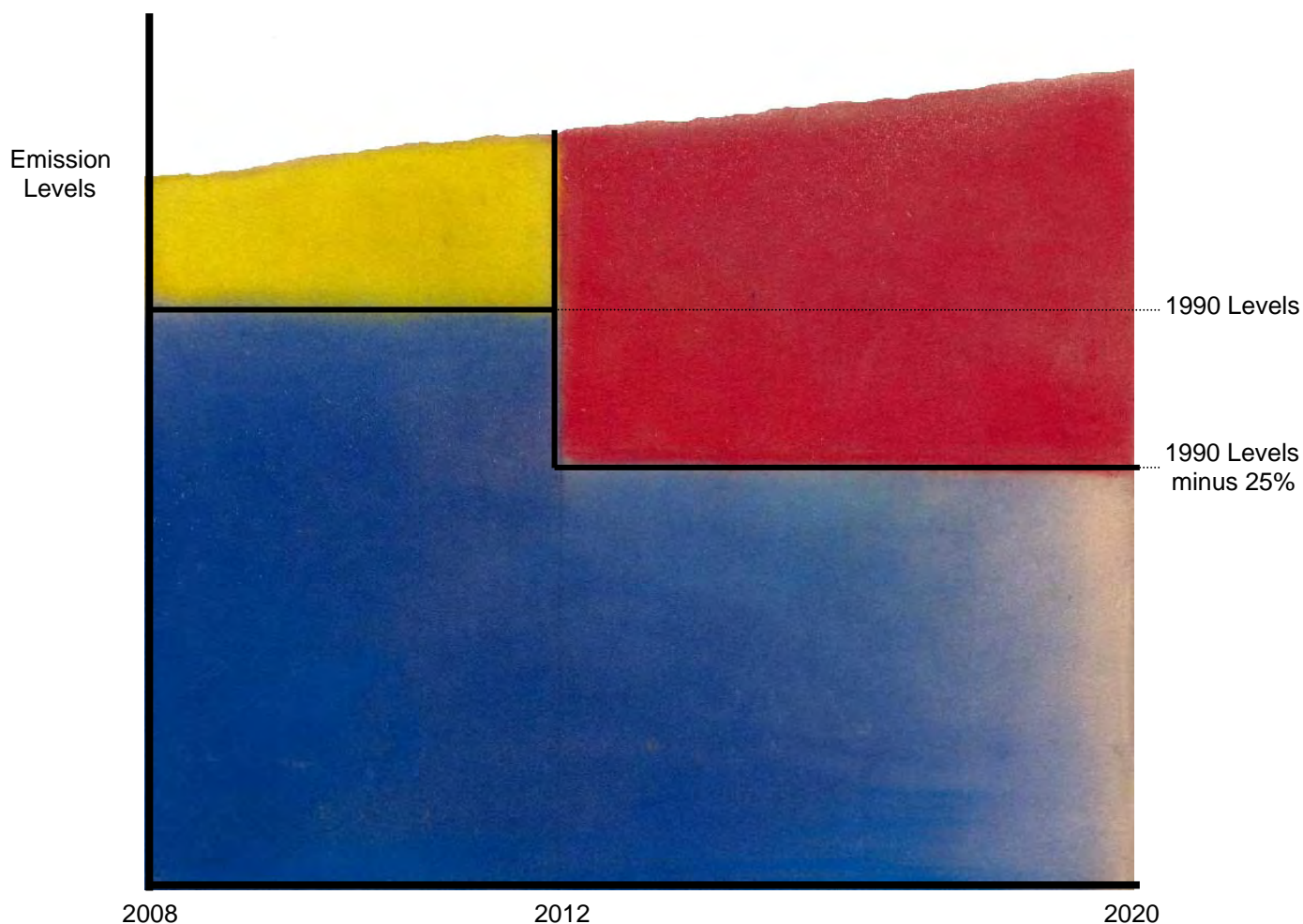


THE CARBO₂N CH₄ALLENGE

Response, Responsibility, and the Emissions Trading Scheme



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Key Points

- New Zealand's gross emissions are projected to be 31% in excess of the Kyoto Protocol baseline during the 2008–2012 period. After adjusting for carbon credits earned by forestry, the nation's net liability is expected to require the purchase of extra offsetting credits costing around \$1.37 billion at a world price of \$30/tonne.
- The proposed Emissions Trading Scheme (ETS) is likely to reduce gross emissions by less than 2% compared to the levels otherwise expected. Only if deforestation is restrained significantly by the ETS will any meaningful difference be made to the Kyoto bill.
- Households, SMEs and road users generate a third of the nation's greenhouse gas emissions but will meet \$4 billion or about 90% of the net payments required before 2013 as a result of the ETS. Large industrials pay \$0.2 billion and agriculture pays \$0.2 billion of the \$4.4 billion total. Pastoral farmers receive a net subsidy of \$1.31 billion during the scheme's first five years, relative to their "fair share" of the Kyoto bill. Kyoto forest owners earn up to \$2.37 billion for carbon absorption, while generators of renewable electricity secure windfall profits of \$1.8 billion.
- The ETS does not provide a least cost means of reducing emissions prior to 2013. It exempts entirely the sector with the largest amount of low-cost abatement potential (agriculture), while bringing in first, and taxing most heavily, the sector exhibiting probably the least ability to abate during this period (transport). A preliminary study for Government found that agriculture holds over 60% of the total quantity of emission reduction options costing \$30/t or less and that all of these are available at a profit.
- The current ETS rules fail to position New Zealand strategically for the post-2012 world. If New Zealand arrives at 2012 with emissions about 30% above 1990 levels, with or without the ETS, then even a "soft" target for the next commitment period - to bring emissions down to 25% below 1990 levels - would mean a 55% gap between the starting point and the target. New Zealand would commence the next commitment period staring down from the top of an emissions cliff.
- The ETS can be retooled relatively simply. The core idea of having the domestic carbon price set by the global market is sound and should be retained. However, instead of creating a new carbon currency, payments would be made using the existing international carbon currencies that were established under the Protocol.
- An alternative strategy would position New Zealand to develop and export abatement technologies for agriculture, and to be a strong advocate for emissions "travelling with" exported goods. This would mean that countries receiving products carry the carbon emissions on their accounts.

Summary

In Excess – Position Before the ETS

New Zealand signed the Kyoto Protocol in 1997. Once ratified in 2002, this committed New Zealand to a target of reducing its emissions to 1990 levels during the First Commitment Period, from 2008 - 2012, known as “CP1”. The Protocol allows a country to comply with its target by cutting its own emissions and/or by purchasing credits from other countries that offset the excess.

The Government estimates that in absence of new policies, New Zealand’s gross emissions will be 31% in excess of its Kyoto target during CP1. Were it not for the availability of credits earned by New Zealand’s forest sinks, the failure to hold gross emissions to 1990 levels would mean the nation would be liable under the Protocol for 124.5 megatonnes (Mt) of excess emissions. At the current price for quality carbon credits of around \$30/tonne, this would represent a cost to the nation of \$3.73 billion.

Adjusting for credits to be earned by forest sinks brings the projected liability down to 45.5 million tonnes. This figure, which is the one commonly referred to by the Government, represents a cost to the nation of \$1.36 billion at \$30/tonne.

No Parliamentary political party advocates New Zealand’s withdrawal from the Protocol. The resulting damage to the nation’s international reputation and trade is generally viewed as too great a cost, especially now that Australia has ratified the treaty leaving the US isolated. The Protocol is a “hard” policy fixture and the question is how to use it to drive what is required in any case – the reshaping of the economy to recognise the environmental and social costs of greenhouse gas emissions.

In September 2007 the Government announced details of a proposed Emissions Trading Scheme (ETS). This report sets out an analysis of the scheme, with a focus on CP1.

How Did We Get into This Mess?

New Zealand’s history of climate change policy is littered with bold promises that have expired worthless, and emission-reduction targets that were progressively downgraded. The opening target in 1990 was to bring CO₂ emissions 20% below 1990 levels by 2005. Currently, the target is to reduce only the rate of growth in emissions, and then only net emissions, not the gross emissions that are the principal measure.

The gross measure of emissions is paramount because this will be the basis of properly-constructed international comparisons of performance under the Protocol. It allows an ‘apples with apples’ comparison with 1990 base levels, which are measured in gross, not net, terms.

Goal deflation in part reflects a decade-long failure to set a price on “carbon”. A series of commitments to introduce a carbon tax were met and overturned each time by strident opposition from major emitters. Even after most major emitters had been accommodated through exemptions of one form or another, the 2005 proposal for a \$15/t tax was eventually abandoned in the face of business lobbying pressure and a lack of support from other Parliamentary parties. In recognition that withdrawal from the Protocol is not an option, the most recent pitch from a number of the major emitters is that the Government should meet the Kyoto bill out of general taxation, leaving their businesses untouched.

Goals became less ambitious also in response to the spectacular collapse of New Zealand’s Kyoto accounts since they were publicly set out in 2002. The Government originally anticipated that New Zealand would generate a significant surplus under the Protocol, but those projections were wildly astray. The correction of three major mis-estimates led to a net deterioration in the position of 113 Mt, or \$3.39 billion at \$30/t.

Key problems were inadequate or late investigation of key uncertainties, along with inadequate disclosure of certain revisions as they were made – particularly for failed policies to reduce emissions. The mistakes of the past point to a lack of recognition of the scale of financial risks the Protocol carries, and of the resources needed for proper risk management.

Casting Illusions while Delivering Minimal Emission Reductions

Any set of reforms designed to reduce greenhouse gas emissions efficiently will put a price on “carbon” as a part of the package. This can be achieved either through taxing emissions, or by issuing emission permits that are tradeable but scarce, so that the total volume of emissions is constrained.

The proposed ETS is not a mechanism for trading emission permits in the usual sense of the term. It is an emissions tax, payable in vouchers rather than cash. When emitters buy an ETS emissions unit (an NZU), they do not purchase any right to emit. They simply choose to pay their emissions tax in NZUs rather than one of the four international carbon currencies established by the United Nations which are to be similarly accepted by the New Zealand Government.

The ETS is not a cap-and-trade scheme because there is no cap. The NZUs to be traded under the ETS are not shares in a fixed total volume of allowed emissions. They are simply emission-tax vouchers. Provided the tax is paid, there is no restriction on the volume that can be emitted.

Ultimately, it is reductions in emissions that any major scheme advanced under the climate change banner must deliver. Extraordinarily, the official documentation provides no overall estimate of this. Using Government projections where available, and making generous allowances otherwise, the ETS can be expected to reduce gross emissions by less than 2% (5.9 Mt out of 405.5 Mt).

It can also be inferred from Government statements that there will be about 15 Mt less deforestation than previously projected (unless industry proposals for greater “flexibility” of land use are agreed to). This results from the way in which a previous

promise to forest owners, that the Government would “cover” 21 Mt of deforestation emissions, is now to be interpreted and tied into the ETS.

There are a number of ways in which nations’ performances against the benchmark of 1990 emission levels can be compared, but by any measure New Zealand currently ranks very poorly: third, sixth or eighth worst of the 37 countries that committed to reduction targets under the Protocol, depending on the way the rankings are calculated. The expected impact of the ETS will not change any of these rankings. New Zealand similarly places in the leading ten when emissions per capita are assessed. New Zealand’s placing might alter significantly if the accounting rules changed in future to ones that provided for emissions used in producing a good to travel with it to the destination country.

‘Let them Eat Carbon’

The ETS has so little effect on emission levels partly because of the proposed exemptions and corporate-welfare arrangements. Two-thirds of all emissions are exempted through delayed or absent coverage, on top of which rebates are to be granted to selected sectors.

The scheme can be expected to gather in \$5.1 billion during CP1, though net proceeds are just under \$4.4 billion. Assessing the impact in cash terms alone, losers under the ETS pay out net about \$4.4 billion to the winners. Large industrial emitters pay \$0.2 billion and agriculture pays \$0.2 billion, while \$4 billion is paid by road users, households, and small and medium businesses. Those last three groups make 91% of the net payments but account for only 34% of the nation’s emissions.

Beyond cash costs and gains lies the question of the extent to which each sector is being overtaxed or undertaxed, relative to an equitable allocation of the burden. If notional “fair shares” are based on the widely-accepted “Polluter Pays Principle”, then the implicit cross-subsidies resulting from sectors not paying in proportion to their emissions can be calculated. These implicit subsidies arise from a combination of exemptions from the ETS and the gifting of NZUs.

Taking account of both cash payments and implicit subsidies, the overall impacts on key sectors during CP1 are:

- **Transport:** Road users pay \$1.34 billion more than is required to fund their “fair share” of the Kyoto bill.
- **Small - medium firms and households (excluding agriculture):** These groups pay \$0.51 billion more than their “fair share” on emissions from fuels and electricity. They also pay \$1.20 billion extra to renewable electricity generators, making total payments of \$1.71 billion beyond that necessary to fund their share of the Kyoto bill.
- **Agriculture:** Pastoral farmers gain a \$1.49 billion subsidy relative to their “fair share” of the Kyoto bill, by virtue of being exempted. This is partially offset by \$0.11 billion over-fair-share emissions tax on liquid fuels and fossil

fuel electricity, along with a payment of \$0.065 billion to renewable electricity generators, leaving an overall benefit to farmers of \$1.31 billion.

- **Large Industrial Producers:** Large manufacturers gain a \$0.84 billion subsidy relative to their “fair share” charges for industrial process emissions and stationary energy use, if they are gifted the full 45 million NZUs proposed. However, they pay \$0.09 billion more than their fair share for fossil fuel electricity, and \$0.51 billion to renewable electricity generators. This implies a total net benefit of \$0.2 billion, though this remains subject to future negotiations with the Government.

These amounts cover only the first five years’ cross-subsidies. The most striking feature of the huge transfers of wealth between sectors is the disproportionate transfer from small and medium energy users to the major power blocks. The overall result is that major emitters are exempted, or provided with rebates to largely offset the tax, or can fully pass through the tax, while households and other firms pick up effectively the full cost of the Kyoto bill.

Sectors directly rewarded as a result of the ETS are:

- **Forestry:** Kyoto forest owners are rewarded for carbon absorption by the gifting of NZUs which, depending on uptake levels and the price of the NZU, have a value of up to \$2,370 million. Owners of pre-1990 forests receive \$630 million transitional assistance and pay deforestation charges in CPI of \$206 million, yielding a net benefit of \$425 million.
- **Renewable Electricity Generators:** Owners of power plants selling electricity from renewable sources secure windfall profits of \$1,808 million.

Inconvertibility and Market Manipulation

Although it is intended that the market for the NZU be open to and linked with the world carbon market, the NZU will not necessarily be bought and sold at the same price as the main Kyoto currencies for which it is a close substitute. The world price for carbon sets the ceiling but by no means the floor. There are a number of factors that will set the price of the NZU relative to world carbon prices, including the ability to convert it to one of the recognised international carbon credits, and the potential for strategic manipulation of the market.

While the Government intends the NZU to be freely interchangeable with Kyoto currencies, there will be restrictions on this. The most important is imposed by the Kyoto Protocol’s Commitment Period Reserve which specifies that at least 90% of the prime Kyoto currency (the AAUs gifted by the UN to each nation) must be retained at all times.

If the Government makes the NZU fully convertible to Kyoto instruments by exchanging NZUs for AAUs, then it faces a serious risk that units will be sold offshore in volumes that would imperil the Commitment Period Reserve. Alternatively, if the Government does not allow direct conversion of NZUs into AAUs, there is a substantial risk that holders of NZUs will seek to cash up their

holdings by direct sale early in CP1, resulting in a discounted value on the remaining NZUs. Thus the Government may need to undertake a balancing act between allowing open trading internationally or allowing the NZU's price to fall while holding the option to intervene to support the price using taxpayer funds.

