterations for grammatical correction.

extremely slow introduction rate would cause very limited incentives to change behaviour or to influence capital investment decisions. To support his opinion, Hodgson provided a summary of costs and benefits associated with the policies:

Table 5.1: Hodgson's Cost-Benefit Analysis of the NZ ETS and the Carbon Tax

	ETS	Carbon Tax
Benefits	<ul style="list-style-type: none"> - being able to be put together as a cap, in the same way as NZ's fishing management system 	<ul style="list-style-type: none"> - relative simplicity, and - relative predictability
Costs	<ul style="list-style-type: none"> - harder to put in place because it requires serious allocation issues to be resolved, and - unpredictable because of the fluctuations in the price of carbon 	<ul style="list-style-type: none"> - cap, and therefore not being a cap and trade system

5.3. Is an NZ ETS More Like a Tax Voucher Rather Than a Trading System?

As mentioned earlier in Chapter 3.2.2.2, 'The Carbo₂n Ch₄allenge – Response, Responsibility, and the Emissions Trading Scheme' (Bertram and Terry, 2008) stated that the NZ ETS, in its current form, is more like a tax voucher rather than a trading scheme. Opinions on this statement were sought, and a majority of the respondents agreed that the current ETS is more like a voucher than a trading scheme, primarily due to the intensity issue resulting from the fact that the National Party substantially downgraded the ETS from then Labour-led Government's (Labour's) ETS, and therefore it does not retain the fundamental characteristics of a trading scheme.

Chauvel commented on the modification made by the National-led Government that the price of the carbon is not set through the supply and demand of the carbon market as a 'proper' trading scheme should, but instead, it is like a regulated tax system dressed up as a trading

scheme, through features such as a fixed price of carbon and ‘two for one’ surrender obligation on NZ units (NZUs).

Hodgson provided a detailed rationale as to why the current ETS does not have the fundamental characteristics of a trading scheme – NZ currently has a different policy than the initially-intended ETS. The National-led government changed it and weakened it, making the policy more impure by including an ‘energy intensive’ aspect to the ‘normal’ cap-and-trade ETS approach – less energy-intensive individuals and businesses should to be less-affected by the introduction of the ETS. In this case, the ETS is no longer ‘cap-and-trade’, becoming somewhat ‘corrupted’. As Hodgson explained; the Labour’s ETS was not ‘corrupted’ – an all-sectors, all-gases scheme with no energy intensity and no carbon tax features, with fast entry to the scheme than the National’s modified-ETS. Thus, he believed that NZ already had a regime that was better than what NZ currently has under the law, although it is worthwhile to ‘wait and see’ how the policy further develops.

Dunne also believed that *“it is a question of how you mitigate the impact”*¹⁰⁰ and that the issue of the ‘voucher-like’ system is due to energy intensity; although Dunne was uncertain about the long-term viability of energy intensity, he believed that the NZ ETS will operate just as effectively in the long-run. However, he acknowledged its dependence on the responses of individual sectors as they enter the scheme. Furthermore, Dunne recognised NZ’s unique profile of emissions in comparison to that of other nations, because of the nature of our agriculture sector, and the way in which we farm. NZ’s agriculture sector can be compared to Australia’s coal industry in the same respect and probably China on a vastly

¹⁰⁰ Stated by Dunne during his interview.

larger scale. Thus, Dunne acknowledged the infeasibility of the idea that NZ should have an ETS without agriculture.

However, the only person to disagree was Wagner, from the National Party. She argued that the statement by Bertram and Terry (2008) is ‘not correct’ as an ETS incorporates a trade between private enterprises, with an objective to change behaviour, not to collect revenue – carbon emitters (companies) are required to purchase credits from people who sequester carbon, such as, foresters. Wagner emphasised that the government only plays a regulatory role; setting parameters and ensuring integrity in the system (*are they actually absorbing carbon*). Therefore, she explicitly stated that the government is not directly involved in the ETS, confirming that the ETS is a trading system.

5.4. Behavioural-Effectiveness of an ETS/Carbon Tax

As mentioned throughout this study, the most crucial factor to consider is the behavioural-effectiveness of the policies – the ability to incentivise individuals and businesses to change their behaviour to reduce the level of GHG emissions. The majority of votes were for the ability of the ETS to incentivise individuals and businesses to change their behaviour. However, it is conceived by most respondents that the NZ ETS, in its current state, does not have the ability to change behaviour, and thus reduce emissions.

Chauvel, one of the respondents who agree with the statement, was very tenacious on his perspective that the current National’s modified-ETS will not achieve the aim of incentivising individuals and businesses to change behaviour. He elucidated some recommendations on what is required of a proper ETS for each of the sectors involved in order to achieve the ultimate objective; the practical objective of the National’s ETS should be to incentivise the

land to be afforested to increase plantation forests. Instead, that marginal land is being employed for more unsustainable dairy production, creating emission-wise problems.

Furthermore, for the ETS to be effective in the transport sector, various investment alternatives must be available to influence behaviour-change, including more investments in public transport, which are yet to happen – for example, bio-fuels, electric vehicle technology, CNG, and LPG. According to Chauvel, the fundamental process required with a proper ETS is the transfer of sales revenue to funding energy-efficient investments. In addition, an extensive period of transition caused insufficient incentives for people to change behaviour in the Stationary Energy, and Industrial Processes (SEIP) sectors. Therefore, in order for the current National's modified-ETS to be more effective, there has to be a stronger system than the one initially proposed by the Labour-led Government.

Despite Chauvel's disbelief in the NZ ETS, he claimed that he himself is an optimist, believing that there will be a positive change internationally as China and the US eventually reach agreement. Chauvel provided the Labour Party's perspective that *"starting to pay a little bit now is much better than deferring the bill to the future"*¹⁰¹ and therefore he believed in the need for a proper, well-structured regime that will be able to achieve that; which the National's modified-ETS does not appear to be doing. Chauvel further expanded on his comment about the need for a stronger ETS, claiming that there is a high possibility of the decrease in emissions being a result of the recession rather than a result of the government policy; a stronger ETS that incentivises real efficiency measures should be implemented because NZ needs to take the notion of reducing agricultural and transport emissions much more seriously. Only when other countries acknowledge the fact that NZ is seriously

¹⁰¹ Comment made by Chauvel in his own words.

concerned about the environment and that New Zealanders are trying their best to minimise emissions, NZ's international trade will continue. Certainly, Chauvel believed that provisions under the Labour's ETS were at an acceptable level to ensure NZ's position in the international market.

Fitzsimons is another respondent who believed that an ETS is not an effective tool for behaviour-change. She considered that the *"ETS will have very little incentive to change peoples' behaviour. Change in behaviour due to the increase in fuel prices is not even noticeable. It just gets lost in the noise of everything that is happening around (for example, GST increase)"*.¹⁰² Although there is a concern that there will be the same consequences with a Carbon Charge to a certain extent, she expected that with a Carbon Charge, you can adjust the charge up on a regular basis through a regular review process: *"I think it is more transparent and it is fairer and I would just hate to see huge amount of human ingenuity and effort going into completely unproductive speculation in carbon markets"*.¹⁰³

In addition, Fitzsimons noted that another disadvantage of an ETS is that this scheme sets a floor, meaning there is a limit on the amount of emissions that can be reduced. Consequently, this gives a 'false' perception: *"[I] can't do any better than this level of emissions reductions because if I save, someone else will buy those credits and emit more"*;¹⁰⁴ whereas with a carbon charge there is no lower limit, thereby emissions can be reduced as much as possible.

However, Fitzsimons did not necessarily think that an ETS will always be the wrong way to do it, but it is just a timing problem, and she considered it is presently not the right approach. As it currently stands, the EU has an ETS, only applicable to electricity with big exemptions,

¹⁰² Opinion provided by Fitzsimons in her own words.

¹⁰³ Statement made by Fitzsimons in her own words.

¹⁰⁴ Additional comment made by Fitzsimons in her own words.

and many free allocations. However, many other countries, especially NZ's major trading partners, do not have an ETS implemented. Thus, Fitzsimons believed that once more countries have fixed a price on carbon, there will be a global ETS, and until then, NZ should have a Carbon Tax.

Moreover, Fitzsimons claimed that the notion of international ETS only involves Organisation for Economic Co-operation and Development (OECD) countries, whilst most of the emissions growth comes from non-OECD countries. Therefore, she concluded that the Kyoto Protocol is fairly ineffective, although the NZ ETS will domestically be the best approach if the Kyoto Protocol eventually becomes an international scheme where large developing countries, including Brazil, China, and India, join and international trading becomes more common practice.

Hodgson provided a comprehensive explanation of the term 'behaviour'. There will possibly be various changes that will take place in each and every sector in NZ, due to the implementation of an ETS. The design of an ETS as a cap-and-trade system, with a cap that allows for a limit to trade, provides an opportunity for change, for example, if there is insufficient savings going on, the price of carbon rises, until further savings take place. Ultimately, Hodgson perceived that it is the capital investment that matters rather than changes in individual behaviour, because the effects of the capital investments are long lasting. The following quote is a summarised definition of the word 'effectiveness', as perceived by Hodgson:

... [although an effectiveness can be] change of behaviour, change of product, and changes in capital investment patterns, I am asserting that the word 'behaviour' means something that someone does day by day – their daily behaviour changes. They think twice about using their car to go down to the dairy

*to buy milk whereas capital investment is about the big decisions that get taken, [making a difference] in an economy.*¹⁰⁵

In addition, he suggested several questions to guide the understanding of the ‘behaviour’ concept:¹⁰⁶

- What is the next electricity generation going to be, gas or geothermal?; and
- Are Wellington Combined Taxis going to take a decision to require their drivers to switch to hybrids in a period of time?

Dunne had a very optimistic view about the ETS. Although he believed that it may not be the policy with the complete set of tools that is 100 percent suitable in the NZ economy currently, it is by far the best policy NZ has, to date. He believed that it is an initiative for achieving NZ’s intention of reducing GHG emissions by changing individuals’ and businesses’ attitudes; the NZ ETS would certainly have the characteristics to incentivise a reduction in emissions in the long-term, and it would most definitely be able to change attitudes of individuals and businesses in the short-term. Dunne advised that “*since the 1 July has occurred and the sky has not fallen, and the argument that people had about whether an ‘ETS’ or ‘no ETS’ seems to have reduced quite significantly*”,¹⁰⁷ which suggested that the transitional phase is believed to be a part of the general ‘settling down process’. Moreover, Dunne alleged that over time, it would be difficult to extrapolate the percentage of ETS-related, Goods and Services Tax (GST)-related and general cost of living-related costs out of the total increased costs. Thus, most individuals might not like it, but they will accommodate it.

¹⁰⁵ Opinion provided by Hodgson in his own words with some alteration for grammatical purposes.

¹⁰⁶ Hodgson provided his understanding of the word ‘behaviour’ during his interview.

¹⁰⁷ Comment made by Dunne in his own words.

Parker provided a detailed explanation on the behavioural-effectiveness of the policies. He perceived that the NZ ETS is fairly operational in industries with no assistance, in the form of free allocations. For example, electricity and transport sector, where the cap on the price of carbon and the ‘two for one’ surrender of units – for every emission, to pay only half of the emissions – is only transitional which does not have long-term effects on the economy and the overall emissions.

However, he considered that an ETS will not be as effective in industries with free allocations because *“they measured the marginal price signal by moving to an intensity-based allocation”*.¹⁰⁸ The normal ETS process with free allocations requires emitters to pay the excess carbon over the generous levels of free allocations. Nonetheless, if measured under an intensity-based allocation scheme, then costs can be remitted, and a full discount can be received if the current market price of emissions has been reduced, because those emitters are getting the benefit of the lower cost structure. This may mean that under this scheme, there is a possibility that it *“might require them to pay \$10 for every tonne of emissions and that is not as strong an economic incentive to reduce your emissions. It is the most problematic in the agriculture sector”*.¹⁰⁹

In strong opposition to an ETS, Boscawen suggested that NZ is promoting a lower standard of living through higher electricity prices. He argued that there is no need for the NZ government to be penalising NZ citizens for more renewable energy when 70 percent of NZ’s energy is from a renewable source already whilst Australia, a country that can be immigrated to with ease that has a competitive advantage in coal, has a higher standard of living with less than 20 percent renewable energy – over 80 percent of energy is being generated by a cheap

¹⁰⁸ A statement made by Parker in his own words during his interview.

¹⁰⁹ Commented by Parker in his own words.

source of energy, for example, coal. Thus, he prefers a Carbon Tax policy, as a tax allows for compensation by way of other tax reductions. For example, increases in electricity and petrol prices can be offset by decreasing other taxes, whereas the ETS does not make anything else cheaper, but gives money away to a small set of smart people who say “*they are giving away free forests, let’s get one*”.¹¹⁰ To support his argument, Boscawen has provided an example:

*Meridian Energy has made a massive investment in wind farms of [about \$2 billion]. [Theoretically, the cost of electricity from the wind farms are deemed to be 12 cents per unit, while in practice, it is believed that the cost will be in excess of 20 cents]... if we have invested on geothermal or something other than wind, we would have got just as much electricity production from a much smaller investment. So once again, that money has been wasted, and all New Zealanders are paying for the cost of that waste.*¹¹¹

Katene, another respondent who does not perceive that an ETS, neither National’s nor Labour’s version, is effective in reducing emissions, supported Boscawen’s perception: Why should those that are being careful have to be penalised as much as those that are not? She was annoyed at the notion of a trading system, which she believed to enforce ‘taxpayer you pay’ rather than ‘consumer you pay’ concept. Thus, she explained her perspective that not only would NZ ETS discourage behaviour-change but emitters are busy passing on the burden onto each other.

Moreover, Katene believed in the existence of global warming and climate change, and the need for a policy to overcome this crisis. The best approach is through public education, as there is not enough awareness about global warming: “*there are still individuals that ask ‘Global Warming? What is that about?’ They failed to see that it is not about individual years but over several years/decades, [affecting their children/grandchildren]*”.¹¹² To further

¹¹⁰ Statement made by Boscawen.

¹¹¹ Opinion provided by Boscaswen in his own words with some modifications for grammatical correction.

¹¹² Comment made by Katene in her own words with some grammatical changes.

explain her opinion, Katene gave an example, comparing the global crisis to the ‘rising sea-levels’ catastrophe – that individuals do not realise the impact of the increase in the sea level rise, rather they think that it is further up the beach, not considering its effect along the coastline.

Moreover, she acknowledged that this global catastrophe is already happening in some places, such as Pakistan. Therefore, she suggested that it is the industrial emissions that need to be reduced in order to have a big impact, as individual emissions are never going to exceed the industrial emissions, and as a result, there will be growth in NZ’s internal refugees from the loss of their land along the coast, as well as international refugees. In addition, although releasing tonnes of methane (CH₄) gas in the air would participate in increasing the level of GHG emissions in NZ, the characteristics of CH₄ would allow them to be recycled (molecules in CH₄ are broken up on a 10-year cycle). Thus, whilst agriculture is going to be hugely affected by climate change, it is in fact, as perceived by Katene and Boscawen, releasing a lower level of emissions than perceived by many individuals and businesses.