The problem will be worsened significantly if abatement projects are undertaken in New Zealand by overseas investors under the Joint Implementation (JI) provisions of the Kyoto Protocol. The carbon credits earned by such projects will be transferred abroad, draining the Government's reserve holdings of Kyoto currencies and putting further pressure on the Commitment Period Reserve.

Strategic manipulation of the market for NZUs may also occur. One possibility well documented from experience with the European ETS is upstream suppliers of energy profiting from their ability to legally mark up commodities for the "opportunity cost" of the emissions tax. Under the ETS, such a supplier could mark up the price for all units sold on the basis of some expensive emission units that are purchased, while buying many of the units they actually need to surrender at much cheaper prices. The ability to purchase cheaply can also be enhanced by the handful of upstream energy suppliers co-ordinating their purchasing to some extent (authorised or informal) so as to drive down the price of the NZU.

The task of foreseeing all the possible strategic opportunities, and designing regulatory countermeasures in advance, is almost certainly beyond the capability of the New Zealand Government. The outlook therefore is for an NZU market which is opaque and manipulated, to such an extent that price signals emanating from it will provide neither reliable incentives and guidance for firms contemplating abatement projects, nor clear public information as to where the costs and benefits of the ETS fall.

Carbon (Policy) Capture

The economically efficient way to meet New Zealand's Kyoto commitments is to set up incentives that bring forward the required emission reductions at least cost. The ETS does not set up a mechanism for least cost abatement during CP1. It exempts entirely the sector with the largest amount of cost-competitive abatement potential (agriculture) while bringing in first, and taxing the most heavily, the sector exhibiting probably the least ability to abate during this period (transport).

For nearly a decade after signing the Kyoto Protocol in 1997, the New Zealand Government failed to undertake any systematic costing of agricultural abatement options, and has still to produce estimates it will stand by. Yet even the first tentative study of the economy wide potential completed for Government in early 2007 reported that agriculture accounted for over 60% of the total volume of emission reductions estimated to be available to the nation for \$30/t or less. All these potential emission reductions in agriculture were estimated to be available at a profit. Despite this study having been based entirely on publicly available information, the Government withheld it until the Ombudsman forced its release – after the ETS had been announced, with its exemption for agriculture.

The Sustainability Council had in the meantime estimated in June 2007 that if nitrification inhibitors were applied to all dairy land throughout CP1, total emissions would fall by 18.5 Mt and that these gains would be available at a profit. A subsequent study undertaken for MAF implied a total saving potential of about 14 Mt using similar but more conservative assumptions. Most recently, MAF released a study that also estimated dairy farmers could apply nitrification inhibitors at a profit.

The dairy industry holds the nation's largest low cost tranche of abatement potential. The use of nitrification inhibitors alone offers the potential for reductions in gross emissions that are two to three times those the ETS is expected to deliver. Equally important is that the agricultural abatement options can be brought in quickly. Agriculture would be the first, not the last, sector to have its emissions priced under a least-cost abatement policy.

From Special Pleading to Strategy

The ETS fails entirely as a strategic response to future international emissions obligations. If New Zealand is to arrive at 2012 with its gross emissions about 30% above 1990 levels (even with the ETS in place), a commitment in the next period to an emissions-reduction target at the "soft" end of the proposed range (25% below 1990 levels) would still open up a 55% gap between the starting point and the target. New Zealand would begin the next commitment period staring down from the top of an emissions cliff, unless it gets a very soft target.

Right up with the myth that there are no cost-effective abatement options in agriculture is the evolving view within Government that New Zealand will be able to secure a very special deal from the negotiations that commenced in Bali. The Treasury puts forward this view essentially on the premise that agricultural abatement options are generally high cost. That assumption sets New Zealand up not as a Bali leader, but a special pleader. It also sets up a major exposure when it comes down to the hard negotiations over what the nation's next reduction target will be, as the grounds for special pleading will look very weak when carefully examined.

At the same time, it would be an act of heroic faith to assess the ETS on anything beyond its proposed short term impacts - at most those over CP1 - given the history surrounding climate change policy. In these terms, the ETS is not a break with history; it is a continuation of the past. In a nutshell, it accepts business as usual emissions and simply redirects the costs of the Protocol away from the politically-influential major emitters.

Once large subsidies to these groups have been established in CP1, the lobbying resources that will be directed into maintaining them will be enormous. The point at which the subsidies are scheduled to even begin to come off (2013) is two electoral cycles away, so far out in political terms that all bets are off as to which makeup of political parties will be deciding how many NZUs are still to be handed out and to whom. While the proposed legislation sets a timetable for phasing out the subsidies, it also requires a review that forces reconsideration of those very provisions.

Taking a longer view, the real challenge is greater than is currently being discussed. The Protocol was explicitly agreed on the basis that developed nations would take up a greater share of the burden of reducing global emissions. This was in large part

because developing countries bear a relatively small responsibility for the present atmospheric concentrations of greenhouse gases. The frequent focus on individual country emission levels (today's flows) underplays the significance of historic emissions (the atmospheric stocks). The real measure of a nation's impact on the atmosphere is its cumulative share of emissions over time, because the main gases that cause atmospheric warming break down only over decades or centuries once aloft.

Ultimately the atmosphere is a global commons – something all people share as a life sustaining system, along with other species. If the atmosphere is capable of absorbing only certain levels of greenhouse gases on a sustainable basis, then that absorption capacity will have to be shared fairly to avoid conflict. While New Zealand's total emissions are a tiny slice of the global burden, it is a significant historic contributor to atmospheric stocks of greenhouse gases on a per capita basis. If international emission targets come to be set more on a per capita basis and/or to reflect cumulative emissions, and less on the basis of a presumed entitlement to 1990 emission levels, New Zealand will be even more exposed than it is now.

There is an opportunity to change course: from dressing New Zealand up as a special case deserving a special deal, to taking a leading role on two fronts: reducing agricultural emissions, and advocating a new basis for international carbon accounting.

The first would involve the nation vigorously pursuing its low-cost agricultural abatement options to significantly reduce the Kyoto bill, while at the same time enhancing the market positioning of its pastoral products. This might also allow New Zealand to profit from the transfer of technology to other countries to abate pastoral emissions.

Tied to this thrust would be advocacy of a new basis for carbon accounting that would make final consumers (and hence their governments) responsible for emissions embodied in the goods and services they consume. This appears to be the principled approach to a comprehensive accounting framework. It would ensure that a price signal is fully passed through the supply chain to the party that ultimately demanded a unit of emissions be expended. Under this approach, New Zealand could export a volume of agricultural products consistent with the willingness of individuals overseas to use their "carbon budgets" to buy foods from pastoral farms in preference to the alternatives.

If such a system were put in place internationally, it would ensure that New Zealand farmers and other exporters no longer faced being undercut by suppliers elsewhere that were not subject to a similar emissions cost. The cost of emissions embodied in traded goods would be either passed on, or absorbed, by all exporters to each major market. New Zealand could then focus squarely on its domestic emissions, providing a more workable basis for setting national reduction targets.

Such a strategy could give New Zealand a constructive role on climate change, as technologies to reduce agricultural emissions, and advocacy of those emissions travelling with exported goods, are key factors that could draw developing nations

into a future global emissions reduction agreement, the framework for which was laid in Bali in December 2007.

Rebuilding the ETS

The ETS package is an inappropriate response but the machinery it proposes is comparatively easy to retool. In particular, its central mechanism of a tax that is automatically indexed to the world price for carbon is well worth keeping and building on.

The key change required is to dump the idea of creating the separate NZU and to use solely the existing Kyoto currencies. Such an emissions obligation based on the Kyoto currencies was proposed, prior to the design of the ETS, by a range of parties including the Business Council for Sustainable Development, Meridian Energy and the Environmental Defence Society.

The Government's arguments for adding extra complexity and opacity to this basic design are unconvincing. The chief attribute delivered by creation of the NZU is the ability to obscure the provision of off balance sheet subsidies to favoured sectors. Take away the blanket subsidies and the rationale for the NZU vanishes.

The first step to ending the subsidies and pursuing economic efficiency is to ensure that all emitters enter the ETS at the same time and are taxed to the same degree at each point in time. All sectors have been on notice for more than ten years since the Protocol was signed, so there are no grounds for whole sectors seeking further adjustment time. To the extent that individual emitters face difficulties as a result, and that there are benefits to the nation in providing transitional assistance, those subsidies should be paid transparently from the Government's accounts.

What proportion of emissions is to be taxed in each year is a key question. Eventually, 100% of the emissions from all sources will be priced, as the ETS proposes. There is merit in a phased introduction, with a pre-defined ramp that specifies the proportion of an agent's emissions that will need to be covered each year by surrendering payment in Kyoto currencies. At each point in time, all would face the same tax rate to keep incentives aligned across the economy.

The starting proportion, and the pace at which the proportion rises, is a matter for wide consultation, but is ultimately a political decision. If the revenue gathered from emitters over CPI were to be required to cover the Government's Kyoto obligations, including payments to forest owners for their sink credits, this would imply an average tax rate over CPI of about 30% if the tax commenced in 2008.

A great deal of the draft legislation would remain as proposed. However, instead of emitters being able to surrender either NZUs or Kyoto currencies, only Kyoto currencies and certain derivatives of these would be accepted. In place of the current timetable for sector entry and rate of gifting of NZUs would be the principle that all emitters are taxed in the same proportion at all stages, with a ramp specifying at least the proportions to apply during CPI.

The carbon challenge is to reshape the economy to recognise the costs of greenhouse gas emissions. Pricing all emissions to the same extent at all times would mean that costs are shared equally and the country gains a sustainable strategy for addressing its global environmental responsibilities. A sustainable pathway to a low-carbon future involves beginning as soon as possible, and requires the wide public support that only a fair allocation of responsibility for emissions can deliver.

1. In the Name of Sustainability

The Kyoto Protocol presents New Zealand with a new type of challenge – responding to a price on an environmental service¹ that is dictated from offshore.

New Zealand has been very slow to adopt the polluter-pays principle in the management of its own natural resources. Barely any government policies explicitly price the cost to the environment of extracting something, or disposing of waste at the other end. The Kyoto Protocol, however, puts an internationally-determined price on the nation's greenhouse gas emissions. This United Nations agreement² requires New Zealand to pay for its national emissions over and above an agreed ceiling³, at a price determined in the international market for carbon credits.

Use of a price mechanism to ration environmental services has been a rarity in this country partly because industrial producers have been unwilling to accept such charges, and governments have been unwilling to impose them in the face of that opposition. The Protocol is different because this time the costs cannot simply be left with the environment. Unless total emissions can be brought down below the Kyoto ceiling, someone has to pay the very sizeable Kyoto bill on the excess. How New Zealand decides to pay this bill is important for a range of reasons specific to climate change, but also because of the precedent it will set for managing other environmental services.

Both National and Labour Governments have taken important stands internationally that commit New Zealand: signing the Framework Convention on Climate Change in 1992, agreeing to a Kyoto target in 1997, and ratifying the Protocol in 2002. Both major parties have accepted that a “price on carbon” is an essential feature of any serious climate change response package. However, attempts to introduce such a price via a carbon tax or similar instrument have repeatedly been abandoned in the face of strong lobbying by major emitters and their supporters. When the Protocol came into force in January 2008, New Zealand still had no comprehensive set of climate-change policies in place – only a blueprint proposal for one.

In September 2007 the Government published a major document entitled *The Framework for a New Zealand Emissions Trading Scheme*⁴, accompanied by a set of policy proposals which were subsequently embodied in the Climate Change (Emissions Trading and Renewable Preference) Bill, introduced to Parliament on 4 December 2007. The Bill establishes a mechanism to charge for emissions, which is to be applied initially only to selected economic sectors (mainly transport, electricity and forest clearing) but is in principle to be extended progressively to set a price on all emissions by 2025.

¹ The service is the use of a global common – the biosphere's limited capacity to absorb and recycle, on a sustainable basis, a flow of greenhouse gases.

² It is a protocol to the United Nations Framework Convention on Climate Change, 1992.

³ New Zealand's target for 2008-2012 is to hold emissions to the 1990 level on average over the five years.

⁴ Ministry for the Environment, Wellington, September 2007. This document is hereafter referred to as *Framework*.

Advanced in the name of sustainability, the details of the new policy package are complex, leaving many of the implications obscure, especially for the first five years 2008-2012 when the dominant elements of the scheme are its exemptions and rebates for selected sectors – particularly agriculture and large industry.

Complexity and opacity mean that the overall effects of the New Zealand ETS are only dimly perceived by all but a tiny pool of specialists. The public, and even Parliamentarians who must ultimately evaluate the merits of the scheme, are left poorly informed on a five-billion-dollar tax-and-transfer package with major economic, equity, environmental and trade implications. Its effects will ripple out for many years to come.

This report sets out the numerical analysis necessary to evaluate the scheme, and a commentary sets out the authors' opinions, focusing in particular on the strategic significance of the ETS for the New Zealand economy. The focus is on the First Commitment Period 2008-2012 (hereafter referred to as CP1),⁵ as the durability and dependability of commitments extending beyond that time can not be relied on, given the history of climate-change policymaking to date and the three-year election cycle.

The ETS does have the potential ultimately to develop into a true polluter-pays arrangement, but its short and medium term shielding of major agricultural and industrial emitters sets up powerful incentives for those parties to continue to oppose the longer-run transformation of the scheme into a clean and clear mechanism for signalling the price of emissions to polluters.

Essential tests to be met by any policy aiming to reduce New Zealand's greenhouse gas emissions to comply with the country's Kyoto obligations include fairness and the ability to seek out the least-cost options for abating emissions. The analysis set out in this report indicates that the ETS will fail to meet these goals during CP1, and will fail to position New Zealand for the period after 2012.

Having identified the shortcomings, the report suggests structural amendments that could rescue the ETS as a viable policy response to climate change, and presents evidence suggesting New Zealand has the potential to emerge from the process in a much better position than is currently indicated by official projections.

In particular, New Zealand has very significant opportunities to mitigate agricultural emissions cost-effectively and could lead in advocating the development of a new accounting framework for emissions.

⁵ For a full list of acronyms, see the final pages of the document.

2. In Excess - Position Before the ETS

2.1 The Kyoto Rock ... and the financial hard place

Over the twenty years since the Intergovernmental Panel on Climate Change was set up in 1988, the New Zealand Government has been party to a series of major international conventions and agreements aimed to research the issue of climate change and to develop effective policies on a multinational basis:

- In 1992 it signed and ratified the Framework Convention on Climate Change (FCCC) that emerged from the United Nations Earth Summit in Rio de Janeiro. This set up the legal structure for international co-operation on emissions reductions and places legal obligations on parties to act in their own right.
- In 1997, New Zealand negotiated an emissions reduction target, along with most other developed nations, under what became the Kyoto Protocol to the FCCC.
- In 2002, New Zealand ratified the Kyoto Protocol and thus became legally bound to deliver on the commitments specified.

New Zealand's agreed target is to reduce the nation's emissions to 1990 levels, on average, during CP1. The Protocol provides for the target to be achieved by a nation cutting its own emissions sufficiently and/or purchasing qualifying credits from other countries.⁶

The Government is responsible for delivering on the financial implications of that commitment. New Zealand's emissions are projected to exceed its target by a wide margin, and the taxpayer will shoulder a very significant liability unless the Government passes through responsibility for Protocol obligations to those producing the emissions, or offloads the costs onto other parties.

For a range of reasons, no Parliamentary party supports New Zealand withdrawing from the Protocol.⁷ The damage that would result to the nation's international reputation and trade is generally viewed as too great a cost, especially now that Australia has ratified the treaty leaving the US isolated. The National Interest Analysis on the Protocol reported that:

⁶ A nation can reduce its net emissions by either reducing gross emissions ("abatement") or by absorbing carbon into forestry sinks recognised under the Protocol ("sequestration"). At least some effort must be made to reduce gross emissions.

⁷ See for example:
New Zealand First: Winston Peters, *Our Future, Our Environment: New Zealand First's Environment Policy Launch*, 24 July 2005;
Maori Party: Te Ururoa Flavell, Speech during Climate Change Response Amendment Bill; Third Reading, 9 November 2006.
United Future: http://www.unitedfuture.org.nz/default,186,climate_change.sm

Being seen to attempt to “free ride” on actions by other countries under the Kyoto Protocol would not be in New Zealand’s long-term foreign policy interests. Ratifying the Protocol would also help maintain New Zealand’s environmental image in the eyes of overseas markets and consumers. New Zealand markets itself on a “clean, green” image, using marketing slogans such as “100% Pure”. Ratifying the Protocol would maintain the credibility and value of such branding.⁸

With respect to international trade implications, the *New Zealand Herald*’s Brian Fallow observed that:

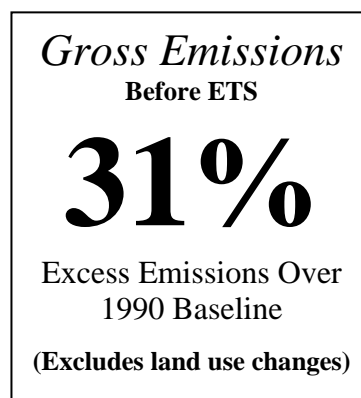
It is often argued that because New Zealand is a tiny contributor to global warming (in absolute terms, certainly not per head) it does not matter what we do. So we might as well do nothing. Apart from being ethically unedifying, this approach assumes that free riding would be costless. Fat chance. At the moment 27 per cent of New Zealand’s exports go to other countries which have accepted obligations under the Kyoto Protocol. If Australia joins, it will be nearly 50 per cent.⁹

The Protocol is set to remain a ‘rock’ - a hard policy fixture. The question is how to use it to drive what is required in any case – the reshaping of the economy to recognise the costs of greenhouse gas emissions. Before looking at the key question of who may be in the financial ‘hard place’, the remainder of this chapter examines the size of the problem.

2.2 The Emissions Overshoot

1990 emission levels, measured in terms of gross emissions, provide the Protocol’s base-year benchmark. Each country’s measurement of its gross figure includes emissions from the six greenhouse gases the Protocol covers¹⁰ but excludes land use changes (such as deforestation and afforestation).¹¹

New Zealand’s gross emissions in 1990 were 61.9 million tonnes of CO₂-equivalent (Mt)¹², which means that the target for the five years of CP1 is 309.5 Mt.¹³ Relative to this baseline, by 2005 New Zealand’s gross



⁸ *National Interest Analysis Kyoto Protocol to the UN Framework Convention on Climate Change*, February 2002, p 21.

⁹ Brian Fallow, *Get real on climate change*, *New Zealand Herald*, 1 November 2007.

¹⁰ These are: Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF₆).

¹¹ Carbon credits arising from forestry activities are part of another measure outlined below.

¹² Ministry for the Environment, *New Zealand’s Greenhouse Gas Inventory 1990–2005: The National Inventory Report and Common Reporting Format*, p.183 Table 10 Emission Trends, figure for emissions excluding LULUCF.

¹³ The New Zealand Government has been grandfathered this amount of allowed emissions in the form of a corresponding number of “Assigned Amount Units” (AAUs) issued by the UNFCCC. Surrendering these back to the UNFCCC at the end of CP1 will cover five years of emissions at the 1990 level.

emissions were 77.1 Mt¹⁴ - 25% in excess of 1990 levels.¹⁵ For the CP1 period from 2008 to 2012, the Government's latest projection is that gross emissions will be 405.4 Mt – 96 Mt in excess, and thus 31% over 1990 levels.¹⁶

So on a business-as-usual (BAU) basis, New Zealand is expected to emit about a third more greenhouse gases, gross, than the Kyoto target provides for.

2.3 Additional Liabilities

Two sets of upward adjustments have to be made to the 96 Mt figure in order to determine the full gross emissions liability for CP1. The most important adjustment is that for deforestation, which is accounted for separately from gross emissions, and which the Government projects will cause 21 Mt of emissions during CP1 for which the Crown will be liable¹⁷ under business as usual.

A further adjustment is the liability for 7.5 Mt of emission credits that the Government has allocated to what are termed “projects to reduce emissions”.¹⁸ Together with the 96 Mt of excess emissions, these adjustments bring the total for excess emissions and other liabilities up to 124.5 Mt.¹⁹

To the extent that New Zealand does not reduce emissions below the Government's business-as-usual projection, the excess emissions will have to be covered by the Government acquiring internationally-recognised carbon credits. The New Zealand Government can get these credits by buying them offshore from countries which have emission reductions available to sell, or by obliging local emitters to buy and surrender Kyoto units, or by appropriating the credits accruing to forest sinks, or any combination of these.

While the carbon price during CP1 cannot be known today, futures markets trading credits for that period arguably provide the best present estimate. A reasonable estimate of the current market price of quality carbon credits with guaranteed delivery

¹⁴ Ministry for the Environment, *New Zealand's Greenhouse Gas Inventory 1990–2005: The National Inventory Report and Common Reporting Format*, p.184 Table 10 Emission Trends, figure for emissions excluding LULUCF.

¹⁵ Ministry for the Environment, NIR, May 2007.

¹⁶ Gross emissions for CP1 are projected to be 405.4 Mt, versus allowed emissions of 309.5 Mt, leaving an excess of 96 Mt. New Zealand Government, *The Framework for a New Zealand Emissions Trading Scheme*, September 2007, p 114.

¹⁷ The total projected emissions are 41 Mt but the Government has capped its liability at 21 Mt, as discussed further below.

¹⁸ Around 10 million AAUs from the Government's assigned amount were awarded during 2002 and 2003 to “Projects to Reduce Emissions” (PREs). Kyoto-relevant abatement from these projects is already taken into account in the emission projections, but the AAUs actually taken up will have to be deducted from the 309.5 Mt initially assigned to the New Zealand Government. The Government currently estimates that the equivalent of 7.5 Mt will be taken up. Strictly speaking these arrangements are one-off measures, to incentivise projects to reduce emissions that will operate beyond the first commitment period, and the cost could be spread over future periods; but the Government accounts for them in CP1 and we follow this convention.

¹⁹ *Framework*, p 115.

is NZ\$30 per tonne of CO₂-equivalent (\$/t)²⁰, so the New Zealand taxpayer potentially faces a bill of \$3.73 billion under business as usual, before collecting payments from emitters, and without counting on the credits earned through forestry.²¹

2.4 Accounting for Forests

Forestry credits are a complex issue. In 1997, New Zealand was instrumental in having the Kyoto Protocol's negotiators accept that gross emissions could be offset by certain carbon absorbing land-use activities (notably new afforestation). Insofar as countries are certified as having achieved such net absorption of carbon during CP1, a Kyoto credit called a "Removal Unit" (RMU) can be claimed at the rate of one per tonne of CO₂-equivalent sequestered.

New Zealand (unlike most countries) had relatively large volumes of afforestation that could be counted, and other countries were concerned that New Zealand might fail to pursue gross emission reductions if it were able simply to free-ride on its forest sinks. To counter this concern, New Zealand's Kyoto target (to cut net emissions to the 1990 gross emissions level) was agreed in 1997 on the understanding that the New Zealand Government would not itself lay claim to all of the forestry credits arising from its carbon sinks. This understanding was the basis for policy up until 2001.²²

In 2002, however, the Government changed tack and announced that it would appropriate all the credits arising from the Kyoto forests²³. Forestry plantings are projected to provide 79 Mt of Kyoto-qualifying carbon absorption over the first commitment period.²⁴

Those afforestation credits are expected to reduce the nation's net emission liabilities during CP1 from 124.5 Mt to 45.5 Mt, and this number has been placed in the bottom line of the New Zealand Government's Kyoto accounts. At a price for carbon credits of \$30/t, 45.5 Mt of excess emissions mean a cost to the nation of \$1.36 billion. (At the time of the ETS announcement in September 2007, the New Zealand Treasury set

²⁰ Future contracts for the highest quality credits are widely traded on the European carbon market (which accounts for around 80% of the traded volume in these instruments). As at 15 April 2008, prices for such 2009 period units were priced at 21.21 Euros, and higher for later delivery. At the ruling exchange rate of that day of 0.50, the price translates to a NZ dollar value of \$42.42 per tonne of CO₂e. However, CDM credits sell at a discount to this and quality carbon credits with guaranteed delivery sell for about three quarters of this, so a figure of NZ\$30/tonne seems an appropriate indicator of the cost the market is projecting at this time.

²¹ There are pre-existing policy measures designed to reduce emissions that are built into the business-as-usual projections but their effect is all but inconsequential.

²² "New Zealand has taken the position internationally that it would not seek to avoid meeting its commitments through retention of emission units generated from Kyoto forest sinks, and Cabinet has already ... agreed in principle that *all or most* of the sink credits would be tradable within an international emissions trading system and that some proportion of the credits would go to those undertaking sink activities." Cabinet Policy Committee Paper 261, 2001.

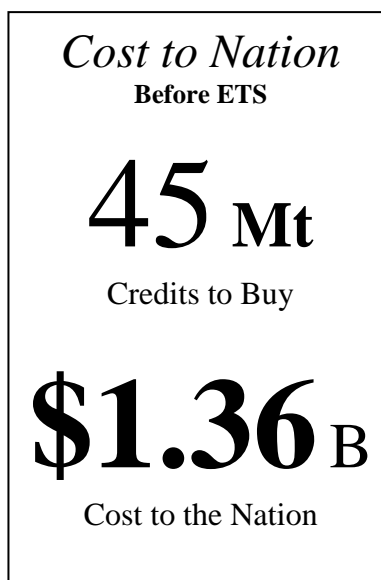
²³ Plantation forests established after 1989.

²⁴ *Framework* p.115 Table 7.5, "most likely scenario".

out a much lower estimate of \$704 million as the cost to the nation for the first commitment period. This was based on the same 45.5 Mt figure, but a much lower assumed price for carbon, US\$11.90/t.²⁵ In December 2007 this was revised upwards to an estimated total of \$956 million dollars, based on a higher carbon price of NZ\$21/t.²⁶)

Under the 2002 policy of laying direct claim to all sink credits, the Government saves itself (and taxpayers) the \$2.4 billion²⁷ cost of buying such credits on the open market.

Forest owners not unnaturally objected to the policy, and as part of the collection of ETS announcements in September 2007, the Government stated that credit for all carbon absorption by Kyoto forests would be offered to the owners of the forests. The proposal is to achieve this, however, not by the Government passing Kyoto credits directly to forest owners, but by giving them an equivalent volume of the New Zealand Government's own new carbon credit, the NZU.²⁸ The international carbon credits (RMUs) earned by forests are to remain costlessly available to Government, which will be able to use them to cover an equivalent volume of gross emissions in excess of the country's Kyoto target. The transfer to Kyoto forest owners of earnings from their carbon sinks is thus tied to the ETS being passed into law, as the Government made clear at the announcement when it stated:



Over the past few years, the Government has maintained that foresters have no automatic right to these credits and this remains our position.²⁹

²⁵ The Treasury, *New Zealand's Liability Under the Kyoto Protocol*, 20 September 2007; and *Financial Statements of the Government of New Zealand for the year ended 30 June 2007*, Note 15 pp.67-68,

<http://www.treasury.govt.nz/government/financialstatements/government/financialstatements/yearend/jun07/>.

²⁶ "Kyoto Liability Revised Upwards", Greenhouse Policy Coalition press release 20 December 2007, <http://www.scoop.co.nz/stories/PO0712/S00292.htm>. The latest available official document gives the current forecast figure of \$956 million: *Financial Statements of the Government of New Zealand or the Eight Months Ended 9 February 2008*,

<http://www.treasury.govt.nz/government/financialstatements/monthend/pdfs/fsgnz-8mths-feb08.pdf>, Note 16.

²⁷ At a \$30/tonne price of Kyoto units.

²⁸ There are some limitations on this broad summary, such as a minimum qualifying area of forest, but this is the essential position. Details are set out in: NZ Government, *Forestry in a New Zealand Emissions Trading Scheme*, September 2007. Page 7 of that document states that "forestry landowners will gain credits and associated liabilities for post-1989 forest that leads to the removal from the atmosphere of the main greenhouse gas, carbon dioxide... Post-1989 forest owners who choose to join the ETS will receive units in proportion to the carbon dioxide stored in their forests."

²⁹ Minister of Agriculture and Forestry, *Sustainable Land Management Announcement*, 20 September 2007, p 2.

While accounting for afforestation is appropriate when calculating liability of the nation as a whole under the Protocol rules,³⁰ it does not provide an accurate measure of New Zealand’s performance in addressing climate change. This is because starting from a gross emissions base but then comparing it with a measure in later years that includes offsets for forestry sequestration is not a like-with-like exercise. As noted above, if gross emissions in 1990 are compared to projected gross emissions over the first commitment period, there is a 96 Mt excess - a 31% overshoot (row 5 of Table 2.1).

**Table 2.1 – Key Figures from Projected Kyoto Accounts for CP1
Official business-as-usual projections**

		Five-year total
		(Mt)
1	1990 gross emissions (these determine the Assigned Amount for CP1, 2008-2012)	309.5
2	Projected CP1 gross emissions	405.4
3	Assigned Amount Units committed to PREs	7.5
4	Assigned Amount Units still held by NZ Government: (1)-(3)	302.0
5	Excess of projected gross emissions over 1990 level: (2)-(1)	95.9
6	Excess of projected gross emissions over Assigned Amount Units still held: (2)-(4)	103.5
7	Projected deforestation emissions	21.0
8	Projected excess including deforestation: (6)+(7)	124.5
9	Projected absorption by Kyoto forests	79.0
10	Excess “net emissions” for CP1: (8)-(9)	45.5

2.5 International Performance Comparisons

New Zealand’s performance relative to its emission reduction target is one of the worst in the world, and this is not due simply to rising production of agricultural exports.

Although the agricultural sector accounts for half of New Zealand’s gross emissions, and has grown strongly, non-agricultural emissions have grown faster. When comparing 1990 levels with those projected for 2010, agricultural emissions are expected to be 27% higher than the 1990 level,³¹ while non-agricultural emissions are projected to be 38% over the 1990 level.³²

³⁰ These rules explicitly provide for offsetting sequestration both within and outside New Zealand.

³¹ 1990 agriculture emissions were 32.1 Mt versus a projected average for CP1 of 40.6 Mt per year (203 Mt over the five years).

³² 1990 non-agriculture emissions were 29.4 Mt versus a projected average for CP1 of 40.5 Mt per year (202 Mt over the five years).

There are a number of ways of comparing New Zealand's performance relative to other Protocol parties that have emissions obligations. The simplest is to rank countries according to their change in gross emissions from 1990 to 2005³³ on an unadjusted basis. The following table shows New Zealand third worst on this basis if the EU nations are represented as one block. (The EU nations are often listed this way as the EU has made internal transfer arrangements to redistribute obligations among its members.)

³³ 2005 is the most recent year for which data is available for all countries.