An introduction of an ETS would mean a change in the way of doing business. This is due to NZ’s unique emissions profile with huge economic contribution by the agriculture sector, and huge reliance on the agriculture sector for NZ’s overall economic activity. Moreover, it is important for businesses and industries to think about their consequences on climate change, as well as the most appropriate approach to protect domestic farmers. Katene believed that the fairest way to achieve this is through the imposition of a Carbon Tax, as the Carbon Tax system penalises emitters on a proportional basis to the level of GHG emissions.

Wagner was the only respondent who was certain that the NZ ETS in its current state is more effective in changing behaviour. She argued that carbon-intensive activities will be more expensive than less carbon-intensive activities, and therefore the existence of a ‘carbon market’ allows for individuals and businesses to make better decisions – *“it is the price that determines what people choose”*.¹¹³ She believed that this is particularly true in the forestry sector. Increase in the forestry revenue would allow for more plantation forests, resulting in more carbon reductions. Wagner also claimed that the primary reason for NZ being on track in terms of paying Kyoto is because of large amounts of forests planted during the 1980s. These forests are currently growing at a full maturity growing rate, providing a large source of carbon absorption.

Furthermore, once those planted forests have to be cut down, more forests will have to be replanted to maintain NZ’s current carbon removal rate. Otherwise, more funds would have to be spent on the introduction of new technologies that can maintain the same carbon removal levels and assist in cutting costs to support struggling businesses – the increase in the level of pressure to maintain low costs on top of the inflation, created by the introduction of the NZ ETS. For example:

- The use of GPS – trucks can reduce the driving distance by choosing the shortest route using a GPS; and
- Back loading – delivering seafood and meat together and changing gas types.

¹¹³ Argument provided by Wagner in her own words.

5.5. Was There a Need to Modify the ETS?

Over the last several years, the NZ ETS has gone through a phase of modification. As previously mentioned in Chapter 2.3.3, the concept of an ETS was introduced and implemented in NZ by then Labour-led Government. However, with the change of government after the last general election in 2008, the National-led Government modified and delayed the policy. According to Wagner, the purpose of the modification was to:

- Be more productive for exports; and
- Cut the costs for households to be able to afford their spending to maintain their ‘standard of living’.

It is Wagner’s belief, and therefore the National Party’s belief, that it is ‘all about keeping a balance’ – “*Do our bit, and we are seen to be doing our bit internationally, and that we are moving to a right direction.*”¹¹⁴ Over the last several years, NZ has been going through a period of recession, and therefore the National-led Government decided to cut the price by half so that people were able to afford necessities, based on the perception that the Labour’s ETS was to incur far more costs during this difficult period of time. In addition, there are great opportunities for a review on a regular basis – considerations of events in science, business, and internationally – which the National-led Government believed would be sufficient to make further modifications, if necessary. Thus, the initial aim of the National-led Government was to:

*Make the first step to make sure something happens. We wanted something off the ground and in place at a level that people could afford and then make our way through and make sure we do ‘our bit’, but that we are not crippling our economy so that we cannot compete either locally or internationally.*¹¹⁵

¹¹⁴ The National Party’s perspective was provided by Wagner in her own words.

¹¹⁵ The National Party’s objective provided by Wagner, as part of her response in her own words.

Another factor to consider is NZ's unique emissions profile – half of the economy is involved in farming. Therefore, Wagner believed that it is easier to change household behaviour than it is to change farming methods, as it is difficult to modify natural behaviour from animals, for example, reduction of CH₄ emissions from gas produced by animals. Moreover, she emphasised that whilst the National-led Government could have justified NZ's ignorance to the climate change issues by arguing: *“we are too small, we cannot do anything, leave me alone”*,¹¹⁶ because NZ only accounts for one percent of the world's emissions, instead, they have chosen to say *“look, we have to be responsible members of the global economy, and if we do not do anything, then anyone else has a reason to not to do anything and we need to take some leadership here, but not to the extent that we cripple our economy or the people of NZ”*.¹¹⁷

Dunne supported this argument, with reasons surrounding the compensation issue, which he thought was inadequate under the Labour scheme, because of its difficulty around obtaining acknowledgement from the Labour ministers on the certainty over the price of carbon. Certainly, under the National's modified-ETS, various scenarios were provided regarding the compensation issue, which was perceived to be dealt with in a better way than the Labour's ETS. Essentially, Dunne perceived that although the climate change situation is very fluid, with an unpredictable long-term fate, there is indisputable evidence of climate change and global warming: humanity would never be in the position to say *“oh, climate change, well that was the big hopes of the early 21st Century, so we do not have to do anything about it”*,¹¹⁸ because the irrefutable evidence is just too overwhelming for the country, which he claimed to

¹¹⁶ A statement made by Wagner in her own words.

¹¹⁷ Comment made by Wagner in her own words.

¹¹⁸ A statement made by Dunne in his own words as part of his response

be one of the benefits about the select committee process – “... *evidence just comes through time and time again*”¹¹⁹ – to prove that climate change is actually happening.

Ultimately, Dunne suggested that the modifications to the dates of entry for the sectors would not make a difference ‘in the grand scheme of things’, although the only desirability for this would be to have something confirmed in place pre-Copenhagen. Despite the indisputable evidence of climate change and global warming, Dunne never had the view that NZ will be setting an ETS in concrete, and he certainly believed the NZ government is committed to it into the foreseeable future, but whether the ETS, in its current form, survives beyond CP1 is an open debate due to Kyoto’s commitment ending in 2012, causing uncertainty in post-2012 regime.

However, one aspect Dunne is definite of is a possibility of further considerations in light of national and international experience. Nationally, there are already some technical issues emerging about the definition of units and how one accesses these units, whilst on an international level, further modifications are probable, depending on the outcome of the next gathering. Some of the questions to be asked at the next gathering are: Where is the US; where are the Chinese; and what is India doing. These developing countries are larger contributions to global emissions than what NZ will ever be. In particular, there was no doubt about the Australians implementing an ETS:

*...this time last year [2009], who would have believed that if you said that in a year from now Australia will not only not have an ETS, it would have got rid of Kevin Rudd, and you would have thought that this was crazy, particularly the way the Australian Government was at the end of last year, we have looked to be setting it up in such a way that he was going to have an election over an ETS or no ETS, and then he has just run a mile away from it.*¹²⁰

¹¹⁹ A statement made by Dunne.

¹²⁰ Comment made by Dunne in his own words.

Nonetheless, other respondents disagree by arguing that the National's modified-ETS has not changed much since the Labour's ETS, and even if it has, it is significantly worse. As Katene claimed, the National's modified-ETS has just taken small incremental steps compared to the Labour's ETS. There is a possibility that it could have worked without the small, incremental steps, but even then, she perceived that the Labour's ETS is not 'great' as it did not affect those emissions-intensive individuals and businesses that it should have. Parker was one of those respondents, who perceived that a modification was unnecessary, explicitly objecting to the notion of intensity-based approach:

*You could have been more generous in your free allocations to the existing industries. You could have gone to 100 percent of their 2005 emissions level. You could have had a pool of emission rights that were reserved for new entrants or major expansions, for example, steelers, but should not have moved to intensity-based allocation. In addition, given that half of our emissions come from agriculture, there is no economic justification and there is an environmental harm as well from what they have done in agriculture which has effectively moved the cost from the agricultural industry to taxpayers.*¹²¹

Boscawen and Fitzsimons also strongly objected to modifying the NZ ETS. Boscawen believed that the NZ ETS should not have been implemented, and should be 'scrapped', and Fitzsimons perceived that the current National's modified-ETS is substantially worse than the Labour Party's one. The primary reason for Fitzsimons to oppose an ETS is the concept of the 'allocation of free credits'. It operates on a notion: "*the more you pollute, the more we will give you free credits*"¹²² – the allocation is based on 90 percent free allocation based on current emissions industry if they are competing with overseas producers with no price on carbon. In addition, upon expanding the business, they still get their 90 percent of those larger emissions.

¹²¹ Argument provided by Parker in his own words.

¹²² A part of a statement made by Fitzsimons.

Thus, in the most simplistic sense, the National's modified-ETS has a less cap on emissions than the Labour's ETS, and Fitzsimons assumed that it will do nothing to reduce NZ's GHG emissions. Possibly, low-income earners may conserve more fuel, purchase fewer cars, or alter transport habits if petrol prices become more expensive, but *"it is not going to do much to limit what business does and it is the people who can least afford it that is going to be making sacrifice"*.¹²³ Ultimately, Fitzsimons also elaborated on the two tests that she perceived should be met in order for an ETS to be effective – the scheme has to be environmentally effective and fair – which, according to Fitzsimons, the National's modified-ETS failed to meet.

5.6. Future Implications – Where to from Here?

After a careful consideration of climate change policies, a fundamental question remains – where to from here? The unanimous vote says it is an 'ETS future'. Hodgson was certain that there was a higher possibility of an ETS future than a Carbon Tax future, and ongoing debates will continue around several issues:

- Exclusion of agriculture – it is impossible to fuel-switch a cow; therefore, should agriculture be excluded, or should it be included because it is 50 percent of NZ's emissions. Furthermore, farmers are not paying anywhere enough attention to reducing their emissions, and they are pretending they do not have any problems; and
- Pace – The issues of climate change need to be addressed much more quickly than what the current National's modified-ETS is intending to do.

¹²³ Opinion from Fitzsimons.

Moreover, Hodgson concluded that, given the unpredictable nature of the politics, it will be impractical to comment that there is no chance for a Carbon Tax to be re-imposed. Nonetheless, there will be a significantly reduced chance than an ETS future. Similarly to Hodgson, Chauvel considered that NZ should retain the ETS policy until all its major partners decide to do otherwise, despite his belief that the current National's modified-ETS will not be an adequate regime, based on the reason that the NZ ETS would not provide any real incentives for behaviour-change, but *“there is a massive subsidy or wealth transfer from households to emitters”*. Yet, depending on decisions made by other trading partners to move toward an ETS, *“it would make sense for us to retain the ETS but to improve it and make it fit for purpose”*.¹²⁴

Katene, who is in favour of a Carbon Tax, also commented that although it is disappointing to see an ETS being implemented, she also assumed that it will be difficult to imagine a Carbon Tax future, with the global trend being towards the ETS – although there is a slight possibility of reintroducing a Carbon Tax if the Labour Party gets re-elected; given that NZ already legislated an ETS, the reintroduction is highly unlikely. Correspondingly, she suggested that a global ETS will not be effective in every country, as each country has its own unique emissions profile. For example, NZ is dependent on agriculture, whereas Australia is dependent on their mining industry. On the other hand, Dunne saw the positive side of an ETS – it is the best policy that NZ has so far, and although what happens post-2012 is unpredictable, an ETS future can be expected:

My view is that we have an ETS that is probably the best ETS of its type that you could design in the sense that it has been through two parliamentary processes and some amendments have emerged relatively un-scaled. The international environment makes the necessary step post 2012, and I think we have to take the view that while this might be the best we can do at the moment, there is no

¹²⁴ Opinion provided by Chauvel in his own words.

*guarantee about what happens post 2012 – what happens if the US, China and India all come to the table much more constructively, but at least we have made some progress.*¹²⁵

Another factor of concern is the ignorance of the public on climate change issues, due to the perspective of ‘why bother?’ in the face of NZ’s small contribution to climate change and climate change issues – only 0.2 percent of global emissions. However, Dunne provided a contrasting perspective: *“Because we are small and particular, [and] because we are isolated, we rely more heavily than most on our ability to trade, and the risk I see is that because we are small, we stand out as a pretty good target to be picked off”*.¹²⁶ He then emphasised the fact that no matter the size, the reality is, that NZ is in the global game as a game player, therefore is dictated by the rest of the world. This suggested that there was no choice but to comply with the movement to an ETS, and its response to climate change. Arguably, given the size of NZ in comparison to the rest of the world, it is highly likely that the contribution to the overall emissions will be insignificant; the important consideration is that NZ is *“far more likely to be saving our trade position in terms of national income and professional government services and public prosperity”*.¹²⁷

Conclusively, Dunne emphasised his preference on an ETS policy. He commented that the actual impact of the NZ ETS is still uncertain, regardless of the costs associated with the regime, in terms of its impacts on households (\$165 per annum) on top of the effects of the GST increase and other tax policy changes. Therefore NZ is in a better position than it previously was, in the sense that the scheme is less costly, and that NZ is well-positioned

¹²⁵ Comment made by Dunne, in his own words.

¹²⁶ Opinion provided by Dunne in his own wrds during the interview.

¹²⁷ Commented by Dunne in his own words.

internationally, based on “*the likelihood of other countries moving in a similar direction or of the tasks starting to be more concerted in its response*”.¹²⁸

5.7. ‘Extended’ Discussion

As the nature of a semi-structured interview suggests, several aspects outside the scope of prepared topics/questions were discussed with several respondents. Although these were not planned at the time of preparation, these questions were thought to be worthy of further discussion, as they would enhance the breadth of discussion. Several aspects including export costs, the reason for choosing to impose a Carbon Tax in 2002, and recommendations of any other adequate climate change policies are discussed further in detail.

5.7.1. Export Costs

NZ, being heavily reliant on trade, will face cost-related difficulties with an ETS future. The issue of export costs were discussed with a couple of the interviewees, and they have identified various points for consideration. Chauvel identified that difficulties with an ETS future on export costs will depend on where NZ’s export markets lie. He assumed that it lies with affluent consumer markets in Northern America, Western Europe and emerging middle class markets like in China and India. Then he added that those consumers have the desire to consume sustainably-produced dairy and agricultural products. Therefore, he believed that in the long-run NZ exporters will not be disadvantaged by taking the ETS a bit more seriously. However, in his view, one unanswered question remains:

Why we would not be taking some steps now to be able to demonstrate to the world that we are in sustainable production mode and that we are trying to minimise our carbon emissions, and that we are trying to do other things sustainably in our dairy produce so that we can actually keep all those markets open and sell it at a bit of a premium rather than trying to produce a volume at

¹²⁸ Emphasised opinion made by Dunne in his own words.

*high carbon costs I do not know, I think the former is the future and the key to our prosperity rather than the latter.*¹²⁹

Contrastingly, Dunne recognised this as a real issue, a possible ongoing debate between a need for a ‘balancing act’ – drawing a fine line between ‘being seen to be playing a part’ at minimal cost to the domestic environment, dressing it up as an environmental issue, and a morality issue of taking the best approach for the planet, not for own self-interest. Furthermore, Dunne compared his sense of the previous government’s focus on the environmental issues compared to the current government, in providing his perspective – the previous Labour-led government concentrated on saving the planet, whilst the current government is focusing on what is the best outcome for NZ (the two not necessarily being the same):

*Given the low scale of our emissions to start with, I would favour the more pragmatic approach that we have at the moment. If we were to have a different emissions profile, and therefore we were in the position to make a much more significant impact globally, I might well favour the former course. But to me, I have always had a bit of a problem in saying ‘why should we be beating ourselves to a pole when the polluters do not really seem that interested’.*¹³⁰

In essence, Dunne suggested that NZ should play its part and take responsibility in mitigating the level of our own GHG emissions, but it needs to be done in such a way that protects the wellbeing of the NZ economy.