Table 2.2 – Ranking on Unadjusted Gross Emissions (Annex B countries)

Kyoto Protocol Party	Million tonnes CO ₂ -equivalent		Change from 1990 (%)
	1990	2005	
Australia	418	525	25.6
Canada	596	747	25.3
New Zealand	62	77	24.7
Liechtenstein	0	0	17.4
United States	6,229	7,241	16.3
Iceland	3	4	10.5
Norway	50	54	8.8
Japan	1,272	1,360	6.9
Switzerland	53	54	1.7
Slovenia	19	20	0.4
European Community EU-15	4,258	4,193	-1.5
Monaco	0	0	-3.1
Croatia	32	30	-3.4
Czech Republic	196	146	-25.8
Russian Federation	2,990	2,133	-28.7
Hungary	98	80	-30.7
Poland	485	399	-32
Slovakia	72	48	-33.6
Romania	249	154	-45.6
Bulgaria	117	70	-47.2
Estonia	43	21	-50.9
Lithuania	49	23	-54.1
Ukraine	924	419	-54.7
Latvia	26	11	-58.9
Totals	18,242	17,806	-1.9
Totals excluding USA	12,013	10,565	-11.1
Individual EU-15 countries			
Spain	287	441	53.3
Portugal	60	86	42.8
Greece	109	138	26.6
Ireland	55	70	26.3
Austria	79	93	18
Italy	517	580	12.1
Luxembourg	13	13	0.4
Netherlands	213	212	-0.4
Belgium	146	144	-1.3
France	567	558	-1.6
Finland	71	69	-2.5
Denmark	70	65	-7
Sweden	72	67	-7.3
United Kingdom	771	657	-14.8
Germany	1,228	1,001	-18.4

The table lists the 38 countries in Annex B. The USA has however declined to ratify. Source: UNFCCC, *National Greenhouse Gas Inventory Data for the period 1990–2005*, document FCCC/SBI/2007/30, 27 October 2007,

<http://unfccc.int/resource/docs/2007/sbi/eng/30.pdf> Table 4 p.17, adjusted to exclude non-Annex B countries.

However, different nations took on different levels of emission reduction obligation at Kyoto and it is arguably more relevant to measure performance against those targets (notwithstanding the political nature of the target setting). New Zealand achieved one of the five most lenient targets of any nation, being required only to bring emissions back down to 1990 emission levels when other countries must generally get below the 1990 mark. When performance is evaluated against these targets, even if the EU member nations are separately assessed New Zealand still ranks eighth-worst out of the 37 countries with ratified Kyoto targets.³⁴

Table 2.3 –Ranking Adjusted for Individual Kyoto Targets (worst eight Annex B countries)

Kyoto Protocol Party	1990	2005	Change	Change	Agreed	Target	Excess of 2005 emissions over target 1990-2005 %
	Gross Unadjusted Kt	Gross Kt	in Gross 1990-2005 Kt	in Gross 1990-2005 %	Target % of 1990 gross	emissions level Kt	
Spain	287,366	440,649	153,283	53.3	92	264,377	66.7
Portugal	59,921	85,540	25,619	42.8	92	55,127	55.2
Greece	108,742	137,633	28,891	26.6	92	100,043	37.6
Ireland	55,374	69,945	14,571	26.3	92	50,944	37.3
Canada	595,954	746,889	150,935	25.3	94	560,197	33.3
Austria	79,053	93,280	14,227	18	92	72,729	28.3
Liechtenstein	230	271	40	17.4	92	212	28.1
New Zealand	61,900	77,159	15,259	24.7	100	61,900	24.7

Finally, if the internationally agreed targets are to be taken into account, then arguably the EU internal targets are also important to assessing a nation’s performance.³⁵ Some EU countries (including Austria and Luxemburg) have been given targets tougher than their Kyoto targets, which makes their actual 2005 performance look worse than in the data underlying Table 2.3, while others (including Portugal, Greece and Ireland) have been allocated much softer targets. Using the EU targets for EU-15

³⁴ The US is slightly worse than New Zealand at a 25% excess over target, but it did not ratify Kyoto, hence did not accept its target, and has therefore been excluded from Table 2.3.

³⁵ For details of these, see: UNFCCC, *Demonstration of progress in achieving commitments under the Kyoto Protocol by Parties included in Annex I to the Convention, Draft decision - CMP.3*, December 2007, p 2. http://unfccc.int/meetings/cop_13/items/4049.php: “The 15 member States of the European Community which are Parties to the agreement under Article 4 of the Kyoto Protocol must achieve a total combined level of emissions reduction of 8% compared to base year emissions. Within this total combined level of emission reduction several member States are permitted to increase their emissions: Greece (25%), Ireland (13%), Portugal (27%), Spain (15%) and Sweden (4%). Other member States have to decrease or stabilize their emissions, Austria (-13%), Belgium (-7.5%), Denmark (-21%), Finland (0%), France (0%), Germany (-21%), Italy (-6.5%), Luxembourg (-28%), the Netherlands (-6%), and the United Kingdom of Great Britain and Northern Ireland (-12.5%).”

countries and the Kyoto targets for all other countries, New Zealand moves to sixth worst status, as shown in Table 2.4.

Table 2.4 –Ranking Adjusted for EU internal and Kyoto Targets (worst six Annex B countries)

Kyoto Protocol Party	1990 emissions Kt	Target % of 1990 emissions	Target	2005 Gross Kt	Excess of 2000 over target %
Luxembourg	12687	72	9,135	12,738	39.4
Austria	79,053	87	68,776	93,280	35.6
Spain	287,366	115	330,471	440,649	33.3
Canada	595,954	94	560,197	746,889	33.3
Liechtenstein	230	92	212	271	28.1
New Zealand	61,900	100	61,900	77,159	24.7

By any measure, New Zealand’s performance is very poor relative to the target it took on. These placings might alter significantly if the accounting rules changed in future to ones that provided for emissions used in producing a good to travel with it to the destination country. While the accounting approach set out in the Protocol seems unlikely to change for CP1, the new round of negotiations provides the opportunity to revisit what is the appropriate way to allocate emissions between nations, as further discussed in section 9.5.

New Zealand’s ranking is the result of a number of problems in the way it has approached its climate change obligations. The relevant history is reviewed in the next section.

3. How Did We Get Into This Mess?

3.1 Goal Deflation

The history of climate change policy is littered with bold promises that have expired worthless and targets that were progressively downgraded:

- 1990** – The Government stated that its aim was to bring CO₂ emissions 20% below 1990 level by 2005.³⁶ This was termed an ‘interim goal’, as MFE was also to investigate the implications of 30% and 40% reductions in CO₂ by 2005 and a 15% reduction in methane emissions by 2020.
- 1991** – “The Government has committed itself to an interim target of a 20% reduction in carbon dioxide emissions by 2000”.³⁷
- 1992** – New Zealand commits to “aim to reduce [its] emissions of carbon dioxide and other greenhouse gases... to 1990 levels” after signing the Framework Convention on Climate Change.³⁸ (The goal of a 20% reduction below baseline had by now been dropped, but the new goal included non- CO₂ greenhouse gases)
- 1994** – “The Government’s primary objective is to return **net** CO₂emissions to their 1990 levels by 2000”.³⁹ (The concept of a net target - after forest sinks - was now in play.)
- 1997** – Adoption of New Zealand’s Kyoto Protocol target to reduce emissions to 1990 levels on average between 2008 and 2012. (This was clarified during 2000 as an expectation on the part of the Government and other parties that for New Zealand this meant a reduction in gross emissions without using forest credits).
- 2001** – Goal: “to ensure achievement of New Zealand’s Kyoto Protocol obligations in a manner that demonstrates environmental integrity and leadership while keeping as low as practicable the social and economic costs of measures to achieve those obligations.”⁴⁰
- 2002** – Ratification of Kyoto Protocol. However, New Zealand made clear that it would now meet its commitments only on a net basis, after counting forest sink credits.
- “Goal: New Zealand should have made significant greenhouse gas reductions on business as usual and be set towards a permanent downward path for total gross emissions by 2012.”⁴¹
 - “Policies must achieve real and sustainable reductions in emissions across all commitment periods – both to protect New Zealand’s international credibility and to ensure that we are prepared for future commitment periods.”⁴²

³⁶ Jim Bolger, Prime Minister, *Climate Change: A Response Strategy*, Government Policy Statement, 4 August 1990.

³⁷ Simon Upton, Minister for the Environment, press release, 12 June 1991.

³⁸ Rob Storey, Minister for the Environment, *The Earth Summit – Where to from Rio?*, 29 June 1992, p 7.

³⁹ Simon Upton, Minister for the Environment, press release, 21 July 1994.

⁴⁰ Cabinet Business Committee paper, *Climate Change: Measures for the Commitment Period 2008-2012*, 23 January 2001

⁴¹ Cabinet paper, ANNEX II – Goal and principles for a preferred climate change policy approach, February 2002.

- 2005** – Officials reported in a major review of climate change policy that: “With some confidence, we can predict that in the period to 2012 ... New Zealand emissions will continue to grow. Mitigation actions will be directed at reducing the *rate of growth*” (emphasis added). It was recommended that instead, “Government may wish to consider an alternative strategic climate change goal” that would be non-quantitative and not measurable.⁴³ This followed publication of estimates that New Zealand would be in deficit even when counting forestry credits, and would be able to meet its Kyoto commitments only through purchasing credits offshore.
- 2006** – A series of sizable discussion documents were produced in December 2006 for consultation. Neither of the central documents contained any target for emissions reduction, relying instead on broad statements of principle that set no explicit boundaries.⁴⁴
- 2008** - The ETS proposes to curb only the rate of growth in net emissions, by an amount that is not specified. Its goal statement is “reducing New Zealand’s net emissions below business-as-usual levels”.⁴⁵ Restricting the goal to just “net” emissions means that there is no commitment to even attempt to target reductions in the rate at which gross emissions are rising.

3.2 Failure to Introduce Economic Instruments

The Ministry for the Environment (MfE) was set up in 1986 to be an impartial source of policy advice to Government on environmental matters. Its mandate was to concentrate on analysis and advice on a clearly-specified set of issues, prominent amongst which was the introduction of economic instruments to internalise environmental externalities.⁴⁶

The Ministry’s first annual report listed “application of economic instruments for environmental management” amongst its key workstreams⁴⁷, but thereafter the subject received only passing mention. The Ministry commissioned a study in 1989 on the application of economic instruments to the global problem of greenhouse gas emissions⁴⁸, but little work was done on the application of economic instruments in a

⁴² Cabinet paper, ANNEX II – Goal and principles for a preferred climate change policy approach, February 2002.

⁴³ *Review of Climate Change Policies*, Ministry for the Environment, November 2005, p75 and 413.

⁴⁴ *Discussion paper on measures to Reduce Greenhouse Gas Emissions in New Zealand Post-2012*, MFE, December 2006, p 8; and *Transitional Measures: Options to move towards low emission electricity and stationary energy supply and to facilitate a transition to greenhouse gas pricing in the future*, A discussion paper, MED and MFE, December 2006, p 9.

⁴⁵ *Framework*, p 5.

⁴⁶ For early discussion of the purposes and functions of the new ministry see the Annual Reports in *Appendices to the Journals of the House of Representatives* 1987-1990, Document C.11 in each annual set; debate on the Environment Act 1986 in *Hansard* 1986 pp. 2980-3000, 5402-5407, 6162-6171, 6354-6356, and 6356-6363; Synergy Applied System Research, *Environment Forum 1985: Synopsis of Submissions and Forum Record*, April 1985.

⁴⁷ *Report of the Ministry for the Environment for the Period 1 December 1986 to 31 March 1987*, AJHR 1987-90 C.11, p.5.

⁴⁸ G. Bertram, R.J. Stephens, and C.C. Wallace, *Economic Instruments and the Greenhouse Effect*, report for Ministry for the Environment, 1989, later published as Working Paper 3/90, Graduate School of Business and Government Management, Victoria University of

national setting. The New Zealand Climate Change Programme, set up by the Ministry in 1989-90⁴⁹, produced a scoping paper⁵⁰ which proposed the goal of a 20% reduction on 1990 CO₂ emissions to be achieved by the year 2000⁵¹, but contained no substantive proposals on how this was to be achieved.

In June 1992 the Government approved a package of measures, including improved energy efficiency and increased forest planting, which were projected to reduce CO₂ emissions to 1990 levels by the year 2000, effectively a 20% cut relative to business-as-usual. A research programme to achieve further reductions of greenhouse gas emissions was also approved.⁵² Economic instruments, however, were conspicuously absent from the policy framework.

Modelling of the economic effects of a carbon tax was commissioned by the Ministry in 1993⁵³, but in July 1994 a proposed \$10/t carbon tax was dropped and a climate-change policy package was approved by Cabinet which focused instead on voluntary agreements with industry, monitoring of emissions, rhetorical support for renewables and energy efficiency, and the threat that a carbon tax would be introduced in 1997 if voluntary action proved insufficient to slow the growth of emissions above the 1990 benchmark⁵⁴. These largely symbolic measures may have been prompted by the Government's need to have something to report in New Zealand's first National Communication to the UNFCCC for its meeting in Geneva in September 1994. The most substantial action in 1994 was the decision to assemble a national greenhouse-gas inventory and, in particular, to collect data on agricultural methane emissions.

During 1995 an officials' Working Group on CO₂ Policy met "to evaluate the costs and benefits of alternative economic instruments and other measures for achieving the Government's CO₂ target, while minimising the impact on output and growth in the economy"⁵⁵, and a report was published in June 1996 recommending a tradeable

Wellington, May 1990. This report was the basis for Geoff Bertram, "Tradeable Emission Quotas and the Control of Greenhouse Gases", *Journal of Development Studies*, Vol.28 No 3, April 1992, pp.423-446, later republished in T. Tietenberg (ed.) *The Economics of Global Warming*, Edward Elgar International Library of Critical Writings in Economics Vol.74, Cheltenham, UK, 1997.

⁴⁹ *Report of the Ministry for the Environment for the Period ending 31 March 1990*, AJHR 1990-91 C.11, p.3. Note that the timelines chart in Parliamentary Commissioner for the Environment, *Creating Our Future: Sustainable Development for New Zealand* (Wellington, June 2002) p.10 shows the "New Zealand Climate Change Programme" as having been "in preparation" only from 2001, with no strategy recorded for the preceding decade – testimony perhaps to the absence of any tangible progress in, or even institutional memory of, the original 1989-90 strategy.

⁵⁰ David Wratt, et al, *Climate Change: The Consensus and the Debate*, Wellington: New Zealand Meteorological Service and Ministry for the Environment, 1991.

⁵¹ *Report of the Ministry for the Environment for the Period Ending 30 June 1991*, AJHR 1991-93 C.11, p.6.

⁵² *Report of the Ministry for the Environment for the Year ended 30 June 1992*, AJHR 1991-93 C.11 p.8.

⁵³ Bertram, G, A. Stroombergen and S Terry, *Energy and Carbon Taxes: Options and Impacts*, Wellington: Simon Terry Associates and BERL report for Ministry for the Environment, 1993.

⁵⁴ *Annual Report of the Ministry for the Environment for the Year Ended 30 June 1994*, AJHR 1993-96 Vol.XX, C.11, p.4.

⁵⁵ *Annual Report of the Ministry for the Environment for the Year Ended 30 June 1996*, AJHR 1996-99 Vol.XIX, C.11, p.8.

carbon certificate scheme.⁵⁶ Any interim carbon charges, the working group recommended, should be low-level only. The recommended tradeable certificates scheme was complex and the report cut across the (already limited) credibility of the earlier threat to introduce a carbon tax in 1997.

The 1996-97 year saw Ministry staff “helping to design a low-level carbon charge”⁵⁷, but the entire workstream built around setting an emissions target for 2000 and the threat to bring in a carbon tax in 1997 came to an end the following year when the focus of climate-change policy shifted sharply.

The new approach flowed from New Zealand’s decision to lobby hard for inclusion of carbon sinks in the Berlin Mandate and subsequent Kyoto Protocol, and to build a new strategy around the six GHGs included in the Kyoto Protocol⁵⁸. The Ministry itself seems to have believed that the inclusion of forestry sinks in a net emissions target effectively removed the urgency of reducing CO₂ emissions from energy. The earlier stated goal of bringing gross emissions below the 1990 level was simply abandoned, without having at any stage been the subject of serious, credible policy action.

The New Zealand Government’s failure to make progress towards emission reduction during the 1990s, and in particular the abandonment of tentative moves towards even a minimal carbon tax, reflected the vulnerability of the Government and MfE to regulatory capture by large industry, whose lobbying successfully diverted policy away from economic instruments and emission-reduction targets and into the safe but ineffective backwater of “voluntary agreements”.

In 1996 an OECD review of New Zealand environmental policies commented on the lack of economic instruments⁵⁹

Economic instruments [as] a mechanism for cost internalization ... could be used on a wider scale in New Zealand. In particular, pollution charges, water charges, energy taxes and waste charges could be strengthened.... There is a need to develop concrete targets for environmental policies, with good monitoring of progress achieved as well as detailed examination of the costs involved. The current lack of targets and of economic and physical data is an impediment to pursuing cost-effective environmental policies. This approach ought to be corrected.

Ten years on, there were still effectively no environmental taxes in place other than the (revenue-driven) petrol and road taxes. Neither has the option of issuing a national policy statement under the Resource Management Act 1991 been utilised,

⁵⁶ *Climate Change and CO2 Policy: A Durable Response*, Discussion Document of the Working Group on CO2 Policy, Wellington, June 1996.

⁵⁷ *Annual Report of the Ministry for the Environment for the Year Ended 30 June 1997*, AJHR 1996-99 Vol.XIX, C.11, p.8.

⁵⁸ *Annual Report of the Ministry for the Environment for the Year Ended 30 June 1998*, AJHR 1996-99 Vol.XIX, C.11, p.7; Ministry for the Environment, *Climate Change: More than just Carbon Dioxide. Significance, Sources and Solutions for Non-CO2 Greenhouse Gases in New Zealand*, Wellington 1998.

⁵⁹ OECD, *Environmental Performance Review: New Zealand*, Paris, 1996, p.19.

and the Act's call-in provisions have been used only once for climate change. In 1994, the Minister for the Environment "called-in" an ECNZ proposal to build a gas-fired generating plant at Stratford.⁶⁰ Following an inquiry, the Minister granted consent on condition that the 1.5 Mt of CO₂ emissions be mitigated by tree planting or other means. Far from establishing a principle that all new thermal generating plant ought to bear the cost of its own GHG mitigation, the Stratford exercise was a one-off, never repeated for electricity generation projects up to the end of 2007.

The Labour Government's 2001 Tax Review report noted that under the RMA, "users are able to benefit from their use of environmental resources without charge." The report pointed out that "the proportion of tax revenue collected from eco-taxes in New Zealand is about half the average for the OECD".⁶¹

The Tax Review strongly supported introduction of a broad-based carbon tax as the centrepiece of New Zealand compliance with Kyoto⁶², while noting that the 1994-97 carbon-tax proposal had been pre-emptively subverted by the Government's decision to enter into case-by-case negotiated arrangements with large businesses.⁶³

In 2002, following ratification of the Kyoto protocol, a climate change policy package was announced with four key planks⁶⁴:

- a carbon tax on energy, industrial, and transport emissions, capped at \$25 per tonne;
- Negotiated Greenhouse Agreements (NGAs) for "at risk" large emitters;
- Projects to Reduce Emissions (PRE), with Kyoto units distributed to incentivise projects that would generate additional emissions reductions;
- industry and government funding of research in the agricultural sector.

In 2005 the government announced that the proposed carbon tax would initially be set at \$15/tonne and would come into effect on 1 April 2007. In December 2005, however, the Government again abandoned its carbon tax proposal in the face of strong lobbying pressure from industry and business interests, combined with opposition to the tax by coalition partner New Zealand First.

3.3 Collapse of the Kyoto Accounts

Since ratification of the Kyoto Protocol in 2002, the Ministry for the Environment has produced sets of accounts to show the projected emissions outcomes for New Zealand over the five years of CP1. The bottom line in these accounts is the net emissions position relative to the 1990 level target. When this is in surplus, the country is

⁶⁰ *Annual Report of the Ministry for the Environment for the Year Ended 30 June 1994* p.5, and *Annual Report of the Ministry for the Environment for the Year Ended 30 June 1995* p.5.

⁶¹ McLeod, R., D. Patterson, S. Jones, S. Chatterjee and E. Sieper, *Tax Review 2001: Final Report*, Wellington, October 2001, pp.44-45.

⁶² McLeod et al 2001 recommendation 5.31.

⁶³ McLeod et al 2001 Chapter 5 pp.51-56 and Annex C pp.109-119. The recommendations quoted above are from pp.54-55.

⁶⁴ *Cabinet Paper CBC (05) 394: Climate Change – Review of Policy and Next Steps*, November 2005

projected to have spare emission credits to sell on the international market. When in deficit, Kyoto credits must be bought in from the world market.

At the time of ratifying the Protocol in 2002, then Climate Change Minister Pete Hodgson told Parliament that: “New Zealand will be a net seller of forest sink credits in the new international market created by the protocol”.⁶⁵ The first column of Table 3.1 shows the projections underpinning that claim: gross emissions 50-75 Mt above 1990 levels, offset by an anticipated 110 Mt of credits for afforestation, giving an overall net surplus of 35-60 Mt (with a mean value of 47.5 Mt).⁶⁶

As the table shows, the accounts have progressively deteriorated since then, to the point where in 2007 they project the net deficit of 45.5 Mt discussed in Chapter 2.

The following subsections describe three factors that were central to the numbers worsening. First, between 2002 and 2003, came a downward revision of the 1990 baseline on which the Kyoto target rests. Then between 2003 and 2006 the projected number of forest credits available to New Zealand fell steeply. Finally, the important role of what were termed “projects to reduce emissions” is documented.

Table 3.1

New Zealand's Deteriorating Kyoto Accounts						
Projected Megatonnes of Carbon Dioxide Equivalent, 2008-2012						
Year of Projection	2002	2003	2004	2005	2006	2007
Projected Emissions	415 to 440	383	399	402	399	405
Allowed Emissions	365	309	308	308	308	309
Excess Emissions	50 to 75	74	91	94	91	96
Other Emissions Liabilities	0	0	10	8	8	8
Emission Reduction Policies	-	25	39	-	-	-
Total Emissions Deficit	50 to 75	49	62	102	98	104
Forest Credits	110	105	95	71	57	58
Net Emissions Position	35 to 60	56	33	-31	-41	-46

Notes: All figures are drawn directly from the relevant MFE net position report for the year in question, rounded to the nearest whole number. The accounting convention changed from 2005 to include the effect of policies within “projected emissions”.

Sources: 2002: *National Interest Analysis Kyoto Protocol to the UN Framework Convention on Climate Change*, February 2002, <http://www.mfe.govt.nz/issues/climate/consultation/round1/national-interest-analysis.pdf>, p 18.
 2003 and 2004: *Report on revised projections for the Kyoto Protocol - first commitment period* 30 April 2004, <http://www.mfe.govt.nz/publications/climate/revised-projections-kyoto-protocol/revised-projections-kyoto-protocol.pdf>, p12.
 2005: *Projected balance of units during the first commitment period of the Kyoto Protocol*, May 2005, <http://www.mfe.govt.nz/publications/climate/projected-balance-units-may05/index.html>, p.7.
 2006: *Projected balance of emissions units during the first commitment period of the Kyoto Protocol*, June 2006, <http://www.mfe.govt.nz/publications/climate/projected-balance-emissions-jun06/projected-balance-emissions-jun06.pdf>, p 34.
 2007: *Projected balance of emissions units during the first commitment period of the Kyoto Protocol*, September 2007, <http://www.mfe.govt.nz/publications/climate/projected-balance-emissions-sep07/projected-balance-emissions-sep07.pdf>, p 10.

⁶⁵ *Hansard* Vol.605 p.2569, Questions for Oral Answer, 10 December 2002.

⁶⁶ In subsequent years the accounts provided an “expected” projection as well as high and low ones. For the 2002 accounts, a mean of the range is here taken as a proxy for the expected outcome.

3.3.1 The Methane Belch that Really Hurt

The first jolt, which went unannounced and unreported at the time, occurred within a year of Parliament receiving in February 2002 the estimates that underpinned New Zealand ratifying the Protocol.⁶⁷ By April 2003 MfE filed internationally a revised greenhouse-gas inventory that more than wiped out the surplus of credits Parliament had been told could be expected.⁶⁸

The new inventory revised sharply downwards the emissions estimated to have occurred in New Zealand during the 1990 base year. Each country is responsible for filing to the United Nations not only estimates of current and future emissions, but also revisions that improve the accuracy of estimates of historic emissions. A key past reference point is the 1990 base year.

When in 2002 New Zealand upgraded its methodology for estimating agricultural emissions, there was a dramatic revision in the estimates for the amount of methane that had been emitted in 1990 (see change in the “allowed emissions” row in Table 3.1 above). It emerged that the previous estimates were about 46% too high compared with the new more reliable figure.⁶⁹ The old estimate for nitrous oxide emissions was also higher than the new one, by 16%.⁷⁰

As agriculture produces half New Zealand’s total emissions (with methane accounting for two thirds of this and nitrous oxides the other third), the new estimates meant that the emissions target (1990 levels) had been over-estimated by a full 18% in the National Interest Analysis presented to Parliament. In other words, the estimate of what New Zealand could emit without penalty during CP1 had dramatically shrunk, meaning that deeper cuts in emissions would be required to meet the new target, or alternatively that greatly-increased offshore purchases of carbon credits would be required to cover excess emissions.

The revisions reduced New Zealand’s total allowed emissions for CP1 from 365 to 309 Mt – a drop of 56 Mt. The mis-estimate of agricultural emissions that had driven this was worth \$1.68 billion at a carbon price of \$30/t.

New Zealand’s official filing to the UN explained the reasons for the methane revision as follows:

The values in this inventory are considerably lower than those previously reported, and show an increase in methane emissions since 1990 rather than a decrease. Two factors are responsible for these changes. Firstly, previous inventories were

⁶⁷ *National Interest Analysis Kyoto Protocol to the UN Framework Convention on Climate Change*, February 2002, p 18.

⁶⁸ That is, the surplus of 35-60 Mt shown in table 3.1, with a mean value of 47.5 Mt.

⁶⁹ Total methane emissions for the 1990 year, which in 2002 had been estimated as 1493.1 (Gg CH₄) per animal class, were revised to 1017.7 in 2003 – a 46% primary difference.: See MFE, *National Inventory Report – New Zealand, Greenhouse Gas Inventory 1990-2001*, April 2003, p28, Table 10.

⁷⁰ Total nitrous oxide emissions for the 1990 year were in 2002 estimated to be 37 (Gg CH₄) per animal class, as against 31.9 in 2003 – a 16% primary difference. Source: MFE, *National Inventory Report – New Zealand, Greenhouse Gas Inventory 1990-2001*, April 2003, p35, table 13.

calculated using methane emission factors derived from a complex model of ruminant digestion (the Baldwin model) that over-predicted methane per unit of intake by about 20 to 30% compared to New Zealand experimental data (Clark, 2001). Secondly, the revised inventory uses animal performance data that reflects the increased levels of productivity achieved by New Zealand farmers since 1990. Animals are now larger and more productive than they were in 1990 – they eat more and thus emit more methane. Previous inventories were calculated using a fixed emission factor across all years for each animal class.⁷¹

Revision	2002 Estimate Mt	2007 Estimate Mt	Over- Estimate Mt	Value at \$30/t \$ mill
“Allowed Emissions”	365	309	56	1,680

MFE officials formally reported on this to Minister Hodgson on 5 May 2003. After gently breaking the news, the briefing states:

Completion of the inventory provides an opportunity for a press release, highlighting the revisions and improvements that have occurred since the last inventory report.⁷²

Despite this specific recommendation for a release, the Government opted not to advise the public of the dramatically revised estimate and its implications. The new value was published in the subsequent set of accounts, but with no comparison against the 2002 estimate nor explanation of the change. So far as we are aware, the significance of the new value remained unknown outside government circles until the Sustainability Council reported it in March 2007.⁷³

Other things equal, the change in the base year benchmark would have left the 2003 accounts (second column of the table above) showing a negative overall position. However, in the preparation of the 2003 accounts some underlying assumptions were considerably altered, resulting in the figure for projected emissions (top row of the table) being lowered, while a new credit entry of 25 Mt was made for policies intended to reduce emissions (fifth row of the table). The cut in projected emissions was partly justified and partly not, judging by subsequent projections. The new entry for emission reductions resulting from government policies was to prove a fiction, as detailed in section 3.3.3.

Following the adjustments, the 2003 (and also the 2004) accounts projected that the taxpayer would still be making money once the forest credits were counted. (The Government had decided by this point that it would claim essentially all the forestry credits and liabilities, having earlier committed to sharing a proportion of the credits with forest owners.)

3.3.2 Kyoto Forests that Fell

⁷¹ MFE, *National Inventory Report – New Zealand, Greenhouse Gas Inventory 1990-2001*, April 2003, p28.

⁷² MFE, *New Zealand’s greenhouse gas inventory 2001*, briefing paper dated May 5 2002, p 4.

⁷³ Simon Terry, “Heat Treatment”, *NZ Listener*, March 24 2007.

A second major change in the accounts related to the overoptimistic 2002 projection of credits for forests planted after 1989 – the Kyoto forests.

Government's original plan had been to largely meet the Kyoto emissions reduction target without counting the forests, allowing the credits to be sold overseas. A cabinet paper in October 2001 noted that Government had pledged internationally "that it would not seek to avoid meeting its commitments" to cut emissions by instead using the forestry credits to mop up any excess:

It is projected that forest planting since 1990 will generate a substantial quantity of sink credits (about 110 million tonnes over 2008-2012). This amount is larger than projected excess emissions. However, New Zealand has taken the position internationally that it would not seek to avoid meeting its commitments through retention of emission units generated from Kyoto forest sinks, and Cabinet has already:

...

- noted that making sink credits tradable internationally *would reduce the risk of such sink credits being used to shield emitters from having to face the cost of their emission reduction responsibility*, and this would enhance New Zealand's credibility.⁷⁴

At the point when the Government withdrew from this commitment in 2002 and claimed ownership of all the forestry credits,⁷⁵ the numbers at the time also suggested that this would provide insurance against any failure of other policies to produce genuine emission reductions. Such was the expected volume of the forestry credits relative to New Zealand's excess of gross emissions that the Government had stated when ratifying the Protocol that:

New Zealand would, in a technical sense at least, be able to meet the letter of its commitments under the Protocol, for the first commitment period, without taking further domestic action.⁷⁶

This was, of course, precisely why other Protocol parties had asked New Zealand not to rely on a windfall of already-planted forests as a means of avoiding having to bear a share of the Kyoto burden.

When a more detailed examination was made of the 110 Mt of projected carbon absorption, the figures began to melt.⁷⁷ The slide showed up most noticeably in 2005 which saw the removal of a large amount of recent plantings from the category of "Kyoto forests". This was the biggest factor contributing to 24 Mt fewer forestry credits⁷⁸ being projected in that year's accounts:

A loss of 14.7 Mt CO₂ is included for forests planted into existing kanuka and manuka forest. Field studies have shown that a proportion of existing planted forests,

⁷⁴ Cabinet Policy Committee Paper 261, 2001, emphasis in original.

⁷⁵ *Carbon Tax Included In Kyoto Policy*, NewsRoom, 30 April 2002.

⁷⁶ *National Interest Analysis Kyoto Protocol to the UN Framework Convention on Climate Change*, February 2002,, p 20.

⁷⁷ See the "forest credits" row in Table 3.1.