5.7.2. Why a Carbon Tax in 2002?

In 2002, Hodgson was the Minister Responsible for Energy and Climate Change Portfolio, during which time he, together with his colleagues, developed a regime to impose a Carbon Tax. However, gathering from previous comments made during the interview, it appeared that

¹²⁹ Comment made by Chauvel in his own words.

¹³⁰ The comparison provided by Dunne in his own words.

Hodgson preferred an ETS over a Carbon Tax. Thus, a further discussion was stimulated as to the reason for committing to a Carbon Tax rather than an ETS in 2002.

The discussion was initiated with the reason for not implementing an ETS in 2002, when Hodgson favoured an ETS approach. There was uncertainty in the price of carbon, which had been undiscovered internationally. Europeans were not involved in the ETS, and the US was “*looking like they were going to throw the Kyoto Protocol out the window*”,¹³¹ which became a reality when George W. Bush became the President of the US, thereby resulting in a period of uncertainty.

Thus, NZ decided not to implement an ETS when the price is potentially so hugely volatile due to the uncertainty in the price of carbon. Consequently, markets were non-existent, and the future of NZ businesses would be very risky if they were forced to a non-existent international market, which would be unfair on domestic industries. As a result, the second best approach was adopted, an uncapped, Carbon Tax approach, that had certainty in the price of carbon. However, this caused uncertainty on the amount of reduction of the level of GHG emissions.

In addition, Hodgson explained that the uncertainty in the carbon price was primarily due to the ‘hot air’ that the Russians had. The Russian sovereign economy collapsed immediately after the establishment of the ‘base year’ for the Kyoto Protocol in 1990, creating a whole lot of republics that were not united. As a result of the collapse, all industries went bankrupt, decreasing the Russian emissions enormously, way below their 1990 levels. This led to a huge credit that the Russians could either put on the market to make profit if the price of carbon

¹³¹ A statement made by Hodgson in his own words as part of his response.

was acceptable and adequate or, leave it off the market and carry it forward into the second commitment period hoping that there would be one with the expectation of a higher carbon price and therefore more profit. However, their actions were unknown, and therefore in the ‘hot air’ is the amount of credit that they had.

This led to another questionable thought – the likely decision with the uncertainty of the carbon price in 2001/2002. A question was asked on whether an ETS would have been implemented instead of a Carbon Tax if the price of carbon was certain back in 2001/2002. Without any hesitation, Hodgson’s response was a ‘Yes’. The response was publicised in an article, together with then Labour-led Government’s intention of imposing a Carbon Tax as a step towards an ETS – initially implement a policy for a carbon tax, developing it into an ETS. However, it did not get enough votes to be legislated in 2005, and industries persuaded then Labour-led Government to go for an ETS rather than a Carbon Tax. Thus, an ETS was implemented by Parker who took over the responsibility of the portfolio, and he developed the all-gases, all-sectors ETS, which was passed in 2008.

Subsequently in November 2008, the National Party won majority of votes and seats at the NZ general election, and decided to weaken the ETS to maintain the ‘standard of living’¹³² for individuals and businesses due to the ‘noise’ made by the polluters, although it is primarily to do with a wealth allocation rather than a ‘standard of living’ – with a weak ETS, taxpayers are seen to be losing out as polluters are subsidised by taxpayers; however, with a strong ETS, there is *“a less cross-subsidy to the polluters from the taxpayers”*,¹³³ which allows for taxpayers to lose out less. Despite the on-going, regular reviews, Hodgson did not believe the ETS will become stronger, although it may possibly get weaker, as the National Party does

¹³² Hodgson claimed that ‘Standard of living’ is not quite ‘the word’, because with an ETS that has a bit more teeth, more money can be made by reducing emissions.

¹³³ Comment made by Hodgson in his own words.

not want to be world leaders in this matter; they would rather be world leaders in something else.

Upon finalising the interview with Hodgson, one last issue was raised – would it be easy to impose a Carbon Tax if no other countries had one imposed already. In reality, by 2001, other countries had a Carbon Tax from time to time – Norway had one, and some of the other Europeans countries had a very weak Carbon Tax. Then there was the excise tax on fuel, which varies around the world – low in America, medium in NZ and high in Europe. However, with the ongoing debate on whether NZ should have an ETS when all our major trading partners do not have one, the researcher was curious about whether it would be reasonable to impose a Carbon Tax or not if NZ was the first country to do so. Hodgson's response was simple:

Let's imagine there were no carbon taxes anywhere around the world, it would still be easy to put one in NZ because it is predictable. The government comes along and says 'we are going to tax you this amount of money for this level of activity' and that is it. So the government tax people, they tax people for making profits, they tax people for buying petrol, cigarettes, and goods and services etc. and we will just have a Carbon Tax as well. It is easy to do it, and you do not wreck the economy by putting a tax – everyone claims that you wreck the economy that it makes. Well, no not really, it does not stack up to econometrics, it does not stand up to proper economic model, it is just wrong. But people debate that.¹³⁴

5.7.3. Recommendations of Any Other Adequate Methods

While interviewing Fitzsimons, she recommended a potentially adequate alternative method other than those proposed under the existing climate change policies – the notion of a 'Citizen's Dividend'. A 'Citizen's Dividend' is an improved approach to provide a tax-free threshold to the entire population. The dividend will be a small amount of money, which will be provided to individuals. In the case of taxpayers, the amount will be credited against their

¹³⁴ Response provided by Hodgson in his own words.

tax payment, and non-taxpayers or low-taxpayers will receive dividends in the form of ‘cash’. According to Fitzsimons, the ‘Citizen’s Dividend’ approach is a reward system which will strongly incentivise individuals as it is assumed to impact ordinary individuals as follows:

*I am getting this many dollars a year as my dividend from the carbon tax, if I waste energy, I am going to be paying more than what I’m getting in carbon tax. But if I use energy efficiently or if I use clean energy then I can make a profit on this. I will get more back in cash dividend than what I will have to pay as a Carbon Tax.*¹³⁵

Another benefit of this approach is the ‘fairness and equality’ issue. A solo parent, to whom the next dollar really matters, gets the same amount as the millionaire. It will be ‘socially equal’ as the millionaire will most likely pay more tax as a result of greater energy use. Ultimately, Fitzsimons presumed that this will attract public support as the entire population will get ‘dividends’ from saving energy and suggested that the amount collected in the form of a Carbon Tax can be spent as an investment in clean energy projects.

In addition, she added that the ‘citizens’ dividend’ should only be given out to individual adults, as they would not get any benefits from paying the Carbon Tax. Under the current National’s modified-ETS, only businesses are entitled to free allocations, therefore households should be entitled to the ‘Citizen’s Dividend’, which could be used to make wise choices, for example, purchasing a more efficient car. Although purchasing an efficient car costs a lot in of capital, huge savings can be made on petrol costs. Consequently, providing individuals with a ‘citizens’ dividend’ will give freedom to make choices, which will provide stronger incentive to reduce other GHGs.

¹³⁵ Recommendation provided by Fitzsimons in her own words.

5.8. Opinions from the Current Minister Responsible for Climate Change Issues

Smith, speaking for himself as the Minister Responsible for Climate Change Issues and also for Mr. Craig Foss (a member of the Emissions Trading Scheme Review Committee and a member of the National Party), sent his response through a written letter, because he could not participate in the interview. He explained, in his own words, reasons for implementing an ETS, and for the modification, whilst providing references to public information relating to reasons for choices made in terms of climate change policies.

The purpose of the National-led Government implementing an ETS is the consistent and steady approach required by the issue of climate change. It is perceived that the ETS “*will provide strong incentives for planting trees, investing in renewable energy and making that transition to more efficient technologies*”.¹³⁶ Concerning the reason behind the modification, Smith’s logic is in line with most other respondents, that the revision was to ‘*soften the impact*’, which consequently slowed the pace of the NZ ETS, allowing for more generous phase out of allocations for trade-exposed industries. The full letter is laid out in Appendix 26.

5.9. Discussion of Qualitative Outcomes

This section provides a comprehensive discussion on the topics discussed, including perspectives of the researcher. The qualitative outcomes gathered through a series of semi-structured interviews were discussed on a thematic basis and themes were extracted from interview questions, including those additional topics that were discussed during particular interviews without any prior prompting. The interviewees provided various perspectives on these issues, some of which were based on their personal experiences and viewpoints, while others were based on their political standpoints. Themes discussed were:

¹³⁶ A statement made by Ms. Fitzsimons in her own words as part of her discussion.

- Perspectives on the climate change policies;
- Opinions on whether the current NZ ETS is more voucher-like than a trading system;
- Behavioural-effectiveness of the NZ ETS and a Carbon Tax;
- Opinions on whether there was a need to modify the existing NZ ETS;
- Future implications – where to from here in terms of climate change policies;
- Export costs;
- The reason for imposing a Carbon Tax instead of an ETS in 2002; and
- Recommendation on alternative methods.

Overall, there is a general consensus that NZ should not be a world leader in resolving the global climate change issue, although there is a definite need to be responsible for NZ's share of the global catastrophe. As confirmed by the entire group of interviewees, NZ is insignificant on a world scale, with emissions of 0.2 percent of the global GHG emissions level. Thus, although it is ethical for NZ to be accountable for its share of the global emissions, NZ will not have the ultimate power to lead and influence the world in regards to reducing GHG emissions.

Another fundamental point addressed by the entire group of interviewees is that no matter what the interviewees' perceptions may be, the global trend is leaning towards an ETS, thereby suggesting that NZ should retain its ETS. However, all interviewees agree that the NZ ETS, in its current form, will not be effective in incentivising behaviour-change to reduce GHG emissions. Yet, Dunne believed that there is a bright side to this approach, while Fitzsimons, Katene and Boscawen suggested that in practical terms, the current National's modified-ETS is not the 'right' tool, at least it is the 'wrong timing'. Many of NZ's major trading partners do not have an ETS in place, which will penalise NZ's domestic exporters

and traders. Thus, as of the end of 2010, until a ‘global ETS’ is introduced, the Carbon Tax is perceived to be a fairer, simpler, more accurate and a potentially more adequate approach to take.

One argument that can be made against the introduction of a ‘global ETS’ from the researcher’s perspective is varying governmental systems. Different countries, and even different states in some cases, have different government/parliamentary systems. In particular, the basis of NZ’s parliamentary system is on the principle that power is allocated across three divisions: the Parliament, the Executive and the Judiciary, where the “*Parliament makes the law, the Executive, (also known as the Government), administers the law, and the Judiciary interprets the law through the courts*” (New Zealand Parliament, 2006, p 2).

The NZ Government is formed from a democratically elected House of Representatives, which is elected using the Mixed Member Proportional (MMP) representation voting system. Each elector has two votes — one for a local member of Parliament and one for a preferred political party. Political parties are represented in Parliament in proportion to the share of votes each party obtained in the party vote during the general election held every three years (New Zealand Parliament, 2006). This system allows the NZ public to ‘have their say’ on the most adequate representative of their region in Parliament, and therefore it can be assumed, with relatively high level of confidence, that politicians are a fair representative of individuals and businesses.

However, this system will vary across different states and/or countries, creating difficulties in implementing and administering a successful ‘global’ ETS, in addition to creating difficulties in generalising the outcome of this study to that of other contexts. A relevant evidence of the

above statement is the comment made by Chauvel that the fact the NZ ETS is not sectorally linked with the EU ETS is a major lost opportunity. This is because NZ and the EU have a trading environment, where the EU consists of several countries that predominantly trade with each other, while NZ is a sole country trading with countries without an ETS. Thus, it makes a more logical sense for the ETS to be adapted to suit a country's own culture and legislation, which is no different to having a separate ETS as they current stand.

One of the primary reasons for the current National's modified-ETS being inadequate, as suggested by all respondents except for Wagner from the National Party, is the emergence of substantially weakened policy. All interviewees except for Wagner agreed with the statement made by Bertram and Terry (2008), that the weakened ETS policy lost its 'cap-and-trade' characteristics. This process created the policy to be more like a tax 'dressed up' as a trading scheme as Chauvel described it, consequently recommending a need for a stronger ETS to be implemented, similar to the one introduced by then Labour-led Government in 2008. High export costs are another fundamental consequence of introducing an ETS. Being the only country to have a comprehensive, all-sectors and all-gases ETS, it is important to address this issue, as NZ has competitive advantage over trading agricultural and farming products. Thus, the researcher perceived that while NZ needs a stronger ETS to retain its 'cap-and-trade' characteristics, it is essential to review and modify the ETS appropriately in order to lessen the penalties on NZ's domestic consumers and traders.

Furthermore, the researcher criticised the price increase of energy, when NZ already has over 70 percent of renewable energy use. The public should not necessarily pay – polluters should be incentivised to invest in activities that produce fewer emissions – and it should be the emissions-intensive polluters that are responsible for their actions, not the entire energy sector.

A comparative example of this is smoking, where a non-smoker should not be paying for hospital bills of the smoker.

NZ is the only country in the world that has gone through several implementation and modification stages. The first was the initial attempt to introduce a Carbon Tax, which was abandoned by strong oppositions from businesses including forestry sector. The next move was the implementation of the NZ ETS by then Labour-led Government, which was modified by the current National-led Government. Wagner, Smith, and Foss, and Dunne were all in support of the view that the modification was required to ‘maintain the balance’, with an aim to retain our international position. However, a noticeable point is the influence political standpoints have on interviewees’ perspectives. All interviewees in favour of the modification, except for Dunne, are members of the National Party (the proponent of the modified-ETS). According to Fitzsimons, the National Party did not have the intention to reduce emissions at all, and the major reason for the weakening of the scheme is the promise made to large emissions-intensive organisations in order to be elected. She commented that:

*We kept asking the National-led Government on how much emissions would be reduced, and they would not say. It was never going to be all that expensive, but they have weakened it further... all the National-led Government is trying to do is look as though they are doing something.*¹³⁷

Moreover, Fitzsimons claimed that all the emissions that have reduced over the last year are probably due to the reduced economic activity as a result of the recession which would outweigh the effect of the ETS. In addition, although Dunne supported the modification, he believed that the future is unpredictable and therefore whether the NZ ETS survives in its current form or not is open for debate. Hence, it appears to be fair to conclude that it was not

¹³⁷ Comment made by Fitzsimons in her own words as part of her discussion during the interview.

necessary for the National-led Government to weaken the ETS, as it only resulted in implementing an ineffective scheme by taking small, incremental steps.

Another extensive comparison was made between the perspectives of the politicians and the perception of Working Group on CO₂ Policy (WOGOCOP) (1996) 15 years ago, in order to examine the possible change of perception over the last two decades. However, the perception did not appear to have changed radically with the increase in the research and development. WOGOCOP (1996, p 83) suggested that:

... if greater reductions in emissions are sought, then the gains from a two-sided instrument are likely to exceed the costs. Tradeable Carbon Certificates, [now known as an ETS], which must be surrendered for emissions and can be earned for absorption, would then be preferred.