⁷⁸ Down from 95 Mt in the 2004 accounts to 71 Mt in the 2005 accounts.

estimated at up to 16% nationally, were planted in scrub that could meet the definition of forest in the Kyoto Protocol, i.e. the planting was not onto “grassland”.⁷⁹

Planting rates had also been revised substantially, with projected plantings halved from the previous year’s 20,000 ha/yr figure to a most likely estimate of 10,000 ha/yr.⁸⁰ The following year, 2006, it was halved again to a rate of 5,000 ha/yr⁸¹ and that year’s report noted that: “Afforestation has fallen from a 30-year annual average (1974 to 2004) of 43,000 hectares to just 6,000 hectares in the year to December 2005”.⁸²

While the fall-off in planting had major implications for meeting emission reduction targets in later years, trees absorb so little carbon in the early years of their life that this change of forecast had only a very minor impact on the accounts for CP1. By way of illustration, if 5,000 hectares were newly planted each year from 2007 to 2012, this would capture only 0.9 Mt over the period.⁸³

Overall, the large drop in projected forestry credits since 2002 was due not so much to reduced planting as to the rocketing rate of deforestation. The 2006 report spoke of:

The new phenomenon of deforestation where plantation forest land is converted to alternative land uses, particularly pastoral grazing. In the year ended March 2005, an estimated 7,000 hectares of deforestation occurred. Historically there has been little plantation deforestation.⁸⁴

An historical rate of deforestation of 2-3% per annum, which equated to 6.3 Mt of emissions, had been assumed in the 2005 accounts.⁸⁵ However, a review of the 2005 accounts commissioned by MfE highlighted the uncertainties surrounding this figure and methodological issue, commenting that the “pessimistic” scenario included in the 2005 accounts had been

based on clearance of 30,000 ha over CP1. This value appears to have been set by the ‘cap on CO₂ liability resulting from deforestation’ of 21 Mt CO₂ eq set by the NZ Government. It is not clear as to the Government’s policy response should this cap be breached. In terms of uncertainty calculation, a value of –21 Mt CO₂ eq is used to truncate the Monte Carlo triangular probability distribution. We recommend that

⁷⁹ MfE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, May 2005, p 19. Also Martin Adams et al, *Review of New Zealand’s Net Position: Final Report to the Ministry for the Environment*, AEA Technology report AEAT/ED48447/R1, 24 October 2005, pp.23-24.

⁸⁰ MfE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2005, p 18.

⁸¹ MfE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, June 2006, p 31.

⁸² MfE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2006, p 28.

⁸³ MfE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2007, p 27.

⁸⁴ MfE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2006, p 28.

⁸⁵ MfE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, May 2005, p 19.

consideration might be given to sampling beyond this limit for the pessimistic scenario.

Methods for assessing future deforestation have been reviewed and this work illustrates the difficulty of predicting the future intentions of forest managers.

Defining deforestation as land that is not replanted after harvest is rather narrow. Deforestation of natural forests and shrublands that may meet the Kyoto forest definition are not included in this approach. The drivers for deforestation may include for example perceived needs for pasture or housing development and will not simply depend on the narrow views of forest managers on the economics of commercial forestry. Further work is required to investigate where and why permanent deforestation occurs in NZ.⁸⁶

Following a survey of forest owner intentions that showed they expected to deforest 47,000 hectares during CP1, the estimated liability made a six-fold jump to 38.5 Mt in the 2006 accounts.⁸⁷ The next year it increased to 41 Mt following a further survey of intentions.⁸⁸

Unlike other changes, this one did not fully register on the Kyoto accounts, as the Government had early on set a cap on its liability for deforestation of 21 Mt. So while the 2007 projections register 41 Mt of deforestation liabilities, the Crown only acknowledges 21 Mt of these and treats the other 20 Mt as liabilities for private parties to pay. Nonetheless, the nation's Kyoto liability (the measure on which the rest of the accounts are based) is 41 Mt for deforestation.

Summing all the forestry-related changes, the total projected credits from forestry dropped from 110 Mt in 2002 to just 38 Mt by 2007⁸⁹ – a two-thirds reduction of 72 Mt with a current value of \$2.16 billion at \$30/t.

Revision	2002 Estimate Mt	2007 Estimate Mt	Over- Estimate Mt	Value at \$30/t \$ mill
Forestry Credits	110	38	72	2,160

3.3.3 Emission Reduction Policies Without Substance

The expected gains from a host of government policies were included in the Kyoto accounts from 2003 on, but with wildly high estimates in the early years for the savings these would produce. This was largely because a targeted emission reduction would be named, and the projected savings would be included in the Kyoto accounts,

⁸⁶ Martin Adams *et al*, *Review of New Zealand's Net Position: Final Report to the Ministry for the Environment*, AEA Technology report AEAT/ED48447/R1, 24 October 2005, p.26.

⁸⁷ MfE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, June 2006, pp. 31 and 35.

⁸⁸ "41.0 Mt CO₂-e represents 50,000 hectares which is the base scenario from a deforestation intentions survey carried out in late 2006." MfE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2006, p 27.

⁸⁹ As discussed above, while the books show 58 Mt of credits net, another 20 Mt must be deducted to allow for liabilities not covered by the Government, making figure 38 Mt.

before there was any adequate specification of how the promised gains were to be achieved.

One of the key programmes was the Energy Efficiency and Conservation Strategy. Launched in 2001, it set a target of “at least 20% improvement in economy wide energy efficiency by 2012”. The motivation was heavily climate change focused, and the expected outcome was stated to be a halving of the gap between business as usual emissions and 1990 levels (as then understood).⁹⁰ When reported on in the National Interest Analysis in 2002, this strategy was expected to reduce emissions by between 18 and 22.5 Mt over CP1.⁹¹

This clearly made up a considerable proportion of the estimated 25 Mt of savings to come from unspecified government policies that appeared in the 2003 Kyoto accounts.⁹² However, by 2004, the best estimate for the Energy Efficiency and Conservation Strategy had crashed to just 5 Mt.⁹³ A year later it was 3.2 Mt and by 2006 and 2007 it was down to about 1 Mt.⁹⁴ The original proposal had based its target on the scale of gains other countries were planning to achieve. It provided no documentation of the target having been checked against New Zealand conditions.⁹⁵

This process of crediting to the accounts what seems little better than “pick a number” reached its peak in 2004 when 39 Mt of savings were counted from “policies”. This amount is close to the total net deficit currently projected under the Protocol of 45.5 Mt.⁹⁶ However, along with the projected savings from energy efficiency, every one of these policy programmes of any significance was later assessed to be hollow.

The Government had, for example, counted 6 Mt for the New Zealand Waste Strategy in 2004.⁹⁷ The next year this was down to 2.6 Mt. By 2007 it was estimated as 1.8 Mt, but significantly it was not even counted that year as one of the policies expected to have an impact on net emissions.⁹⁸

⁹⁰ *National Energy Efficiency and Conservation Strategy*, draft, EECA, 2001, p 5.

⁹¹ *National Interest Analysis Kyoto Protocol to the UN Framework Convention on Climate Change*, February 2002, p 24. “It is estimated that, if the targets that have been established are met, the National Energy Efficiency and Conservation Strategy will reduce New Zealand’s greenhouse gas emissions by between 18 and 22.5 million tonnes of carbon dioxide-equivalent during the commitment period, relative to the emissions that would have otherwise occurred.” Note that this estimate was not included in the overall net balance subsequently presented to Parliament.

⁹² MFE, *Report on revised projections for the Kyoto Protocol first commitment period*, 30 April 2004, p 5.

⁹³ MFE, *Report on revised projections for the Kyoto Protocol first commitment period*, 30 April 2004, p 5.

⁹⁴ MFE states that part of a sensitivity test undertaken but otherwise not reported provides for 1.7 PJ of residential energy savings and 2.34 PJ of industrial and commercial savings beyond BAU. The emissions savings that could be expected from this are indicated in the EECA strategy document – roughly a 5 PJ reduction equating to 1 Mt of emissions saved, and so a 0.81 Mt credit. Source: Letter from MFE to Sustainability Council, 16 April 2007.

⁹⁵ *National Energy Efficiency and Conservation Strategy*, draft, EECA, 2001, p 5.

⁹⁶ As set out in the 2007 accounts.

⁹⁷ MFE, *Report on revised projections for the Kyoto Protocol first commitment period*, 30 April 2004, p 5.

⁹⁸ MFE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2007, p 78.

The 2004 accounts were also padded by including a policy proposal that had been included before there was any clarity that Parliament would support the change of law required to implement it. A reduction of 11 Mt was booked in 2004 as the impact of the then-proposed carbon tax⁹⁹ - an entry that had to be removed in 2006 after the Government dropped the idea.

In total, the 39 Mt of policy-driven emissions reductions booked in the 2004 accounts had fallen by 2006 to a mere 5.9 Mt (for the same policies). This is just 15% of the original projection – and a 33 Mt difference.¹⁰⁰ When the declared costs of the programmes are factored in, the overall result is that they represent a net cost on the Kyoto accounts.

Revision	2004 Estimate Mt	2006 Estimate Mt	Over- Estimate Mt	Value at \$30/t \$ mill
Policies to Reduce Emissions	39	6	33	990

So Government programmes that were supposed to reduce the nation’s emissions by 10% turned out on closer examination to be valueless on the accounts. The inconvenient truth was that, in aggregate, all the announced steps that MfE and MED had for three years promised were going to make a major difference to New Zealand’s emissions were worthless.

This plummet in the projections cannot be readily observed simply by reading the various years’ accounts. There was no consistent reconciliation of these projections year by year (as Table 3.1 above does) in the way other significant figures are tracked in the Kyoto accounts. Only sporadic comparisons were made. Also making the tracking difficult was a shift from counting each project’s effect as an explicit reduction on projected business as usual emissions (2004 accounts) through to incorporating all the policies within the broader modelling (2006 accounts).¹⁰¹

A check of the most recent 2007 accounts for the four policies that had been counted as expected to have an impact on the Kyoto accounts reveals that no estimate of the expected emission reductions is provided for any of these polices.¹⁰² Two new

⁹⁹ MfE, *Report on revised projections for the Kyoto Protocol first commitment period*, 30 April 2004, p 5.

¹⁰⁰ MfE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2006. Interpolated from 2004 report and 2006 report assisted by a letter from MfE to Sustainability Council, 16 April 2007, answering questions on this.

¹⁰¹ MfE explained the reason for the change in accounting convention as follows: “In 2005 and following reports, the Ministry for the Environment (which oversees the projections from Ministry for Agriculture and Forestry and the Ministry for Economic Development) changed the way emissions were reported in the net position report to obtain better alignment with the annual inventory submitted to the UNFCCC. This decision was reviewed by the UK consulting firm AEAT that confirmed that the method used was appropriate”. MfE, email to RNZ’s *Nine to Noon*, 20 March 2007.

¹⁰² MfE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2007, p 50. MED responses to enquiries by the Sustainability Council

policies are the biofuels obligation (the effect of which is not counted for the net position as gains are assumed to be no more than inputs) and the solar water heater programme which, although projected in the accounts to deliver an additional 5,000 units in the year to March 2008,¹⁰³ is making a very slow start and will need to raise unit sales very significantly to meet its targets.

The 2007 accounts note that projected total emissions include allowance for the "outcomes of policy measures".¹⁰⁴ However when specifically asked to state "what are the estimated emissions without any policies and what contribution is each policy that is now counted assumed to make", MFE ducked the question. It stated "The Ministry for the Environment does not calculate a projection of greenhouse gas emissions that excludes existing policies."¹⁰⁵ However, when MED was subsequently approached with the same question, it transpired that some of the figures were directly available and other figures that would allow calculations to be undertaken were located, though MED could not fully disaggregate these.¹⁰⁶

Less than transparent accounting meant that the role of the collapse of the policies was far from evident when the dramatic reversal in the Kyoto accounts came in May 2005. That year, New Zealand's net position under the Protocol crashed from the previously-projected 33 Mt surplus to a deficit of 31 Mt. Appearing before Parliament's Local Government and Environment Select Committee, then Environment Ministry CEO Barry Carbon attributed the sudden turnaround to issues to do with how forest credits would be assessed. Only under repeated questioning did he acknowledge that projection errors were the bigger part of the change from the previous year.

Even then, the committee appeared to be left with the impression from the oral responses given by the contingent of officials that it was a change in the forecast of actual emissions that was the root cause of the non-forestry changes. The Environment Ministry's written reportage of this part of the two billion-dollar deterioration in the accounts can also easily be interpreted as suggesting that it was largely a result of an increase in "projected emissions".¹⁰⁷

suggest that even including the two new policies, in aggregate the policies will represent a net cost on the accounts.

¹⁰³ MFE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2007, p 46.

¹⁰⁴ MFE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2007, p 14.

¹⁰⁵ Letter from MFE to Sustainability Council, 7 February 2008.

¹⁰⁶ Personal communication, MED, 26 February 2008.

¹⁰⁷ The 2005 report opens the reconciliation discussion by stating on p 21: "The decrease in the projected balance of units from the 2004 projection is due to: 1. An increase in projected energy and industrial processes emissions over the first commitment period. This is caused by changes in the modelled emissions and policy measures and changes in the reductions attributed to non-modelled policy measures." It then goes on to explain in indent:

- i. Changes in modelled emissions include updated information from the Maui re-evaluation showing an increase in the long-term price of gas and consequently more coal use in electricity generation, the impact of diesel consumption in excess of the previous projection and an increase in fugitive and industrial processes emissions.
- ii. The new projection also includes changes resulting from modelling reductions from the carbon charge and the Projects to Reduce Emissions policy.

That impression was reinforced by the way the reconciliation with past years was presented in the tables. The emissions for each sector were listed under the heading “projected emissions including policies”, which to anyone not steeped in the detail would read as simply “projected emissions” (for which there had been a big rise in the 2005 accounts).¹⁰⁸ Only careful comparison with the previous year’s accounts shows that there was less than a 2% rise in the forecast for actual emissions, once the allowance for the carbon tax is removed. The biggest single factor in the turnaround was the collapse of the savings previously attributed to policies, followed closely by the reduction in expected credits from Kyoto forests.

3.3.4 Inadequate Risk Management

The history of the Kyoto accounts reveals a dangerous mix of unfounded optimism, padding, and late investigation of key uncertainties. In particular, the volume of credits expected from forestry plantings appears to have provided false comfort with the result that investigations into major sources of uncertainty were left far too late.

For MAF and MfE to wait for over five years after signing the Protocol in 1997 before undertaking the tier 2 work that showed a 46% overestimation of the 1990 methane emissions appears to represent quite inadequate risk management, given that these emissions make up a third of New Zealand’s total. While it can also be argued that this work should have been done prior to New Zealand agreeing its Kyoto target, in reality this might not have made much difference as New Zealand had in any case managed to negotiate one of the five most lenient targets.¹⁰⁹

Projections surrounding the forestry credits were more explicable in terms of an unfolding story as falling log prices and the rising value of alternative land uses altered forestry economics. However, the failure to recognise until 2005 that some 15 Mt worth of credits previously counted would not meet the Protocol definition of new forest again points to inadequate risk management.

The projections surrounding policies designed to reduce emissions showed the most serious problems. The issue here was not late investigation, but an inadequate basis for ever including such poorly founded estimates in the accounts, and allowing the accounts to be padded out with a major policy (the carbon tax) that had not gained the necessary approval. It cannot have been just a matter of bad luck that the MfE and MED estimates for every single policy had to be seriously downgraded or abandoned within a few years. Reconciliation of the performance of these estimates became increasingly difficult to track, however.

iii. There were also changes to reductions from non-modelled policy measures, i.e. the NEECS, local Government initiatives and the Small to medium business opportunities.” MFE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2005.

¹⁰⁸ MFE, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto Protocol*, 2007, p 22, Table 7.

¹⁰⁹ Only by holding out on the other Kyoto parties until the very end and threatening not to sign at all did Australia gain a 9% improvement on New Zealand, and by far the softest target at 109% of 1990 emissions.