This implies that despite the increase in knowledge or a change in circumstances over the last few decades, an ETS is the preferred approach (theoretically as it currently is), based on the rationale that gives certainty of emissions reduction and the trading aspect, ‘paying for emissions and earning for removals’, adds value to incentivising reductions in emissions. However, practicality may be a different question – a Carbon Tax is a more favourable approach in practical terms, given that price certainty is one of the fundamental aspects in business.

Another factor worthy of consideration as perceived by the researcher is that in any situation, these climate change policies will not have a sole effect on the economy. There will be other possible economic circumstances such as the global recession and changes in other tax structures, for example, an increase in the Goods Services Tax (GST) rate or a decrease in the income tax rate (Westpac, 2011). Thus, the decrease in the level of emissions cannot be solely

measured based on the impact of climate change policies. Regardless of any other influential factors, the existence of these policies will increase the awareness of the significance of climate change on individuals and businesses.

Definitely, businesses have a bigger impact on the environment than individual households, but as Wagner commented, businesses start off with a household: making little steps from the households to large corporations will indeed make a difference to the environment. With respect to Wagner's statement, a few recommendations on the design of the ETS are discussed in the following subsection (Chapter 5.9.1).

5.9.1. Justification for 'No Further Steps' Taken by the NZ Government, and Recommendations of Possible Alternative Designs

Upon examining never-ending debates surrounding the issue of reviewing the adequateness of proposed climate change policies, one questionable note can be contemplated – 'Is the NZ Government's commitment towards resolving the global climate change issue sufficient to improve NZ's position?' The researcher does not believe so.

According to Watkin (2009), NZ has surprisingly high percentage of 'climate change deniers' – those that do not believe in the existence of climate change, and its resulting impacts on the NZ environment. With this high percentage of climate change-averse individuals coupled with the NZ Government being prudent on associated-risks, Watkin (2009) suggested that a political pragmatist would believe that the current progress of the NZ Government towards dealing with climate change "*amounts to sure and steady progress*" (Watkin, 2009, p 1). However, it appears that the science is demanding more, minimum of a 40 percent reduction, in order to maintain the increase in the global temperature to less than two degrees.

On the contrary, arguments exist on humanity's willingness to 'gamble' the future of the planet. As evidenced in Figure 4.3 in Chapter 4.2.2, it is probable that the level of GHG emissions will increase to unsustainable levels if no action is taken to resolve climate change issues in the near future. However, Professor Sir Peter Gluckman, the Prime Minister's Chief Science Advisor in NZ, published a document explaining (Watkin, 2009, p 1):

We cannot gamble the future of the whole planet on the low probability of that occurring. We do many things in life that are based on the balance of probabilities, for example we think it is prudent to insure our houses and wear seat belts in our cars not because we plan to have a fire or a crash, but rather because we are weighing the cost of the insurance premium or the minor inconvenience of putting on the seat belt against the significant risk of damage to our finances or ourselves if those events were to happen. It is the same with climate change – the collective wisdom of the scientific community is that action is needed to address global warming because without action the potential risk to the planet and us is too high.

In the modern society, the reality is that most individuals are willing to be 'insured' for the 'extra protection' against a 'remote possibility' of an unfortunate event. Gluckman related this realism to the Environment, by comparing climate change regimes to an insurance policy. Nevertheless, one questionable thought was raised by the researcher: Is a Carbon Tax or an ETS adequately designed to be an insurance policy for the current and future generations? If not, did the NZ Government take any 'further actions' to improve the situation?

Throughout this thesis, advantages and disadvantages of climate change regimes were discussed. In particular, Hodson provided his understanding of the two policies, comparing their benefits and costs, which are set out in Table 5.1, in Chapter 5.2. Benefits of a Carbon Tax are: its relative simplicity and predictability compared to an ETS due to certainty over the price of carbon, whilst the ETS is harder to implement because of its unresolved issues surrounding allocation and uncertainty over the price of carbon. Yet, the ETS has its benefits,

the existence of a cap allows for a 'cap and trade' system, and has environmental certainty on the emissions reduction.

With consideration to advantages and disadvantages of each policy, there are endless political, social controversies as to the adequateness of the policies. However, neither the NZ Government, nor any other agencies are considering modifying the basic structure of the policies. Instead, they are contemplating changes to the negotiated provisions (Ministry for the Environment, 2008). The fundamental purpose behind this can be assumed to be 'simplicity' and 'policy problems'. As noted by Weitzman (1974), there is no limitation on the use of instruments to regulate the release of emissions, for example, a schedule of prices or a 'twist' of a two-tiered price system in addition to a correlation of prices and quantities. However, a cost-benefit analysis proved that the benefit of 'simplicity' outweighed the cost of 'inefficiency', resulting in focusing on pure 'price and quantity based' tools.

In the researcher's opinion, there are several possible ways this situation can be improved. The first approach is the reintroduction of a Carbon Tax. It was explained by Hodgson that the only reason the Carbon Tax was abandoned from the policy perspective, is the issues surrounding uncertainty of carbon price in 2002. Thus, although not recommended by Hodgson, the Carbon Tax could be functional if the price of carbon is known. The existence of the current international carbon market solves some of the issues surrounding the uncertainty of the carbon price issue. To overcome the uncertainty of environmental outcome, a hybrid system – a tailored system combining price and quantity features – is an idealistic approach. The Government could place price ceiling or price floor on the tax in such a way that penalties can be imposed for non-compliance. Hepburn (2006, p 230) confirms the practicality of this approach by suggesting that:

Often the penalty is proportional to the difference between actual performance and target (for example, proportional to emissions in excess of emissions target). Then, if payment of the penalty is an alternative to compliance, the penalty is effectively a price ceiling in a hybrid system. In contrast, if payment of the penalty does not amount to compliance – and the firm is still obliged to comply as soon as possible – then the scheme is not directly equivalent to a conventional hybrid system.

However, re-imposing a Carbon Tax at this point in time may not be a practical approach as the international preference is on an ETS in the future, and it would make sense if NZ retained its ETS structure, with further modifications as necessary. Thus, a second recommendation is a hybrid system based on the ETS structure. In order to improve the situation and effectively reduce the level of GHG emissions to achieve the aim as ratified to the Kyoto Protocol, an approach that can overcome major disadvantages of an ETS must be introduced.

The fundamental reason for the current National's modified-ETS failing to get support from politicians and businesses is the inability to regulate the emitters to pay, and uncertainty over the price of carbon. As Fitzsimons commented, businesses would require price certainty to invest. Therefore, the current notion of the ETS being 'taxpayer, you pay, instead of consumer, you pay' is unacceptable. However, with the hybrid system, the Carbon Tax feature will allow the emitters to be accountable for their actions, have certainty over the carbon price, and the existing cap feature of the ETS will allow for businesses to monitor their emissions. In addition, the 'user pays' concept will restrict the government subsidies on heavy emitting industries, and all businesses are fairly-affected by the climate change policy.

However, a fundamental disadvantage of a proposed hybrid system is evident since a Carbon Tax appears to be more transparent while an ETS appears more likely to be subjective and more easily manipulated. Thus, there is a possibility of this hybrid system causing an increase

in opacity with increased complexity, while retaining the ETS's subjection to potential corruption. Perhaps it is necessary, if the National-led NZ Government was to consider this aspect, to research and develop an additional feature to protect against this – something unseen in either the Carbon Tax or the ETS.

Another feature that the researcher perceived to be worthy of further consideration is Fitzsimons recommendation of a 'Citizen's Dividend' system. The dividend is a reward system, where individuals will receive a small amount of money upon saving emissions in the form of cash, which will incentivise tax-paying individuals strongly. Therefore, this feature, when in-built into the chosen climate change policy, would provide a tax-free threshold to the entire population, which will incentivise and provide motivation to individuals to change their behaviour in order to maximise the level of emissions reduction. Effectively, in order for these approaches to be legitimately considered and enforced, further research on its theory, practicality and its advantages and disadvantages is also required.

Ultimately, although some political pragmatics believed that NZ is in line with the international progress in terms of achieving its aim to contribute in reducing the global emissions, the researcher perceived that as long as there are political parties that deny the existence of climate change and global warming, the NZ Government still has a lot of 'work' to do in order for NZ to participate in getting 'adequate insurance' for the protection of humanity's only home – 'the planet earth'.

5.10. Chapter Summary

This chapter examined the political perspectives of climate change policies. Politicians involved with the implementation and the review process of the climate change policies were

interviewed as a representative of the NZ public, based on the perception that politicians are a reasonable representation of NZ citizens. Interviews were conducted based on various topics surrounding the history of climate change policies in NZ, the development of the policies and its future implications, to provide a comprehensive argument as to which climate change policy is perceived to be more adequate in the NZ context.

Diverse opinions were raised regarding the effectiveness of the policies, where a number of the interviewees perceived the Carbon Tax to be a better tool for emissions reduction compared to an ETS. This is because of the certainty of carbon price, where an ETS is deemed to have certainty over the environmental issue of emissions reduction yet uncertainty over the carbon price. However, for a successful trade, certainty over the price is more crucial. Others perceived the ETS to be more effective because of the flexible characteristics, with the existence of a cap and the ability to trade.

In the end, it is certain that a policy of some sort is necessary and the vital point to consider is to ensure that NZ is in line with the rest of the world – especially with its major trading partners – and that the design of the policy is adequate to incentivise individuals and businesses to be aware of the situation and make changes to reduce GHG emissions. Profoundly, the researcher is in support of Chauvel and Hodgson's perspective that it is not the 'tool' that matters, but the way it is designed. Regardless of how simple and fair the Carbon Tax approach may be, if it is not designed effectively to incentivise emitters any better than the complex ETS approach, an ETS will be the adequate regime to implement. Politicians from across government will continue to work in collaboration to review and improve the ETS for the benefit of NZ citizens and domestic producers, but further research and development is necessary to introduce an improved design which will provide proper

incentives to change behaviour and reduce emissions. Examples of improved designs were discussed in depth in Chapter 5.8.

On a concluding note, whatever the tool, and whatever the design, it is certain that this global ‘catastrophe’, as seen by all interviewees except for Boscawen, is not to happen in the next millennium, but it is a matter that needs to be solved within the foreseeable future for the benefit of the current and future generations to come.

Chapter Six:

Conclusion

6.1. Concluding Thoughts and Recommendations for Future Research

Global warming and climate change issues became a ‘hot topic’ over the last few decades, and evidence of ‘crowded planet gone bad’ is overflowing (IPCC, 2007; and Sachs, 2008). Thus, in order to prevent the level of emissions from increasing any further, the Kyoto Protocol was introduced for countries to ratify, to mitigate their emissions, and to be accountable for their share of the global crisis. To achieve this, two distinctive policies were debated, discussed and proposed in New Zealand (NZ) – a Carbon Tax and an Emissions Trading Scheme (ETS). It is evident that there are numerous studies on the effectiveness of these policies in other states and countries, although there is only a handful of media releases on the effectiveness and the adequateness of these policies in the NZ economic environment (Scrimgeour *et al.*, 2005; Kopp, 2007; Lee *et al.*, 2008; Convery, 2009; Humphreys, 2009; and Metcalf, 2009).

There is no doubt in the researcher’s mind or in most of the politicians’ minds, that global warming and issues that climate change brings need to be addressed in the near future. At the current rate, it is certain that policies should be legislated to manage and regulate individuals’ and businesses’ behaviour in order to decrease the amount of emissions currently being released. Although it is true that “*when it comes down to problem solving, [humanity] remain weighed down by cynicism defeatism and outdated institutions*” (Sachs, 2008, p 35), NZ should demonstrate the seriousness of this global crisis, and the urgent need for it to be appropriately addressed, by being responsible for NZ’s share of the escalating level of GHG emissions. In particular, environmentally sustainable action is required to retain the current state of the environment for the benefit of the current generation and those to come.

In addition, NZ is the only country that has gone through a phase of debating the merits of introducing a Carbon Tax but ultimately introducing an ETS, and therefore it is important to study the adequateness of these policies in the NZ environment. Thus, in order to examine the reality of the ‘crowded planet gone bad’, this study aimed to evaluate the behavioural-effectiveness of the climate change policies that were introduced in NZ, investigating the adequateness of those policies in the NZ economic environment.

In order to achieve this, a case study was conducted with a focus on the NZ context. Previous literature on the Carbon Tax and the ETS was overviewed to collect general, yet in-depth information on the history of climate change issues and policies. In addition to information gathering, quantitative and qualitative data collection and analyses were conducted to enhance the quality of the research. Quantitative research was conducted to analyse the statistical effects of the policies, in particular, to examine the numerical changes in the level of GHG emissions to evaluate the statistical-effectiveness of the policies. A statistical analysis was carried out in three different categories: historical emissions (1990 – 2008), emissions ‘with’ and ‘without’ climate change policies during the first commitment period (CP1), and emissions post-2012 – which was proved to be uncertain. It can be concluded that historically there was a significant increase in the level of GHG emissions, which motivated the regulators to ratify to the Kyoto Protocol, and to implement a policy to restrict and reduce GHG emissions.

Essentially, by continuing to release GHG emissions at an increasing rate without any form of policy implementation, it is certain that emissions would increase in the future, to a rate that humanity cannot address. Therefore, it is certain that any type of policy needs to be implemented in order to restrict and stabilise the level of emissions. Although the implications

of a Carbon Tax are difficult to measure because of its non-physical existence in NZ, projections suggested that this policy could have decreased approximately 13m tonnes of emissions if it was imposed. On the other hand, the NZ ETS was implemented in July 2010; however, because of the short timeframe, it is too early to assess the actual effects of this policy. Nevertheless, it is projected that the National-led Government's (National's) modified-ETS will be less effective in changing individuals' and businesses' behaviour to reduce the level of GHG emissions, as a result of substantially weakened provisions. This appears to be a political manoeuvre in order to satisfy the lobbying efforts of large organisations, whilst also enhancing the National's chances of re-election. Ultimately, it remains uncertain what the future emissions are going to be, whether the current National's modified-ETS will do its 'job' properly and reduce the amount of GHG emissions released, or whether there will be another modification at the next review meeting in order to strengthen the policy.

To further enhance the results obtained from the quantitative research, a qualitative research was conducted through carrying out a series of semi-structured interviews with politicians directly involved in the introduction, implementation and/or revision processes of the Carbon Tax and the NZ ETS policies. In addition to overviewing submissions received from individuals and organisations, politicians from various parties were interviewed with an assumption that they are a representation of individuals and businesses in NZ. As pointed out in Chapter 5.8, the reason behind this assumption is that NZ's Mixed Member Proportional (MMP) voting system allows for the NZ public to elect the most preferred politician to represent their region.

The results from the qualitative research highlighted the importance of the decision from other countries, especially NZ's major trading partners – their opinions outweigh the perceptions of the politicians, as NZ is considered to be a small country with no influential power on a global scale. A group of politicians believed that the Carbon Tax is more effective, while others believed that an ETS is the answer to this global problem. Yet, the general consensus of those interviewed is that 'it is not the tool but rather, it is the design that matters', as a Carbon Tax can be well-designed to incentivise individuals' and businesses' behaviour, while an ETS can be very badly-designed, and fail to do the same. In addition, the unanimous view of the interviewees is that NZ should not be a leader, but a responsive follower, and therefore should retain its ETS until other countries implement their chosen policies. However, the NZ ETS in its current state is definitely not the 'best' solution for the global crisis.

To conclude, NZ is only at the early stages of implementing its climate change policy of 'making a difference' to reduce the level of GHG emissions, and becoming responsible for its share of the global crisis. From the researcher's perspective, the size of a country's economy does not matter when assessing the viability of being accountable for its individual share of the global problem. Hence, if NZ can lead in trying to 'make a difference' by influencing other countries to be aware of the global crisis and the need to reduce their level of GHG emissions, NZ has done its job.

In terms of implementing adequate climate change policies, it is definitely necessary to observe and learn from decisions made by other countries. However, it is true that the type of policy to be implemented is not the fundamental factor to consider, but rather it is 'how' those tools are going to be designed. Yet, having projected a high feasibility in an 'ETS future' for NZ, it is recommended that NZ should retain the ETS policy approach, with annual revisions

to modify and re-evaluate the policy to ensure it ‘properly operates’ in terms of incentivising behaviour-change. Through examining the outcomes from the quantitative and qualitative research that has been conducted, it is clear that the current National’s modified-ETS is not currently in the right shape or form in order to effectively incentivise individuals and businesses to change their behaviour.

One other important factor to consider is that the ETS is not the sole policy that might influence individuals’ and businesses’ behaviour. Over the last few years, NZ was under a global recession which has had a substantial influence on the NZ and global economic market, reducing the number of transactions, and in turn, the level of GHG emissions. Another change in NZ during 2010 was the increase in the GST rate, and the decrease in the individual income tax rates and thresholds. These changes in tax policies are expected influence consumer spending patterns, which would have an impact on the level of economic activity in domestic markets (Westpac, 2011). As a result, the level of GHG emissions released would change accordingly. Ultimately, as exemplified in the above statement, the reality is that the effects of the ETS are not able to be calculated on its own, without considering various other influencing factors, such as: the state of the economy; improved efficiency; and changes in demography and in environmental conditions (California Environmental Protection Agency, 2010b).

Moreover, with NZ at the early stages of implementing a climate change policy, there are still unresolved issues. One of the fundamental issues is the debate over the inclusion of agriculture. Currently, agriculture is scheduled to enter the scheme in 2015. However, some argued that agriculture sector should enter the ETS earlier because 49 percent of the total emissions are emitted from agriculture. Nevertheless, others argued that because agriculture is

NZ's major exporting industry, it should not be included in order to protect NZ's domestic producers and exporters from losing trade with other countries without an ETS. It is worthy to note however, that this will not be an issue provided that NZ is to become a fast follower when its trading partners decide to take an alternative route. There are several other concerning matters that needs to be resolved; for example: technologies are not available to accurately measure farm emissions; the inclusion of international sea and air transport in the ETS; basic issues around administration; the risk of mismanaged or poor implementation; and finally, opportunities for carbon fraud.¹³⁸ It is hoped that these issues will be addressed at the next revision meeting in late 2011. Ultimately, the researcher perceived that until all unresolved issues are solved, it is best for NZ to retain its ETS policy. Effectively, the policy would correctly reflect the necessary provisions to incentivise and influence decision making processes of individuals and businesses, whilst maintain NZ's relationship with other countries.

This study suggests several ideas for future research, including: a longitudinal study of the effectiveness of the ETS. As claimed by Hodgson, it is capital investments that 'make the difference', suggesting that behaviour-change of large organisations are essential for reducing GHG emissions. As such, it would be worthwhile to conduct a longitudinal study on the perceptions of large organisations on the ETS, to examine their beliefs on what the ETS ought to achieve, and whether the policy can be modified to change their perceptions to enhance emissions reduction. Interviews with key individuals within the major sectors such as energy, transport, export, agriculture, and tourism can be conducted to achieve this, and in studying the perceptions of households, focus groups can be formed to obtain some representativeness in the sample of individuals. This potential future research will enhance the outcomes

¹³⁸ Carbon Fraud is the use of buying and selling carbon credits for fraudulent purposes – for example, “*buying and selling emissions allowances across borders in order to avoid paying Value Added Tax (VAT)*” (Probe International, 2009, p 1).

obtained from this study, and influence the future of the NZ ETS. Other research areas include investigating Corporate Social Responsibility (CSR)-related issues surrounding the ETS; examining the social discourse on the factors that actually change individuals' and businesses' behaviour; and a longitudinal, quantitative research examining the numerical effects of the NZ ETS, by analysing the actual change in emissions using the official figures released.

Whilst “*meeting the growing demand for energy while reducing CO₂ emissions may seem like an impossible equation*” (Sachs, 2009, 71), it is believed that the impossible will gradually become possible, with continuous research and development in social, economic and environmental accounting, together with the ETS and Carbon Tax related issues. Effectively, improved policies will be developed for maintaining and eventually reducing the level of GHG emissions for the benefit of not only the current generation, but those many more to come.

6.2. Key Assumptions and Limitations

The primary assumption made in conducting this research is the potential implementation of a Carbon Tax in NZ. Despite ongoing global debates of the effectiveness of a Carbon Tax in comparison to an ETS, the NZ's National-led Government currently has no intention of considering abandoning the ETS in order to implement a Carbon Tax. However, for the purpose of this research, it is necessary to consider the possibility of the reintroduction of a Carbon Tax in NZ in order to examine the potential effects of a Carbon Tax on individuals' and businesses' behaviour, with respect to reducing the level of GHG emissions.

Another assumption is that the National's modified-ETS remains in place until the end of CP1 in 2012. This research reflected the effectiveness of the National's revised version of the ETS. Therefore, in evaluating the ETS through measuring projected cash flows for the period, it is assumed that the National's modified-ETS remains in place indefinitely, and that no further substantial amendments will be made.

This study assumed that the calculated projected figures are a reasonably accurate reflection of actual future performance. The projected figures are only estimates of the intended future performance of the ETS or a Carbon Tax. However, there is a possibility that these figures will not accurately reflect future performance given that there are various other factors, for example, economic recession, and tax rate changes that need to be considered, limiting the ability of establishing the 'additionality' of the level of emissions. Thus, it would be feasible to offset the effect of the tax through changing other existing tax structures.

Furthermore, the use of projected figures to evaluate the effectiveness of climate change policies is another limitation. In relation to the ETS, projected figures are calculated to evaluate its future effectiveness. Although the figures were calculated using reliable historic figures and future estimates, it is questionable whether the projected figures will accurately reflect future events. Similarly, with a Carbon Tax, only predictions and estimates can be made in order to evaluate the effectiveness of such policy since it is not currently operative in NZ. Thus, whether it reflects actual data remains open to speculation.

This study was based on the political perspective, intending to obtain insights from the members of the NZ Parliament with professional knowledge in the climate change issues. However, despite considering submissions from individuals and businesses, the fundamental

assumption was that the politicians from various political parties are a fair representation of NZ citizens, in answering the research question related to individuals' and businesses' behaviour. This is due to the impracticality of interviewing a random sample of the entire NZ population. Nonetheless, this assumption is also a limitation, in that opinions of the interviewed politicians may not represent opinions of individuals in NZ on climate change issues. Yet, conducting interviews with the members of Parliament with knowledge in climate change issues was by far the 'best' way to make some broad generalisations.

Finally, the fundamental limitation of undertaking a case study type research is the inability to generalise to the entire population, which has an impact on the adequateness and reliability of this research. Whilst this study provided in-depth knowledge about the effectiveness of the climate change policies in a NZ context, the outcome from this research cannot be generalised to other countries.

Chapter Seven:

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Chapter Eight:

Appendices

Appendix 1: List of Annex 1 and II Countries

List of Annex 1 Countries

The industrialized countries listed in this annex to the Convention which were committed return their greenhouse gas (GHG) emissions to 1990 levels by the year 2000 as per Article 4.2 (a) and (b). They have also accepted emissions targets for the period 2008– 2012 as per Article 3 and Annex B of the Kyoto Protocol. They include the 24 original OECD members, the European Union, and 14 countries with economies in transition. (Croatia, Liechtenstein, Monaco, and Slovenia joined Annex 1 at COP-3, and the Czech Republic and Slovakia replaced Czechoslovakia.).

 Australia	 Greece	 Norway
 Austria	 Hungary	 Poland
 Belarus **	 Iceland	 Portugal
 Belgium	 Ireland	 Romania
 Bulgaria	 Italy **	 Russian Federation **
 Canada	 Japan	 Slovakia **
 Croatia **	 Latvia	 Slovenia **
 Czech Republic **	 Liechtenstein **	 Spain
 Denmark	 Lithuania	 Sweden
 Estonia	 Luxembourg	 Switzerland
 European Union	 Malta	 Turkey **
 Finland	 Monaco **	 Ukraine **
 France	 Netherlands	 United Kingdom
 Germany	 New Zealand	 USA

(UNFCCC, 2010a p 1; and 2010c, p 1)

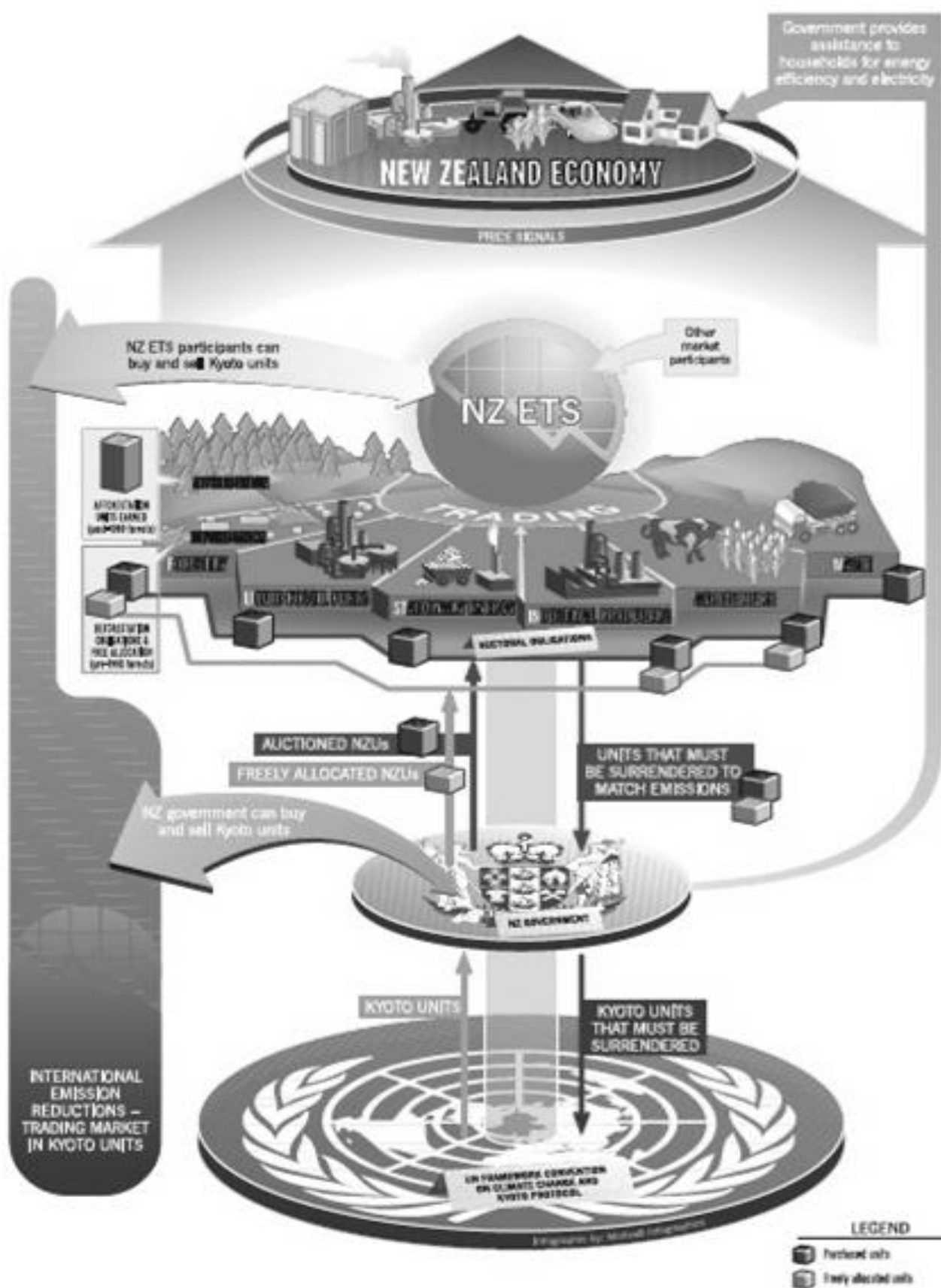
List of Annex 2 Countries

The countries listed in Annex II to the Convention have a special obligation to provide financial resources and facilitate technology transfer to developing countries. Annex II Parties include the 24 original OECD members plus the European Union.

	Australia		Italy **
	Austria		Japan
	Belgium		Luxembourg
	Canada		Netherlands
	Denmark		New Zealand
	European Union		Norway
	Finland		Portugal
	France		Spain
	Germany		Sweden
	Greece		Switzerland
	Iceland		United Kingdom
	Ireland		USA

(UNFCCC, 2010a, p 1)

Appendix2: Operational Process of the NZ ETS



(Renowden, 2007)

Appendix 3: Summary of the Changes to the NZ ETS

Summary of Government Amendments

The major amendments to these provisions contained in the Supplementary Order Paper (SOP) are as follows:

Forestry and Fisheries Allocation

- Amendments are made to the provisions governing the entitlement of pre-1990 forest landowners to a free allocation of New Zealand Units (NZUs). The most significant change is to the criteria for determining whether the owners of pre-1990 forest land transferred after 31 October 2002 will be entitled to 39 or 60 NZUs per hectare of land;
- Similar amendments are made to the entitlement rules for fishing quota owners, including the provision governing how the number of NZUs freely allocated to each fishing quota owner will be calculated;
- The fishing industry allocation will be made to quota owners on the basis of tonnes of quota;
- The free allocation to the fishing sector will be increased from the current level of 50 percent of 2005 emissions for three years, to 90 percent of 2005 emissions for two and a half years (July 2010 to December 2012). The level of free allocations will be specified as a number in legislation;
- The provisions containing pre-1990 forest landowners' and fishing quota owners' obligations when applying for and receiving a free allocation of NZUs are substantially rewritten, and new offences are created for pre-1990 forest landowners and fishing quota owners who fail to comply with these obligations;

- Consequential amendments are made to the Māori Fisheries Act 2004 relating to the allocation of NZUs to fishing quota owners; and
- Exportation of NZUs will not be permitted during the transition phase. However, the prohibition on exports will not apply to forestry-related units. There will be no restrictions on the banking of units during the transition phase.