Accurate information is a vital starting point for any attempt to design and monitor serious climate change policy. The extraordinary performance with the accounts blew away much of the lead-time the nation had to recognise the scale of the problem and tool-up for change. (Also undermining serious action, however, were the campaigns by a grouping of major industrial emitters and Federated Farmers, detailed in the next subsection.)

If the effects of all the revisions are measured from the time the accounts were first produced in 2002 to the latest estimates, the change is from +47.5 Mt to -65.5 Mt¹¹⁰ – a turnaround of 113 Mt with a value of \$3.39 billion.

This value is less than the total of the individual over-estimates mainly because the billion dollars of failed policy measures were not included in the original 2002 accounts. However just because these policies were a late entry and an early departure, it does not follow that those errors were unimportant. On the contrary: they were the key factor supporting the official position that New Zealand would be in credit, when the accounts should have been registering something close to a deficit during the critical period of 2003 and 2004. It was during this time that a formal agreement was entered into between Government and the agriculture sector to exempt it from charges for agricultural emissions during CP1.¹¹¹

Most members of Parliament and even most Cabinet ministers are likely to have little understanding of the history of the Kyoto accounts, and officials do not seem to have gone out of their way to enlighten them. When the current Cabinet was again confronting the need for new climate change policy after a major internal review, it received the following summary in early 2006 on how New Zealand got into this mess:

Until recently, we thought we were well situated to meet our Kyoto obligations, but the stronger than expected growth in net emissions, as well as analytical adjustments, means we face a greater than anticipated challenge.¹¹²

The accounting conventions and quality of analysis have improved a great deal since the Kyoto accounts were first set out, so there is reason to hope that there will be fewer large “analytical adjustments” in future. However, there is a need for a series of reforms going forward:

- A return to the explicit accounting of individual policies, as well as more detailed breakdowns of the estimates and reconciliation with previous years’ projections. This should include online public access to the database that underlies the figures, currently stored on MFE’s “Silent One” system.¹¹³

¹¹⁰ The 47.5 Mt figure is the average of the 2002 range, and the 65.5 Mt figure allows for the 20 Mt of BAU deforestation emissions projected but not recognised in the accounts.

¹¹¹ See Chapters 8 and 9 for details of this agreement.

¹¹² Cabinet Paper, *Climate Change Policy: the Way Ahead*, Office of the Minister Responsible for Climate Change Issues, 2006, para 8.

¹¹³ MFE reported that: “All information required to produce the national inventory is documented and archived by the MfE on a networked document management system known as Silent one” and “Documentation includes sufficient information to enable all activity data, emission factors, uncertainty calculations, expert judgments and QC/QA information to be recalled,

- Given that CPI is just the first period in which New Zealand will have emission obligations and many of these future liabilities will be determined by decisions made today, there is a strong need for the accounts to assess future contingencies - those that may arise after 2012 and also new forms of emission liabilities that are either already under discussion for inclusion (such as those from international aviation) or are prospects for inclusion.
- Above all, there is a strong case for much greater investment in risk management within the departments that hold primary responsibility for the Kyoto liability – MAF, MfE and MED. The mistakes of the past point to a chronic lack of recognition of the scale of financial risks the Protocol carries and of the resources that need to be put in place to manage them.

3.4 Major Emitters' Role in Stalling Emissions Pricing

From the outset, major industrial users of energy and natural resources opposed any policy intervention that would have the effect of raising their costs. The threat of a carbon tax attracted immediate and energetic lobbying in the early 1990s from the Natural Resource Users Group, a coalition of mining and industrial interests which, in response to the \$10/tC tax foreshadowed in 1994 by then-Minister for the Environment Simon Upton, mounted strong lobbying to defer the tax, accompanied by a two pronged critique: such a low tax would have no effect on emissions, while any tax at all (let alone an effective one) would damage employment and economic growth¹¹⁴.

In mid-1996 the Natural Resource Users Group, the Major Energy Users group (MEUG), the Manufacturers Federation, and other industrial interests opposed to a carbon tax formed an umbrella group, the Greenhouse Policy Coalition, to head their lobbying effort. Membership included MEUG, the Cement and Concrete Association, Comalco, Manfed, Carter Holt Harvey, BHP NZ Steel, the Packaging Industry Advisory Council, the Employers Federation, and the Petroleum Exploration Association.¹¹⁵ Spokesman Terence Currie argued that “despite the government's almost obsessive desire to introduce a carbon tax, a tax is not the only option available to meet New Zealand's commitments to reduce greenhouse gas emissions.... [O]ther options include greater use of carbon sinks through both plantation forests and native bush, and increased energy efficiency.”¹¹⁶

Industry lobbying succeeded in inducing the Government to abandon Upton's carbon tax and to rely instead upon negotiated voluntary agreements with individual firms, and on carbon sinks in forestry, to meet the long-established goal of bring emissions back down to the 1990 level by 2000. The voluntary agreements, which were the sole

reproduced and justified.” MFE, *New Zealand's Initial Report under the Kyoto Protocol*, 2006.

¹¹⁴ Graeme Speden and Jenni McManus, “A victory? A sell-out? Government delays carbon tax till 1997”, *The Independent* 22 July 1994 p.1.

¹¹⁵ “New Coalition Forms to Fight Greenhouse Tax”, *The Independent* 14 June 1996 p.2.

¹¹⁶ Ibid.

policy initiative the Government found it politically possible to carry into practice during the 1990s, had made no perceptible impact on the country's gross emissions track as of 2000.¹¹⁷

In 2001, with proposals for a carbon tax or tradeable certificate scheme once more in the wind, the Greenhouse Policy Coalition again acted as the spearhead of the industry lobbying effort in opposition, with support from Federated Farmers and the Forest Industries Council.¹¹⁸

By 2003 Federated Farmers was in the front line of opposition, organising a series of marches against the Government's proposal to levy farmers in order to fund research into methane emission abatement.¹¹⁹ The so called "fart tax" was abandoned in October 2003 in the face of this highly-effective campaign, which received public support from the Act Party's agricultural spokesman Gerry Eckhoff¹²⁰, New Zealand First's Doug Woolerton¹²¹ and Winston Peters¹²², and National's Shane Ardern.

Federated Farmers' case was that "[i]f the Government wishes to undertake research into ways of reducing greenhouse gas emissions, which are over and above those that can be justified on sound investment analysis, in order to appear to meet its undertakings under the Kyoto protocol, then such research should be funded from general taxes. We believe that the imposition of this tax to fund public-good activities from targeted groups would set a very dangerous constitutional precedent."¹²³

¹¹⁷ This is not to say that individual companies necessarily failed to abate their emissions; simply that no perceptible effect on national emissions resulted from the voluntary arrangements. Some large-industry claims of emission reductions under NGAs are documented (as note (i)) in the Greenhouse Policy Coalition's May 2007 "GPC submission on climate change policy", at http://www.gpcnz.co.nz/Site/Papers_and_Submissions/Default.aspx. Taken at face value, these figures indicate that very large abatement opportunities have been available in the industrial sector. Reductions of up to 60% relative to business-as-usual are claimed, which suggests that a carbon charge across industry in general might well achieve far greater effects than the Greenhouse Policy Coalition argues in its submission. However, notwithstanding the Coalition's repeated insistence on the importance of full economic analysis, with allowance for issues such as carbon leakage across sectors, firms and countries, no such analysis of the Coalition members' claimed emission reductions is presented in support of its opposition to the ETS. (Fonterra, for example, claims to have achieved 50% abatement, but much of this is probably attributable to the company's outsourcing of energy and steam supply, to cogeneration plants owned by third parties, at its Hawera, Te Rapa and Edgecumbe factories.) The absence of costing data for the abatement claimed by GPC makes it impossible for outside observers to estimate true marginal abatement cost curves for these firms.

¹¹⁸ "Cross-industry group urges slow-down on Kyoto", press release dated 24 October 2001, <http://www.scoop.co.nz/stories/PO0110/S00136.htm>.

¹¹⁹ "Government faces farmer revolt on tax", *Southland Times* 18 July 2003; "Farmers begin fart tax convoy", *New Zealand Herald* 19 August 2003; "Fergie Goes to Wellington", *Stuff Daily News* 6 September 2003; Gareth Gillatt, "Farmers march in protest over gas tax", *Rural News* 16 July 2003; Aaron Smale, "Farmers toast flatulence win", *Evening Standard* 17 October 2003

¹²⁰ "Eckhoff Tables Fart Tax Petition", ACT press release 9 September 2003.

¹²¹ John Cutt, "City MP feels heat at fart tax protest", *Southland Times* 25 August 2003

¹²² Winston Peters, "Fart Tax – one more case of mad cows disease", speech to Waikato Federated Farmers, 22 August 2003.

¹²³ From Federated Farmers submission to the Ministry for the Environment, quoted in Terry Tacon, "Feds fear fart tax precedent", *The Daily News* 21 August 2003 p.20.

Following the backdown, the Government agreed a research programme with farmer organisations with greatly reduced funding from the sector, under a Memorandum of Understanding.

In 2005, as the Government moved toward implementation of the carbon tax it had foreshadowed in 2002, industrial opponents headed by Business New Zealand, the Business Roundtable, and the Greenhouse Policy Coalition, with support from Wellington Chamber of Commerce, Federated Farmers, the Forest Industries Council, and MEUG¹²⁴ again moved to block the measure¹²⁵, labelling it “a ‘tax grab’ that would damage the economy”¹²⁶. The arguments advanced by GPC spokesperson Catherine Beard were very similar to those put forward in 1994 by the Natural Resource Users Group: “with 50 per cent of New Zealand greenhouse gas emissions coming from agriculture and 20 per cent coming from transport, a carbon tax will not have much impact on reducing our increasing greenhouse gas emissions”, while Negotiated Greenhouse Agreements (NGAs), (the new term for voluntary agreements that granted tax exemption in return for abatement promises), should be used over the long term (beyond 2012) to “shield energy intensive companies from the tax in order to stop them leaving New Zealand”¹²⁷.

The Greenhouse Policy Coalition had by this stage expanded to fourteen members¹²⁸ and its full submission on the 2005 carbon tax proposal¹²⁹ rejected a carbon tax as both ineffective and economically damaging:

Only if the carbon tax suppresses or cuts demand will there be a swift reduction in emissions. And if this happens our standard of living will be severely cut back, and imports will necessarily increase from countries that are more competitive than New Zealand because they have failed to put costs or caps on their own greenhouse gas emissions...[T]he only way New Zealand will be able to reduce emissions (in the absence of significant technology advances in transport and agriculture) will be to restrict growth... [I]t might be more appropriate to put New Zealand in a group of countries with a similar emissions profile, such as Argentina, rather than the so called ‘developed countries’.

More analysis was needed, the Coalition argued, before any policy should be adopted. The Government bowed to the pressure and sent the entire issue of greenhouse policy off for a major officials’ review, with the carbon tax again dropped.

In 2007, as the Government moved towards implementing the ETS, industry pressure again mounted, once more headed by the Business Roundtable and the Greenhouse Policy Coalition, both of which commissioned economic consultants to produce

¹²⁴ Marta Steeman, “Govt to net most in tax on hot air”, *The Press* 5 May 2005 p.5.

¹²⁵ “Carbon tax announcement stirs up a storm”, *National Business Review* 4 May 2005.

¹²⁶ Marta Steeman, “Govt to net most in tax on hot air”, *The Press* 5 May 2005 p.5.

¹²⁷ Ibid.

¹²⁸ Carter Holt Harvey Pulp and Paper, Comalco Aluminium Ltd, Business New Zealand, Norske Skog Tasman, Pan Pacific Forest Products Ltd, Coal Association of New Zealand, NGC Ltd, New Zealand Aluminium Smelters Ltd, Fletcher Building Ltd, Fonterra Cooperative Group Ltd, Holcim (New Zealand) Ltd, New Zealand Steel Ltd, Solid Energy New Zealand Ltd, and Winstone Pulp International.

¹²⁹ <http://www.businessnz.org.nz/file/910/GreenhousePolicyCoalitionSubmissionCarbonTaxes.pdf>

reports purporting to demonstrate severe damage to the New Zealand economy and the impossibility of achieving any significant emission reductions at acceptable cost.¹³⁰ A Castalia report for the Coalition argued that “the Government is able to purchase credits at lower prices than firms, and there is a loss to the economy of allocating the cost of meeting commitments to those less able to bear them”¹³¹. This suggestion, that the Kyoto bill would be better picked up by the Government and paid out of general taxation, rather than funded out of proceeds from a domestic carbon tax or trading scheme, would effectively shift the burden of paying for the Kyoto overshoot off the Coalition’s members and onto the general taxpayer community.

After Business New Zealand explicitly proposed this solution in mid 2007,¹³² something close to it was also advanced by the GPC in its submission on the Climate Change (Emissions Trading and Renewable Preference) Bill in April 2008: “assist the economy via government purchases of AAU’s (as is being done by other governments). If governments can buy these at better rates than industry why wouldn’t you?”¹³³

¹³⁰ These reports are available from:
<http://www.nzbr.org.nz/documents/publications/NZBR%20PEPANZ%20Carbon%20Mitigation%20Scenarios.pdf> and http://www.gpcnz.co.nz/Site/Papers_and_Submissions/Default.aspx.

¹³¹ Castalia Strategic Advisors, *The New Zealand Emissions Trading Scheme: How do we make it work? The Need for Sustainable Climate Change Policy*, November 2007, p.53.

¹³² “Cost Blowout from Rushed Carbon Trading”, press release from Business New Zealand, 25 June 2007.

¹³³ Catherine Beard, *Emissions Trading – At What Cost?*, Greenhouse Policy Coalition news release, 2 April 2008, section 2.

4. Casting Illusions: Anatomy of the ETS

This chapter sets out the architecture of the ETS, explains why it is not a cap-and-trade scheme, and identifies it as a vouchers-based carbon tax.

4.1 The Essence of the Scheme

The ETS was announced in September 2007, and is to be made into law, retrospectively effective from January 2008, by passage of the Climate Change (Emissions Trading and Renewable Preference) Bill currently before Parliament.

At first sight the ETS resembles a miniature reproduction within the New Zealand economy of two of the key mechanisms of the Kyoto Protocol:

- The requirement¹³⁴ that each tonne of CO₂-equivalent emissions must be matched by the surrender of one unit of a “Kyoto currency” to the regulating body (the UNFCCC);
- The proviso that Parties needing units of carbon currency to cover their emissions may acquire them by trading with others who have qualifying carbon credits that are surplus to their needs.

Closer inspection shows, however, that the New Zealand ETS is not a mechanism for the trading of emissions quotas at all, in the usual sense of the term. It is an emissions tax, payable in vouchers rather than cash.

Under the ETS, each tonne of emissions released by sectors covered by the scheme must be paid for by surrendering to the Government one unit of an acceptable carbon currency – either the New Zealand Government’s new unit, the NZU, or one of the four Kyoto currencies:

- **Assigned Amount Units (AAUs):** issued free by the UNFCCC to countries such as New Zealand, in amounts sufficient to cover each country’s negotiated Kyoto target emissions.¹³⁵
- **Removal Units (RMUs):** issued free by the UNFCCC to countries for each tonne of carbon sequestered (absorbed from the biosphere).¹³⁶
- **Emission Reduction Units (ERUs):** awarded for each tonne of emission reduction resulting from a Joint Implementation (JI) project.¹³⁷
- **Certified Emission Reductions (CERs):** issued by the UNFCCC to reward Clean Development Mechanism (CDM) projects in developing countries.

¹³⁴ On each country that has committed to an emissions reduction target under the Protocol, and is thus listed in Annex B to the Protocol, for the six gases and specific activities it covers.

¹³⁵ Kyoto Protocol, Articles 3.7 and 3.8.

¹³⁶ The varying qualifying activities are known as ‘LULUCF’ activities (land-use, land-use change and forestry). Kyoto Protocol, Articles 3.3 and 3.4.