Industry and Agriculture Allocation

- The Stationary Energy, and Industrial Processes (SEIP) and Liquid Fossil Fuels (LFF) sectors will enter the New Zealand (NZ) Emissions Trading Scheme (ETS) on 1 July 2010. Monitoring and reporting requirements for these sectors will still commence on 1 January 2010;
- A transition phase will operate until December 2012 for industries to implement the amendments to the scheme. The transition phase will be implemented through:
 - o A progressive obligation requiring SEIP and LFF participants to surrender only one unit for every two tonnes of CO₂e emitted; and
 - o A NZ\$25 fixed price option whereby SEIP, LFF and forestry participants can satisfy surrender obligations by paying NZ\$25 per unit;
- The powers to make regulations to determine the industrial activities for which a free allocation of NZUs will be given have been overhauled. Key aspects of the new provisions include:
 - o Clarifying the government's ability to adopt Australian eligible industrial activities as eligible industrial activities in NZ; and
 - o Where an Australian eligible industrial activity is adopted in NZ, the emissions intensity level of the Australian activity must be adopted in NZ, along with the Australian allocative baselines adjusted for NZ-specific conditions in the

- electricity and natural gas industries;
- Greater specification of how NZ-specific eligible industrial activities are to be developed, including the calculations to be used to determine emissions-intensity levels and allocative baselines;
- An express power to obtain and take into account the electricity-related contracts of specific firms when determining the average amount of emissions per unit of output from an eligible industrial activity;
- Explicitly stating the categories of emissions that can be used in the calculation of an eligible industrial activity's emissions-intensity level and allocative baselines; and
- Clarifying the government's consultation requirements when setting eligible industrial activities;
- Similar amendments are made to the regulation-making power for eligible agricultural activities, including to clarify how the allocative baselines of eligible agricultural activities will be set;
- The provisions governing how firms carrying out eligible industrial and agricultural activities must apply for a free allocation of NZUs are similarly overhauled. The key aspects of the changes are:
 - The basic framework enabling firms to receive both a provisional and final allocation for each year is preserved, but there is much greater specification for how such applications must be made; and
 - The chief executive (i.e. the administrator of the scheme) has greater powers to seek further information from applicants, determine allocation entitlements, and vary or revoke previous decisions about firms' allocation entitlements;
- New offences are created for firms' failure to comply with their obligations when

- applying for and receiving a free allocation of NZUs;
- Free allocation to Emission Intensive Trade Exposed (EITE) industry will be provided on an intensity basis;
- The entry of agriculture into the NZ ETS will be delayed until 1 January 2015. Mandatory monitoring and reporting requirements for agriculture will still commence on 1 January 2012;
- The free allocation to the agriculture sector will be provided on an intensity basis, on a similar basis to industry and will phase out at 1.3 percent annum starting from 2016;
- An initial processor-level point of obligation will apply with flexibility to move to a farm-level point of obligation in the future; and
- Processing of applications for allocation to industries and agriculture will be removed from ministerial control. In the longer term, the NZ Government's intention is to transfer administrative functions associated with the NZ ETS to an Environmental Protection Authority.

Post-1989 Forest Provisions

- There are substantial amendments and wholesale rewrites of the provisions governing the participation of post-1989 forest landowners in the scheme. Most of the changes concern how carbon stocks in post-1989 forests are to be tracked when carbon accounting areas are subdivided into new carbon accounting areas, or when existing carbon accounting areas are combined.

Price Cap and 50 percent Obligation

- New provisions replace the existing provisions to implement the \$25 price cap and 50 percent obligation in the period before 2013. These provisions:

- give participants a choice when surrendering or repaying emissions units in certain circumstances to either surrender or repay an emissions unit or to pay \$25 instead; and
 - specify that for emissions that result in the period before 2013, participants need only surrender one unit for each two tonnes of emissions;
- Although these provisions are new, their overall intent and effect appears to be the same as the equivalent provisions in the Bill as introduced.

Administrative Provisions

- The level of assistance will initially phase out at a rate of 1.3 percent per annum beginning in 2013. The phase-out of allocation will also be considered through a five-yearly review of free allocations. The first review will be conducted in 2011. Any significant changes to the provision of free allocations will require a five-year notice period;
- The provision setting out how participants jointly carrying out an NZ ETS activity are to comply with their obligations (so called “unincorporated bodies”) has been substantially revised. The key change is to extend the unincorporated body concept to firms jointly carrying out an activity for which a free allocation of NZUs is given, thereby requiring those firms to jointly apply for and receive a free allocation of NZUs;
- The rules concerning how related companies may form consolidated groups to comply with their NZ ETS obligations are revised, including the timeframes for forming new consolidated groups and for firms to join and leave existing consolidated groups. The ability for consolidated group members to add and remove activities from the ambit of the consolidated group is also provided for; and

- A number of changes are made to how the emissions unit register will operate, including the treatment of trusts in the unit register.

Amendments to Regulations

- In addition to changes to the Climate Change (Unit Register) Regulations 2008, amendments are also made to the:
 - o Climate Change (Forestry Sector) Regulations 2008;
 - o Climate Change (Stationary Energy and Industrial Processes) Regulations 2009.

(Hercus *et al.*, 2009, pp 1- 3; and Ministry for the Environment, 2009b, p 1)

Appendix 4: Information on New Zealand Units

Where/How to obtain New Zealand Units (NZUs)

- Purchased from the Government – \$25 fixed price to 2012;
- ‘Free allocation’ from the Government:
 - One-off allocation to pre-1990 forestry (per hectare) and fishing quota owners;
and
 - Intensity-based allocation of units to EITE industry and agriculture;
- Earned through removals – forestry and other removals; and
- International purchases:
 - Certified Emission Reductions (CERs) and Emissions Reduction Units (ERUs);
and
 - Decision on imported Assigned Amount Units (AAUs) yet to be made.

(Ministry for the Environment, 2010, p 16)

Participants Eligible to Earn NZUs

- ‘Removal activities’ can earn emissions units:
 - Owning or leasing forests planted after 1989 is the most common way to earn emissions units;
 - Other removal activities include exporting products containing synthetic gases, and embedding carbon dioxide in methanol; and
 - Carbon capture and storage may be included as a removal activity in the future.

(Ministry for the Environment, 2010, p 18)

Appendix 5: Economic Impacts

Initial Impacts of the NZETS on Businesses Given the Current Economic Climate

There is a need to provide smoother transition into the scheme while participants are dealing with the current recession and becoming familiar with their obligations and the operations of carbon markets. The concern is that while carbon markets are immature there could be potentially high and volatile carbon prices in early years of the scheme. It may be difficult for firms to manage their liabilities in such an uncertain environment.

(Ministry for the Environment, 2009f, p 5)

The Loss of Production from Key Industries

The concern about loss of production is greatest for firms that are both emissions-intensive (where production leads to significant levels of emissions) and trade-exposed (compete against goods produced in other countries that do not face similar emissions costs). The fear is that a loss of competitiveness from these EITE will result in carbon leakage, with market share being lost to countries that do not have emissions reduction policies in place. This will see a loss in production in NZ with no global environmental benefit. There is justification for providing greater protection to avoid the loss of key industries that are expected to be competitive once international competitors adopt equivalent carbon pricing regimes and there is a concern that the phase-out of free allocation under the current scheme may cause key industries to lose competitiveness. Other countries (in particular Australia) are developing emissions trading schemes incorporating greater assistance for at-risk firms than is currently provided under the NZ ETS.

(Ministry for the Environment, 2009f, pp 5 - 6)

Allocation under the European Union Emissions Trading Scheme (EU ETS)

Another competing economy with an ETS is the EU. Phase three of the EU ETS (2013 to 2020) will provide two levels of allocation for:

- Those at significant risk of carbon leakage; and
- Other covered industries.

Firms deemed at significant risk of leakage could receive up to 100 percent allocation based on 2005 to 2007 emissions. However, the free allocation to individual installations will not exceed the level of a benchmark corresponding to the 10 percent cleanest technologies in the EU. If an installation emits more than the benchmark level, it will need to acquire allowances up to the level of its actual emissions. The allocation to significantly-at-risk firms decreases by 1.74 percent per year. Not-at-risk sectors will receive 80 percent allocation based on 2005 to 2007 emissions level, decreasing to 30 percent in 2020 and zero in 2027. Overall allocation in the scheme is made on an absolute basis, with an effective intensity-based allocation to individual participants within the pool via the top 10 percent benchmark.

This approach would be difficult to implement in NZ as some industrial sectors have a small number of participants which could lead to difficulties in establishing a benchmark. It is difficult to quantify the level of allocation for EU firms deemed to be significantly-at-risk as this will depend on work yet to be completed on benchmarks and the distribution of emissions efficient technologies within industries. Therefore, it is also difficult to determine whether this approach is more or less generous than the Australian and NZ schemes. Nominally, it is more generous than the current NZ ETS allocation methodology, but whether this is the case in practice will depend on the stringency of the benchmarks.

However, it is worth noting that at-risk sectors under the EU ETS will represent approximately 75 percent of total industry emissions covered by the EU ETS, which is a larger proportion than the emissions-intensive industries defined under the CPRS.

(Ministry for the Environment, 2009f, pp 8 - 9)

Appendix 6: Comparison between the Existing NZ ETS and the Moderated NZ ETS

	Climate Change (Emissions Trading and Renewable Preference) Bill 2007	Climate Change Response (Moderated Emissions Trading) Amendment Bill
Purpose	To amend the Climate Change Response Act 2002 to introduce a GHG ETS in NZ.	To amend the Climate Change Response Act 2002 and modify the NZ ETS, in order to provide further powers to make regulations and administer the principal Act, and make technical drafting changes to add clarity to the principal Act.
Objectives	<p>A NZ ETS to support and encourage global efforts to reduce GHG emissions while maintaining economic flexibility, equity, and environmental integrity at least cost in the long term by:</p> <ul style="list-style-type: none"> - reducing NZ's net emissions below business-as-usual (BAU) levels; and - complying with international obligations, including Kyoto Protocol obligations 	<ul style="list-style-type: none"> - Reduce competitiveness impacts of the NZ ETS and provide greater certainty for economic growth; - Provide a smoother transition for participants into the NZ ETS and protect against price volatility in early years; - Ensure the NZ ETS is affordable within current fiscal constraints; - Maintain flexibility to respond to possible changes in post-2012 international climate change arrangements; - Maximise the degree of harmonisation with the Australian Carbon Pollution Reduction Scheme, in particular to reduce trans-Tasman competitiveness risks; and - Improve the administrative effectiveness of the NZ ETS.

Timetable		
Stationary Energy (incl. electricity)	1st Jan 2010	1st July 2010
Industrial Processes (steel, cement, aluminum)	1st Jan 2010	1st July 2010
Liquid Fossil Fuels	1st Jan 2011	1st July 2010
Agriculture (cattle, sheep, deer, poultry)	1st Jan 2013	1st Jan 2015
Industry Allocation Changes	<ul style="list-style-type: none"> - Fixed allocation - Based on 2005 emissions - Single absolute threshold >50,000 tonnes CO₂e/annum (Approx 21 companies eligible) 	<ul style="list-style-type: none"> - Production based allocation - Based on industry average - High intensity threshold >1,600 tonnes CO₂e/\$million (Approx 15 companies eligible) - Medium Intensity threshold >800 tonnes CO₂e/\$million (Approx 50 companies eligible)

(Frazer Lindström, 2010e, pp 1-2; and New Zealand Parliament, 2009a, p 1)

Appendix 7: Policies and Measures of the NZ ETS for the Energy Sector

Name of Programme	Description of Programme	Type of Policy or Measurement Base	GHG Affected	Quantitative Effect
Marine Energy Deployment Fund	A four-year, \$8 million Marine Energy Deployment Fund, aimed at supporting the deployment of generating devices that convert wave or tidal energy into electricity - provides grants to deploy pre-commercial devices in the NZ marine environment.	Fiscal policy	Carbon Dioxide and Nitrous Oxide	Save 0.6 PJ of renewable energy and avoid an annual 70 Gg of GHG emissions
Distributed Generation Fund	To provide financial assistance for the completion of feasibility studies to investigate distributed generation projects (refers to small-scale power generation technologies used to generate electricity from many small sources), which use renewable energy sources.	Fiscal policy		
Through granting the above two funds, the Government’s aim is to provide information on available renewable energy resources and their advantages and disadvantages to consumers and industries to increase public awareness of the issues relating to renewable energy				
Business Programmes	A programme coordinated by the EECA for the commercial sector to support energy efficiency. These programmes aim to provide information on new technologies and energy management, grants for energy and design audits and one-on-one support for energy intensive businesses.	Voluntary, Fiscal and Informative	Carbon Dioxide and Nitrous Oxide	Estimated to reduce energy demand by 0.4 PJ and by 32 Gg in CO ₂ -e emissions by 2020.

Equipment Energy Efficiency (E3) Programme	<p>A programme in conjunction with Australia, with an aim to develop a set of policies for common electrical appliances used in residential, commercial and industrial settings. There are several ways the programme allows for consumers to be more energy efficient:</p> <ul style="list-style-type: none"> - Minimum Energy Performance Standards (MEPS) – ensures the most inefficient products are not for sale - Compulsory Product Labelling – regulates retailers of all ‘whiteware’ appliance and heat pumps to provide energy efficiency information to consumers upon sale of products, and; - Voluntary Product Labelling (Energy Star) – Energy Star is an independent international programme that awards labels to only the most energy efficient products on the market. 	Regulatory, and Voluntary	Carbon Dioxide	Save 10 PJ of energy and avoid 1400 Gg of CO ₂ emissions.
Warm Up NZ: Heat Smart	An informative programme with a primary focus on providing information to households and on providing grants on installation of energy efficiency measures and clean heating devices for pre-2000 homes, offering to pay one-third of the ceiling and under-floor installation costs (up to NZ\$1,300) without any income restriction. However, low income earners are eligible for 60 percent of the total costs of the insulation package and \$1,200 worth of clean heating appliances	Informative and Fiscal	Carbon Dioxide and Nitrous Oxide	20 Gg CO ₂ -e annually by 2020
<p>‘Warm Up NZ: Heat Smart’ is a subsidiary programme of ‘ENERGYWISE’ offered by the EECA. ‘ENERGYWISE’ is a programme also offered by the EECA, which provides public information, grants and interest subsidies for every energy efficiency initiatives. This programme aims to increase energy efficiency in NZ homes.</p>				

Efficient Lighting Programme	A programme aim at achieving the potential savings by eliminating the main types of inefficient lighting, and to increase the use of efficient lighting design and controls across all sectors. ¹³⁹	Fiscal	Carbon Dioxide and Nitrous Oxide	Estimated to reduce emissions by 81 Gg CO ₂ -e annually
Commercial Sector Programmes	A programme that allows businesses to apply for part-funding from the Electricity Commission for Electricity efficiency projects where there is current barrier preventing such projects from proceeding.			Estimated to reduce CO ₂ -e emissions by a further 8 Gg Annually, as well as the annual reduction of 81 Gg CO ₂ -e
Industrial Sector Programmes:	A programme with a focus on motorised systems efficiency			
The Electric Motors Bounty Scheme	A scheme that provides a direct incentive to motor users to upgrade their electric motors – subsidies are provided for the removal and permanent disabling of lower-efficiency, three-phase motors that are replaced with MEPS 2006-compliant motors.			
Compressed Air Systems Programme (Pilot)	Subsidies for audits of compressed air systems for their energy efficiency.	Fiscal and Information	Carbon Dioxide	Emissions directly associated with this scheme is yet to be quantified
Crown Energy Efficiency Loans Scheme	For government entities to claim funding for energy efficiency and renewable energy projects, with priority given to projects that are cost effective and can be easily replicated.			

(Ministry for the Environment, 2009e, pp 56 – 64)

¹³⁹ KEMA, an international consulting firm specialising in energy issues estimated that fighting was the single biggest area of potential energy efficiency savings, constituting 8 percent in residential homes and 14 percent in commercial and public settings (Ministry for the Environment, 2009e).

Appendix 8: Policies and Measures of the NZ ETS for the Transport Sector

Name of Programme	Description of Programme	Type of Policy or Measurement Base	GHG Affected	Quantitative Effect
Vehicle Fuel Economy Labelling	A scheme that makes it compulsory for vehicle traders and online vendors to display information about the fuel economy of their vehicles. The aim is to allow consumers to make informed decisions when purchasing a vehicle.	Regulatory	Carbon Dioxide	Estimated CO ₂ savings of 43 Gg CO ₂ -e per year by 2020
Biofuels Grant	Government's grant to biofuel producers in order to incentivise the production of biofuels, The grant is equivalent to the petrol excise tax exemption currently implemented for bioethanol, allocating NZ\$36 million over three years, from 2009.	Fiscal	Carbon Dioxide	Emissions directly accountable to this grant is yet to be quantified
Electric Vehicles	A combination of NZ's competitive advantage in renewable energy and highly efficient electric motors will effectively reduce GHG. Therefore, the Government introduced a legislation exempting road-users charges for uses with electric vehicles.	Fiscal	Carbon Dioxide	Emissions directly accountable to this legislation is yet to be quantified
Fleet Best Practice Programme	A training programme for heavy and light commercial vehicle fleets. In association, there will be developments of tip booklets and videos, additional NZ-based research to tailor driver training and fuel efficiency driving technique for the NZ fleet, training for driver trainers and driver training.	Education and Fiscal	Carbon Dioxide	Emissions directly accountable to this programme is yet to be quantified
Public Transport	Continuous funding for public transport, as substantial proportion of NZ's economic growth and productivity is from public transport. In addition, the Ministry of Transport is examining ways to increase the productivity and efficiency of the public transport system, primarily focusing on ways to remove barriers to greater efficiency that have been identified by key stakeholders, for example, delays in the renewal of passenger class driver licences and buses losing time when re-entering heavy traffic from bus stops.			

(Ministry for the Environment, 2009e, pp 64 - 68)

Appendix 9: Policies and Measures of the NZ ETS for the Agriculture Sector

Name of Programme	Description of Programme	Type of Policy or Measurement Base	GHG Affected	Quantitative Effect
Global Alliance on Agricultural Emissions	The NZ Prime Minister established an alliance to bring together interested parties to increase international co-operation, collaboration and investment in the area of agricultural research.	Research, Information and Education	CH ₄ , N ₂ O, CO ₂	Emissions directly associated with this alliance are yet to be quantified
Primary Growth Partnership (PGP)	<p>A government-industry initiative, providing investments to significant programmes of research and innovation in order to enhance economic growth and sustainability of NZ's primary, forestry and food sectors. PGP covers:</p> <ul style="list-style-type: none"> - Pastoral (including wool) and arable production - Horticulture - Seafood (including aquaculture) - Forestry - Food processing (including nutraceuticals and bioactives) <p>The PGP programme will grant at least \$500,000 over the lifetime of the programme, through an agreement process with industry co-investors.</p>	Research and Information	CH ₄ , N ₂ O, CO ₂	Directly related emissions are yet to be quantified
Centre for Agricultural GHG Research	A primary programme under the PGP, with the annual allocated funding of \$5 million. This programme will be 100 percent government-funded, with no requirement for industry co-funding and a commitment to 10 years' core funding. The aim of the research is to promote technologies that both reduce emissions and improve on-farm efficiency and productivity.			

Pastoral GHG Research Consortium (PGGRC)	A partnership between the Government and the dairy and fertiliser industries. The role is to coordinate the agriculture sector's programme of research into the abatement of agricultural non-carbon dioxide gases, with an aim to provide livestock farmers with the information and means to mitigate their GHG emissions.	Research, Information and Education	Methane and Nitrous Oxide	Emissions directly associated with this partnership are yet to be quantified
Sustainable Land Management and Climate Change Plan of Action Research Programme	A programme with a focus on the development of new technologies and practices for the measurement and mitigation of GHG emissions, adaptation and cross-cutting issues. The Government has allocated NZ\$55 million of the total available government funding.	Research, Information, Education	Methane, Nitrous Oxide	Directly related emissions are yet to be quantified
Research Programme to improve agricultural and forestry inventories	Grants for National GHG Inventory Research. The aim of the grants is to improve the accuracy of NZ's agricultural GHG inventory to, reduce uncertainty in the GHG inventory, and to incorporate the effects of mitigation technologies.			
GHG Footprinting	A plan for developing tools to accurately measure and represent the GHG footprint of NZ produce. The strategy also encourages NZ primary producers to participate in GHG measurement and enhance their GHG performance.			
Biochar Professorships	A Governmental funding to promote the study and development of Biochar ¹⁴⁰ technology			

¹⁴⁰ Biochar is created by a similar process to that used to make charcoal. The resulting charcoal-like material is a form of semi-permanent carbon storage (Ministry for the Environment, 2010, p 73)

Nitrification Inhibitors	A trial with significant area of investment for the PGGRC. The aim is to provide independent verification of the role these inhibitors play in reducing the environmental impacts of farming practices			
Livestock Emissions and Abatement Research Network (LEARN)	An international research and collaboration network with an aim of improving measurement of and reducing GHG emissions from livestock.			
Farm Monitoring	A model of the production and financial status of farms, orchards and vineyards throughout NZ. The aim of the programme is to analyse the relationship between financial results and the sustainability, productivity, and adaptability of the different sectors.			
Technology Transfer	A programme developed to encourage the land management sector to adopt GHG emissions mitigation technologies and land management practices.			

(Ministry for the Environment, 2009e, pp 69 - 75)

Appendix 10: Policies and Measures of the NZ ETS for the Forestry Sector

Name of Programme	Description of Programme	Type of Policy or Measurement Base	GHG Affected	Quantitative Effect
East Coast Forestry Project	A project with an aim to encourage an additional 200,000 hectares of commercially productive forest to be planted through to 2020 on eroding and erodible land in the East Coast region of the North Island. The primary objective of this project is to reduce erosion; this project also enhances the sequestration of carbon in forest sinks.	Voluntary Agreement	Carbon Dioxide	Estimated sequestration of 3,196 Gg of CO ₂ . By 2040, an estimated total of 399.4 Gg tonnes of CO ₂ annually will be sequestered from the forests already participating in the project, with a 'no deforestation' assumption.
Afforestation Grant Scheme	A contestable fund with an aim to increase the area of Kyoto-compliant forest in NZ.	Fiscal, Voluntary Agreement	Carbon Dioxide	Estimated sequestration of 6 Gg of CO ₂ . By 2040, an average of 153.8 Gg tonnes of CO ₂ annually will be sequestered from the forests already participating in the project, with a 'no deforestation' assumption.

Permanent Forest Sinks Initiative	An initiative promoting the establishment of permanent forests on previously unforested land.	Voluntary Agreement	Carbon Dioxide	Estimated sequestration of 6 Gg of CO ₂ . By 2040, an estimated 84 Gg tonnes of CO ₂ annually will be sequestered from the forests already participating in the project, with a 'no deforestation' assumption.
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(Ministry for the Environment, 2009e, pp 75 – 79)

Appendix 11: Policies and Measures of the NZ ETS for the Waste Sector

Name of Programme	Description of Programme	Type of Policy or Measurement Base	GHG Affected	Quantitative Effect
New Zealand Waste Strategy	A strategy aiming to lower the social costs and risks from waste, reduce the damage to the environment from waste generation and disposal, and increase economic benefits by encouraging more efficient use of materials.	Regulatory	Methane	Directly related emissions are unquantifiable.
National Environmental Standard for Landfill Methane	A standard for landfill methane, which requires landfill sites with a design capacity greater than one million tonnes (Mt) of refuse to collect and destroy methane emissions.	Regulatory	Methane, and Carbon Dioxide	Directly associated emissions are unquantifiable.

(Ministry for the Environment, 2009e, pp 79 – 80)

Appendix 12: Negotiations between the NZ Government and the Māori Party

Māori Party Amendments

The SOP moved by the Māori Party inserts a Treaty of Waitangi clause into the Climate Change Response Act. The clause requires decision-makers under the Act (i.e. the relevant Minister or the chief executive) to discharge the Crown's responsibility to give effect to the principles of the Treaty of Waitangi by consulting representatives of iwi and Māori who they consider have an interest in various specified matters.

The matters that representatives of iwi and Māori must be consulted about include the fishing and pre-1990 forest land allocation plans, the details of allocation and points-of-obligation for agriculture, and the setting of emission reduction targets. Also, the review panel conducting the mandatory 2011 review of the scheme must include at least one member with appropriate knowledge, skill and experience relating to Treaty principles and tikanga Māori, and the terms of reference for the panel must incorporate reference to Treaty principles. The panel itself, once established, must consult representatives of iwi and Māori with an interest in the review.

Overall, this Treaty clause is highly process oriented in that it gives iwi and Māori a right to be consulted about matters in which they have an interest. Whilst any future litigation involving this clause may determine otherwise, it does not appear on its face to deliver substantive outcomes for iwi or Māori.

The Government's Agreement with the Māori Party

With every other party in Parliament opposing the Bill, it was crucial the government strike a deal with the Māori Party to secure its support for the Bill. A deal was struck and announced last Monday. The key elements of the deal announced are:

- Enabling 5 iwi (Ngai Tahu, Waikato-Tainui, Te Uri o Hau, Ngati Awa, and Ngati Tuwharetoa) to plant trees on 35,000 hectares of Crown land and keep the profits from any emissions units earned. Prior to the announcement of the deal, estimates of the value of this for iwi varied widely, but current Maori Party estimates put the value at \$25 million to \$50 million depending on the price of carbon;
- The government will support the Maori Party SOP (outlined above) to insert a Treaty of Waitangi clause into the Climate Change Response Act;
- A further \$24 million will be invested in the Warm-Up NZ home insulation scheme, to lessen the impact of the NZ ETS on low income households;
- An increase from 50 percent of 2005 levels to 90 percent for allocation to the fishing industry through the transitional period to 2013 (this was already National Party policy and provided for in the Bill before the deal was agreed with the Maori party);
- The development of a suitable format for contracts to facilitate afforestation project partnerships on Crown land;
- A review of the Permanent Forest Sink Initiative undertaken in 2010, with a particular emphasis on the impacts on landowners and whether the schedule rates for indigenous planting fairly reflect actual carbon storage in indigenous forests;
- The development of a Cabinet paper by March 2010 to establish a process to develop a National Policy Statement on Biodiversity, which will include the involvement of iwi; and
- The establishment of a special advisory group to advise the government on issues concerning the entry of agriculture into the NZ ETS, with Māori agricultural interests reflected in the group's terms of reference and membership.

(Hercus *et al.*, 2009, pp 3 – 4)

Appendix 13: Comparison between the proposed Australian CPRS and the NZ ETS

Element of regulation	Australian CPRS	NZ ETS
Target	60 percent below year 2000 emissions by 2050	Target as set by Kyoto Protocol or its successor (currently maintain emissions to 1990 levels).
Commencement	To commence from 2010.	Currently set to commence 1 September 2008.
Gas Coverage	All six GHG.	All six GHGs.
Unit of Trade	Australian Emission Unit (AEU).	New Zealand Unit (NZU).
Sectors included	<p>Compulsory inclusion of the following industries:</p> <ul style="list-style-type: none"> - Stationary Energy - Transport - Fugitive Emissions - Industrial Processes - Waste <p>Forestry only included on an 'opt- in' basis for afforestation.</p> <p>Agriculture will be reviewed in 2013 for potential inclusion in 2015.</p> <p>Large industrial emitters of more than 25,000t CO₂e-annually will be compulsory participants.</p>	<p>Compulsory inclusion of the following industries:</p> <ul style="list-style-type: none"> - Stationary Energy (including fugitive emissions) - Liquid Fossil Fuels / Transport - Industrial Processes - Waste - Agriculture - Forestry - Removal products and services (embedded products, CCS, HFCs and PFCs)
Estimated Number of participants	Approximately 1000.	Approximately 200 (excluding forestry).
Price Cap	A price cap for AEUs will be set – details not yet included. Cap will be set higher than the expected market price. The set cap will be reviewed.	None provided.

Limits to international trade and international linking	<p>Intention for open linking to international trading in the longer term but significant barriers imposed in the short term.</p> <p>International non-Kyoto units not accepted.</p> <p>No exporting of AEU units in initial phases of the CPRS.</p> <p>In the initial phases there will be a limit on the number of international units able to be surrendered to comply with the CPRS.</p> <p>Temporary certified emission reduction units and long-term certified emission reduction units not permitted.</p>	<p>International linking considered crucial to have reasonably priced compliance.</p> <p>No significant limits proposed. Overseas units are able to be approved for inclusion.</p> <p>The following units specifically included:</p> <ul style="list-style-type: none"> - assigned amount units (AAUs) - certified emission reduction units (CERs) - emission reduction units (ERUs) - removal units <p>No restrictions on the exporting of NZUs.</p>
Assistance to vulnerable industry	<p>Emissions-intensive, trade- exposed industry:</p> <ul style="list-style-type: none"> - Upfront free allocation of permits dependent on continued production. - Assistance based on an industry-average emission intensity baseline. - Could be provided for activities with an emissions-intensity above 1,500t per million dollars of revenue. - Allocation likely to be up to 30 percent of national AEU units. Strongly affected industries - Support for investment in Carbon Capture Storage research and technology. - Limited assistance to coal-fired electricity generators. 	<p>Free allocation to waste, agriculture and trade-exposed industry at 90 percent of 2005 emissions levels.</p> <p>Firms qualify as trade-exposed if:</p> <ul style="list-style-type: none"> - Face foreign competition; - Are exposed to higher emissions costs than overseas competitors; and - Cannot pass on those costs to consumers.
Assistance to households	<p>Increased pension, carer, senior and allowance benefits.</p> <p>Increased assistance to other low- income households through the tax and payment system.</p> <p>Provide assistance to middle- income households.</p>	<p>Government to look at programmes to reduce impact of higher electricity prices on low- modest income households.</p> <p>However imported AAUs cannot be used in the NZ ETS after 2012.</p>

(Chancery Green, 2008, p 1)

Appendix 14: A Template of the Letter to the Participants

College of Business and Economics

Department of Accounting and Information Systems



RECIPIENT ADDRESS

DATE

Dear Minister/Mr./Ms./ (Recipient's Name),

First, let me introduce myself. I am a Master of Commerce (MCom) student in accountancy at the University of Canterbury. As part of my M.Com degree, I am currently writing a dissertation on 'A comparison between a Carbon tax and an Emissions Trading Scheme – the New Zealand (NZ) perspective'.

To provide a brief overview of my research, the primary objective is to review the adequacy of Kyoto Protocol mechanisms in NZ, namely a Carbon Tax and an Emissions Trading Scheme (ETS), by evaluating the effectiveness of the mechanisms. The effectiveness of the mechanisms will be measured through examining the behavioural change of individuals and businesses prior to, and subsequent to, the actual or proposed implementation of the mechanisms. The behavioural effect will be measured through incorporating various research methods, including one-on-one, semi-structured interviews, and adopting a process of 'additionality' as part of the statistical data analysis.

The outcome of this dissertation will determine whether the Kyoto Protocol mechanisms (Carbon Tax and/or ETS) are effective in reducing carbon emissions in NZ, and if not, a recommendation will be provided as to any modifications to the two options or if other approaches should be considered. This is important as NZ has gone through various processes, from imposing a Carbon Tax to implementing the initial and the revised ETS, and yet, the adequateness of the two mechanisms is still in debate. Therefore, this research is considered as a useful source of information for New Zealanders in this regard for the social, economical and environmental wellbeing of current and future generations to come.

In order to gain comprehensive evidence, I have chosen to conduct interviews with a number of individuals, including Hon. Dr. Michael Cullen, Hon. Dr. Nick Smith, Hon. Pete Hodgson, and the members of the Emissions Trading Scheme Review Committee. The reason for choosing these individuals is that the intended participants are individuals directly involved with the review of the NZ ETS and the Carbon Tax. Thus, their opinions on the current ETS and its future implications will likely provide a valuable input into reflecting on New Zealanders' behavioural-change with respect to the implementation of these two mechanisms.

Therefore, I would like to invite you to participate in an interview. I am seeking your knowledge of the two Kyoto Protocol mechanisms as well as your perspective on this issue and its future implications as the (name of position). Please find attached the information sheet for the details of the interview, the consent form for you to sign and a form outlining the agreements, which I will commit to as the researcher. Exact dates and times of the interviews can be arranged at a time that best suits you and other participants, although I prefer the interviews to be conducted during August or September 2010.

An outline of the interview questions are as follows.

1. Please provide general background information on the Carbon Tax and the NZ ETS (definitions, current status/progress/developments etc.)
2. What is your perspective on the Carbon Tax and the NZ ETS?
 - A. Which method, from your perspective, would be more adequate in NZ, and why?
 - B. In relation to the above question, what do you think the future implications of the two climate change policies would be, in NZ?
 - C. Do you think, from your perspective, that either the Carbon Tax or the NZ ETS will effectively change individuals and businesses' behaviour and reduce carbon emissions? Please give reasons.
 - D. Was there a need to modify the NZ ETS, and Why?

Please note that these questions are only guidelines, and other related matters may be discussed if you wish.

It would be grateful if you could participate in this interview to help me gain comprehensive evidence in conducting my research. I appreciate your co-operation and I look forward to hearing back from you as soon as possible.

Yours faithfully,

Sally Sung
Master of Commerce Student
Contact details: Email: sally.sung@pg.canterbury.ac.nz
Phone: 021 238 7943

Appendix 15: Net CO₂ Emissions: Estimates 1990 – 1994 and Projections to 2010

	1990	1991	1992	1993	1994	2000	2005	2010
Gross Emissions	25.5	26.0	27.9	27.3	27.4	31.1	33.6	36.3
Absorption	-17.1	-15.8	-15.1	-14.8	-13.8	-18.6	-23.5	-25.1
Net Emissions	7.8	10.1	12.9	12.5	13.7	12.5	10.1	11.2
Change in Net Emissions (relative to 1990)		+31%	+65%	+60%	+76%	+61%	+30%	+44%

Note: CO₂ absorption is, by international convention, presented as negative since it represents a removal of CO₂ from the atmosphere. Figures are in millions of tonnes of CO₂ and are actual emissions for 1990 – 1994 and projections for 2000 – 2010.

(WOGOCOP, 1996, p 60)

Appendix 16: Article 3.1 of the Kyoto Protocol

The Parties included in Annex 1 shall, individually or jointly, ensure that their aggregate anthropogenic carbon dioxide equivalent emissions of the GHG listed in Annex A [to the Kyoto Protocol, refer below] do not exceed their assigned amounts, calculated pursuant to their quantified emission limitation and reduction commitments inscribed in Annex B [to the Kyoto Protocol, refer below] and in accordance with the provisions of this Article, with a view to reducing their overall emissions of such gases by at least 5 percent below 1990 levels in the commitment period 2008 to 2012.

Annex A to the Kyoto Protocol

<u>GHG</u>	<u>Sectors/Source Categories</u>	<u>Sub Sectors</u>
Carbon dioxide (CO ₂) Methane (CH ₄) Nitrous Oxide (N ₂ O) Hydrofluorocarbons (HFCs) Perfluorocarbons (PFCs) Sulphur Hexafluoride (SF ₆)	Energy	Fuel Combustion Energy Industries Manufacturing Industries and Construction Transport Other Sectors Other
	Industrial Processes	Fugitive Emissions from fuels Solid Fuels Oil and Natural Gas Other
		Mineral Products Chemical Industry Metal Production Other Production
		Production of Halocarbons and Sulphur Hexafluoride Consumption of Halocarbons and Sulphur Hexafluoride Other
	Solvent and Other Product Use	
	Agriculture	Enteric Fermentation Manure Management Rice Cultivation Agricultural Soils Prescribed Burning of Savannas Field Burning of Agricultural Residues Other
	Waste	Solid Waste Disposal on Land Wastewater Handling Waste Incineration Other

Annex B to the Kyoto Protocol (New Zealand Only)**Partly quantified emission limitation or reduction commitment (percentage of base year or period)**

New Zealand	100
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(Ministry for the Environment, 2006, p 17)

Appendix 17: Article 3.3 of the Kyoto Protocol

Article 3

..... included in Annex I shall, by 2005, have made demonstrable progress in achieving its commitments under this Protocol.

3. The net changes in GHG emissions by sources and removals by sinks resulting from direct human-induced land-use change and forestry activities, limited to afforestation, reforestation and deforestation since 1990, measured as verifiable changes in carbon stocks in each commitment period, shall be used to meet the commitments under this Article of each Party included in Annex I. The GHG emissions by sources and removals by sinks associated with those activities shall be reported in a transparent and verifiable manner and reviewed in accordance with Articles 7 and 8.

4. Prior to the first session of the Conference of the Parties serving as the meeting of the Parties to this Protocol, each Party included in Annex I shall provide, for consideration by the Subsidiary Body for Scientific and Technological Advice, data to establish its level of carbon stocks in 1990 and to enable an estimate to be made of its.....

(UNFCCC, 1992, p 4)

**Appendix 18: Projected Emissions of Gases and Sources listed in Annex A of the Kyoto Protocol over the First Commitment Period
(Million tonnes carbon dioxide equivalent)**

	Upper Scenario	Most-likely Scenario	Lower Scenario
Projected Aggregate Emissions	420.4	398.5	382.7
Energy (excluding Transport)	102.1	91.3	83.7
Transport	85.1	78.8	72.5
Industrial Processes	23.0	22.9	22.2
Solvent and Other Product Use	0.3	0.3	0.2
Agriculture	222.2	198.8	180.3
Waste	6.6	6.5	6.4

Note: Projected lower and upper emissions scenarios may not necessarily add to projected aggregate emissions because of the repeated sampling technique used to aggregate emissions.

Note: 1 million tonne is equivalent to 1,000 gigagrams (Gg).

(Ministry for the Environment, 2006, p 18)

Appendix 19: Statistics for GHG Emissions from the Energy Sector (Excluding Transport) 1990 – 2020

Gas	Gg Gas for Energy Sector (excluding Transport)							
	1990	1995	2000	2005	2007	2010	2015	2020
CO₂	14,224.5	13,706.4	15,822.4	18,436.7	17,272.5	17,869.9	16,828.9	15,001.3
CH₄	32.4	31.1	38.9	38.7	37.2	36.2	40.3	41.1
N₂O	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3
CO₂-e	14,987.5	14,444.4	16,731.3	19,364.3	18,153.4	18,723.8	17,765.9	15,946.2

(Ministry for the Environment, 2009e, p 90)

Appendix 20: Statistics for GHG Emissions from the Transport Sector 1990 – 2020

Gas	Gg Gas for Transport Sector							
	1990	1995	2000	2005	2007	2010	2015	2020
CO₂	8,604.2	10,884.5	12,309.1	14,349.8	14,687.2	13,753.8	14,609.2	15,356.2
CH₄	3.3	2.9	2.2	2.5	2.6	2.4	2.4	2.4
N₂O	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.6
CO₂-e	8,748.9	11,051.3	12,484.7	14,557.8	14,903.1	13,954.5	14,823.9	15,583.6

(Ministry for the Environment, 2009e, p 91)

Appendix 21**Actual and Projected NZ Emissions from International Air Transport 1990 - 2020**

Gas	Gg Gas for International Air Transport							
	1990	1995	2000	2005	2007	2010	2015	2020
CO₂	1,338.2	1,571.0	1,733.1	2,630.0	2,611.9	2,564.1	3,228.5	3,768.4
CH₄	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
N₂O	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
CO₂-e	1350.7	1,585.6	1,749.2	2,654.4	2,636.2	2,587.9	3,258.5	3,803.4

(Ministry for the Environment, 2009e, p 92)

Actual and Projected NZ Emissions from International Sea Transport 1990 – 2020

Gas	Gg Gas for International Air Transport							
	1990	1995	2000	2005	2007	2010	2015	2020
CO₂	1,031.1	1,134.8	747.7	982.8	978.9	853.9	844.9	877.4
CH₄	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
N₂O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO₂-e	1,044.6	1,149.3	756.3	993.7	989.4	863.4	854.0	886.8

(Ministry for the Environment, 2009e, p 93)

Appendix 22: Statistics for GHG Emissions from the Industrial Processes Sector 1990 – 2020

Gas	Gg Gas for Industry							
Industrial Processes	1990	1995	2000	2005	2007	2010	2015	2020
CO ₂	2,731.6	3,016.0	3,174.3	3,499.1	3,670.6	3,720.7	3,797.0	3,610.1
CH ₄	1.0	2.8	4.8	0.7	0.9	0.9	0.9	0.9
N ₂ O	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
HF _C (CO ₂ -e)	NA, NO	148.3	304.3	675.5	856.6	868.3	886.1	842.5
PF _C (CO ₂ -e)	642.2	150.3	57.7	59.0	41.7	42.2	43.1	41.0
SF ₆ (CO ₂ -e)	15.2	17.9	10.5	19.0	14.7	14.9	15.2	14.5
CO ₂ -e	3,409.2	3,390.2	3,648.0	4,266.9	4,601.9	4,664.6	4,760.3	4,526.1
Solvent and Other Product Use								
CO ₂	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CH ₄	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
N ₂ O	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
CO ₂ -e	41.5	45.0	47.1	44.3	43.4	44.0	45.1	46.2
Total industrial and processes and solvents (CO₂-e)	3,405.8	3,435.2	3,695.1	4,311.2	4,645.3	4,708.7	4,805.4	4,572.2

(Ministry for the Environment, 2009e, p 93)

Appendix 23: Statistics for GHG Emissions from the Agriculture Sector 1990 – 2020

Gas	Gg Gas for Agriculture Sector							
	1990	1995	2000	2005	2007	2010	2015	2020
CH₄	1,027.8	1,054.9	1,109.8	1,138.3	1,148.5	1,173.3	1,217.8	1,243.9
N₂O	31.3	34.1	36.1	40.3	37.8	39.7	40.6	41.8
CO₂-e	31,281.4	32,716.2	34,483.2	36,385.7	35,839.8	36,934.2	38,168.4	39,072.4

(Ministry for the Environment, 2009e, p 94)

Appendix 24: Statistics for GHG Emissions from the Forestry Sector 1990 – 2020

	Net Emissions and Removals (Gg CO ₂)							
	1990	1995	2000	2005	2007	2010	2015	2020
All planted forests (UNFCCC basis)	-19,188.4	-16,685.7	-22,520.8	-24,031.9	-18,485.1	-20,084.0	-1,370.7	1,926.9
Post-1989 forests only (Kyoto Protocol basis)	816.8	-252.7	-10,309.6	-6,707.5	-2,667.5	-15,938.5	-17,634.4	-15,499.9

(Ministry for the Environment, 2009e, p 95)

**Appendix 25: Removals by Forestry under Different Assumptions for Harvesting Rates
for Pre-1990 and Post-1989 forests**

	Net Emissions and Removals (Gg CO₂)			
Pre-1990 forest harvest age (years)	Post-1989 forest harvest age (years)	2010	2015	2020
28	28	-20,085.9	-1,364.9	1,279.7
	30	-20,084.0	-1,370.7	1,926.9
	32	-20,084.1	-1,676.3	1,971.3
32	32	-24,591.5	-23,596.2	-9,207.5

(Ministry for the Environment, 2009e, p 97)

Appendix 26: Response Letter from Dr. Nick Smith



Office of Hon Dr Nick Smith

MP for Nelson

Minister for the Environment

Minister for Climate Change Issues

Minister for ACC

10 SEP 2010

CC 4104

Sally Sung
sally.sung@pg.canterbury.ac.nz

Dear Sally Sung

Thank you for your letters of 21 July 2010 to Craig Foss MP and me regarding your request for our participation in an interview survey concerning the relative merits of a carbon tax versus the use of emissions trading in New Zealand, and the need to modify the original New Zealand Emissions Trading Scheme (NZ ETS). I am replying on behalf of my colleague as the issues you raise fall within my portfolio responsibilities as Minister for Climate Change Issues.

Unfortunately we are not available to participate in your MCom dissertation survey; the reasons behind the 2009 decisions around the NZ ETS have been widely circulated.

The government proceeded with implementation of the NZ ETS because the issue of climate change requires a consistent and steady approach. The scheme will provide strong financial incentives for planting trees, investing in renewable energy and making the transition to more efficient technologies. It is in New Zealand's long term interests to start making that transition now. The government is conscious of concerns specific to New Zealand's economic resilience, namely, the high value consumer markets where issues of carbon footprint pose a long term risk to our key export industries. We need to do our fair share as a developed nation. We must also recognise that New Zealand is a nation that trades on its clean, green credentials.

On the Ministry for the Environment's climate change website you can access information on the reasons for the choices made in the Cabinet paper and Regulatory Impact Statement for the modified Climate Change Response Act 2002. They can be found at www.climatechange.govt.nz/emissions-trading-scheme/building/policy-and-legislation/.

Concerning the modifications, National's development and implementation of the NZ ETS is in line with our 2008 election policy; namely, that we would continue implementation of the scheme in 2010, but would pass legislation to soften its impact. The legislated changes in 2009 more than halved the costs that consumers and businesses would have faced under the scheme that was introduced by the previous government on 1 January 2008. The revisions significantly slow the pace of New Zealand's scheme, by deferring agriculture until 2015 and providing for more generous phase out of allocations for trade-exposed industries.

Yours sincerely

Hon Dr Nick Smith
Minister for Climate Change Issues