¹³⁷ ERUs are created by one-for-one conversion of existing AAUs or RMUs. Following conversion, the ERU is transferred to the JI parties for them to dispose of on the market. See section 7.7 below.

These countries are not themselves subject to emission reduction targets under the Protocol, but can gain from selling emission reductions to industrial countries which have signed up to targets. Such countries can purchase these CERs to top up their holdings of carbon currencies, enabling them to cover emissions over and above the target “Assigned Amounts” for which they have already been grandfathered the equivalent number of AAUs.

NZUs are to be gifted to selected recipients by the New Zealand Government (with partial auctioning a later prospect), and once in circulation may be freely traded with other parties. The NZU will have no fundamental value, however, other than as a voucher representing one tonne’s worth of emission tax in New Zealand.

A New Zealand firm covered by the ETS, if it has not been gifted or “grandfathered” enough carbon currency to cover its emissions, will have to make up the deficit by purchasing NZUs or Kyoto units on the open market at the going price. As a small country, New Zealand will be a “price taker” in the world market. That is, local developments will not affect the world price, and the NZU will be priced in the first instance by financial-market arbitrage between it and the four Kyoto currencies.

Contracts for the future delivery of the highest-quality Kyoto currencies are currently available for purchase on the European carbon market, which accounts for around 80% of the traded volume in these instruments. As at 15 April 2008, such units were priced at 21.21 Euros for delivery in 2009, and higher for later delivery.¹³⁸ At the ruling exchange rate of that day of 0.50, this price translates to a New Zealand dollar value of \$42.42 per tonne of CO₂. The Kyoto currency in most plentiful supply is CERs (principally covering projects to reduce emissions in Asia). However, CERs sell at a discount to the premium instrument price, with quality carbon credits selling for about three quarters the rate.¹³⁹ So a figure of NZ\$30/tonne seems an appropriate indicator of the price the market is projecting at this time.

With this price assumption, a firm which is covered by the ETS and which emits a tonne of CO₂ must spend \$30 to buy a qualifying carbon voucher – one that the New Zealand Government will accept as covering the emission¹⁴⁰. The New Zealand Government will be receiving a stream of these vouchers, comprising both NZUs and Kyoto currency units purchased offshore.

NZUs, once surrendered to the Government, will be cancelled and will have no further value. However, when Kyoto currencies are bought by emitters and used to cover their ETS liabilities, the Government can then use these units to settle with the UNFCCC for the country’s excess emissions relative to the Kyoto target.

¹³⁸ European Climate Exchange, market highlights, accessed 15 April 2008.

¹³⁹ <http://www.europeanclimateexchange.com/uploads/documents/ECXCERFuturesContract-20Mar2008.xls> showed CER futures for 2009 delivery selling on 20 March 2008 at 15.45 euros, 73% of the EUA futures price of 21.21 Euros and equivalent to NZ\$30.90.

¹⁴⁰ Not all CERs will be accepted by the New Zealand Government, because of the risk that CDM projects will fail or be abandoned, rendering the associated credits worthless.

4.2 The ETS is Not Cap-and-Trade

The terminology used in the Government's documentation for the ETS appears designed to make a rhetorical connection with the economic literature on cap-and-trade schemes, which (in principle) are an efficient way to use market-based instruments to achieve environmental goals. The words "emissions trading" carry the strong implication that the NZU will be a tradeable permit – a "right to emit" – and the Government appears eager to separate the ETS from its previous proposal for an economy-wide carbon tax¹⁴¹, which was scrapped late in 2005 in the face of fierce vested-interest lobbying.

A section on page 4 of the *Framework* document tries to draw distinctions between the ETS and a tax instrument, but upon inspection the distinctions are false. In particular the claim that the ETS "provides the government with relative certainty about the volume of emissions" is simply wrong, as is the suggestion that the ETS is typical of "the favoured measure among developed countries", which ignores the fundamental differences between it and the European trading scheme in particular.

The New Zealand ETS is not a cap-and-trade scheme because there is no cap.¹⁴² The NZUs to be traded under the ETS are not shares in a fixed total volume of allowed emissions. They are simply emission-tax vouchers that can be used to cover liable emissions. The scheme is "price based" in the sense that emitters of greenhouse gases will have to pay the price for emissions covered by the scheme at a rate determined by the world carbon market – that is, they are to pay a tax. Provided the tax is paid, there is no quantitative restriction on how much they can emit. Any reduction in emissions that results from imposition of the ETS will be the result of firms' and consumers' voluntary reduction in emissions in response to an exogenous price signal.

In economic theory, there are two ways to limit an environmental externality: a tax or a quantitative limit. The tax approach forces those who create the externality (for example, carbon dioxide emitters) to pay a price (tax) for each unit of emissions. The resulting increase in costs provides the incentive for firms and consumers to seek out less emission-causing technologies and products, thereby reducing emissions as the result of voluntary responses to a price signal. The causal sequence runs from the price signal (the tax) to the quantity response.

Quantitative control involves the Government (or other regulatory authority) imposing a strict limit on the volume of certain activities (emissions, for example) that are to be allowed. Some mechanism must then be used to ration the limited quantity

¹⁴¹ The ministerial foreword to *Framework*, for example, says (p.x) that "the government has decided in principle that New Zealand will adopt an emissions trading scheme (ETS), rather than an emissions tax" [emphasis added]. Pages 47-48 of the main document similarly obscure rather than clarify the issues.

¹⁴² See *Framework* p.48: "there will be no absolute constraint on the emissions that occur domestically in New Zealand", and (same page) Box 3, which argues that "as the protocol provides an international cap, an additional cap for the NZ ETS is not required" and then goes on to explain, with no hint of irony, that "the cap on emissions for Annex B countries under the Kyoto Protocol does not act as an absolute limit, even at the international level". There is, in other words, no cap, in the sense in which that term is used in the economics literature on cap-and-trade.

across individual emitters. For example, each emitter might be required to apply for an emission quota which it must observe; or Government might decide who is to be allowed to undertake an activity and who is not. Economic theory¹⁴³ suggests that the efficient way to ration a fixed quantity is “cap-and-trade”, under which permits are issued equal to the limited volume of allowed emissions, and these permits can then be traded on the open market so that they end up in the hands of those who value them most. The rest of the economy’s firms and consumers, having been unwilling to pay the going price to secure sufficient permits, are obliged to curtail or cease the activity that causes those extra emissions.

A cap-and-trade scheme for greenhouse gases at the national level would set a fixed maximum volume of annual emissions for the New Zealand economy as a whole, and would prohibit any emissions for which no permit was held. To get permits, those wishing to emit the gases would have to compete in the market for the scarce supply, and in the process the price would be bid up to the “marginal cost of abatement” – that is, the permit price that is just sufficient to bring emissions down under the cap. All those for whom it is cheaper to reduce their emissions than to buy permits would reduce their emissions and sell their permits; the permits then end up with those for whom it is more costly to “abate” than to pay the permit price.

The causal sequence in such a cap-and-trade arrangement runs in the opposite way to a tax: from the quantity restriction to the price.

The general rule for distinguishing a tax instrument from a cap-and-trade instrument is therefore the following:

- if quantity is responding to price, it’s a tax;
- if price is responding to a quantity constraint, it’s cap-and-trade

The New Zealand ETS places no limit on the nation’s allowed emissions, nor on those for any sector. It simply presents emitters with a cost, by requiring them to purchase vouchers with which to pay an emissions charge. The scheme is therefore a tax.¹⁴³

Two areas of potential confusion in particular need to be clarified:

1. The fact that the tax must be paid in vouchers (either one of the Kyoto currencies, or the home-grown NZU) makes no difference to the fact that it is a tax.
2. The fact that the vouchers can be traded makes no difference to the character of the scheme as a tax. All that “tradeability” means is that the maximum tax rate is set by the externally-determined price of Kyoto currency units on the world market.¹⁴⁴

¹⁴³ See also: Hugh Saddler and Richard Denniss, *New Zealand’s Expanding Footprint: Analysis of New Zealand’s Emissions Trading Scheme; major flaws and barriers to emission cuts*, Greenpeace, February 2008.

¹⁴⁴ The existence or absence of the NZU should make no difference to the tax rate so long as the NZU is interchangeable with Kyoto units – it does not matter whether all the tax is paid in Kyoto currencies, or all in NZUs, or some mixture, so long as all these currencies can be exchanged at a known exchange rate. A parallel would be for the Government to announce

Comparison with the European carbon market is instructive. The European scheme imposes an aggregate emissions cap for a set of key sectors, supplemented at the margin by a quantity-restricted loophole. The loophole provision allows firms in the capped parts of the EU economy to use limited amounts¹⁴⁵ of two types of Kyoto currencies – CERs and ERUs – to top-up their local emission permits. The limits range from 8% of the cap in the UK to 22% in Ireland¹⁴⁶. While the existence of the loophole alters the size of the cap, it does not eliminate the cap itself; it simply sets it at a higher level. The great bulk of emission reductions will still have to be carried out within the home country.

The New Zealand scheme is not the European scheme; it is the European loophole without the quantity limit. Local firms will be able to use whatever quantity of Kyoto currencies they wish, to cover whatever volume of emissions they choose for their operations.

In brief, the two key differences between the European and New Zealand trading schemes are:

- The European scheme imposes a quantity cap based on the EU's overall Kyoto emissions target. This cap is made up by aggregation of country-specific caps which are implemented by limited allocations of emissions permits under "National Allocation Plans" (NAPs), each of which is related to the relevant member state's Kyoto target and subject to scrutiny and approval by the European Commission. An NAP sets an overall quantity limit on the total emissions allowed from all domestic installations covered, and this cap is then converted to emission allowances at the rate of 1 allowance to 1 tonne of CO₂. The allowances are distributed free to installations in the scheme, which thereafter can trade among themselves but cannot collectively (at EU level) emit more than the issued amount, except insofar as they are able to supplement the European permits by a top-up from other countries by means

that it would accept income tax payments in either New Zealand dollars or overseas currencies such as the US dollar or the Euro. Taxpayers could choose for themselves which currency to use. Of course, in a world where exchange rates among currencies change continually, the Government would have to decide in which currency the basic tax rate is to be set. The effective ETS tax rate is set at the New Zealand dollar price of acquiring one valid carbon credit, whether an NZU or a Kyoto unit.

¹⁴⁵ Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:338:0018:0023:EN:PDF>, provides for each National Allocation Plan to set a limit on the proportion of its emissions that each liable installation may cover using ERUs and CERs. The limits apply at the individual-firm level. For early modelling of the consequences for the ETS price of opening the market to ERUs and CERs see Patrick Criqui and Alban Kitous, *KPI Technical Report: Impacts Of Linking JI and CDM Credits to the European Emission Allowance Trading Scheme* May 2003, <http://ec.europa.eu/environment/climat/pdf/kyotoprotocolimplementation.pdf>

¹⁴⁶ The percentage JI/CDM top-ups on domestic caps allowed in key NAPs as approved by the European Commission are: France 13.5%, Germany 20%, Ireland 21.9%, Italy 15%, Netherlands 10%, Poland 10%, Portugal; 15%, Spain 20%, and UK 8%. See WWF-UK, *Emission Impossible: access to JI/CDM credits in phase II of the EU Emissions Trading Scheme*, June 2007, http://assets.panda.org/downloads/emission_impossible_final.pdf, Table 1 p.5.

of the mechanism outlined above.¹⁴⁷ The New Zealand scheme, in stark contrast, imposes no caps at either national or sectoral level¹⁴⁸, and places no restriction on what proportion of any firm's emissions may be covered by externally-purchased credits (Kyoto currencies).

- The EU is a large player in the world market for Kyoto instruments, and so tends to be a price setter, as opposed to New Zealand's position as a price taker. Externally-purchased credits may be bought-in by firms subject to the European scheme when those credits are competitive with the European market price, and these transactions serve to provide a reality check on the relationship of the European carbon price to the marginal cost of abatement across the rest of the world economy. New Zealand, in contrast, is small relative to the world market, has no ability to influence the world price, and simply takes the price of Kyoto currencies as a given. In the European scheme the causal sequence runs from restricted quantities to permit prices, modified by the "loophole" ability to buy-in external credits from JI and CDM projects. In the New Zealand scheme, arbitrage between the NZU and the Kyoto currencies sets a ceiling on the carbon price, and hence on the tax rate, with no quantity limit. Local emission volumes will change only insofar as the price of Kyoto currencies constitutes an incentive to change behaviour, and NZUs will be used to pay emission taxes only insofar as they are a cheaper alternative to Kyoto currency units.

4.3 Setting the Tax Base

Exactly who will have to surrender credits to cover their emissions is to be set by regulations which are yet to be finalised. However, the Government has outlined its general intentions in the *Framework* document.

The economy's emission-producing activities have been divided into sectors, each of which is to enter the ETS at a different time, resulting in a patchwork quilt of exemptions shown in Table 4.1. The table lists the sectors in order from those with no exemption to those with the longest proposed periods of exemption.

¹⁴⁷ Specifically, ERUs and CERs from JI and CDM projects, allowed but tightly restricted under the "Kyoto mechanisms" loophole

¹⁴⁸ The New Zealand Government has announced, in addition to the ETS but unconnected to it, command-and-control measures such as a cap on installation of new fossil-fuelled electricity generation capacity, and a minimum proportion of biofuels to be contained in petrol. These quantitative restrictions have no tradeable instruments attached to them, are not "market-based" or "price-based", and do not form a part of the ETS.

Table 4.1 Impact of Exemptions on the ETS Tax Base for CP1

	Year in which ETS liability begins,	Sector's projected emissions 2008-2012 (adjusted for expected ETS-induced abatement) Mt	Share of projected emissions 2008-2012, allowing for projected abatement %	Number of years of exemption from 2008	Volume of emissions to be exempted 2008-2012 Mt	Proportion of sector's CP1 emissions exempted from ETS %
Deforestation	2008	6.9	1.7	0	0.0	0
Forest-weed control	2008	0.8	0.2	0	0.0	0
Transport	2009	79.7	19.6	1	15.5	19
Non-transport liquid fuels	2009	18.5	4.5	1	3.8	21
Electricity	2010	30.4	7.5	2	13.2	43
Other stationary energy use (excluding electricity and liquid fuels)	2010	39.1	9.6	2	16.3	42
Industrial processes (steel, aluminium, cement, glass, and lime)	2010	21.5	5.3	2	8.8	41
Agriculture	2013	203.1	49.9	5	203.1	100
Waste management	2013	7.0	1.7	5	7.0	100
Solvent and other product use	2013	0.3	0.1	5	0.3	100
Totals		407.3	100.0		267.9	66

Sources: *The Framework for a New Zealand Emissions Trading Scheme*, pp.114 -117, plus weed-control emissions from Table 6.1 p.75. All emissions figures incorporate the projected abatement estimates set out in Table 5.2.3 below.

Overall, two-thirds of projected emissions will be exempted from ETS coverage during these first five years of the scheme's operation (CP1). Of 407.3 Mt of projected emissions (after allowing for ETS-induced abatement), 267.9 Mt are to be exempted from the ETS, leaving 139.3 Mt on which carbon-currency units will have to be surrendered to the Government.

Table 4.2 shows the net requirement for surrender of carbon currency units after taking account of the weed-control and large-industrial rebates. Because the *Framework* document presents calculations based on business-as-usual emissions rather than emissions after ETS abatement, the table presents figures on both bases to facilitate direct comparison with Table 7.6 of *Framework*.

The bottom line is that after taking account of exemptions and rebates (ignoring the unquantifiable deforestation rebate), the Government's projections indicate a net tax "take" of 93.5 million carbon-currency units from the ETS during CP1.

Table 4.2

	1	2	3	4	5	6	7	8	9	10
	Projected CPI emissions under BAU	Projected abatement	Projected CPI emissions after abatement	Amount exempted from tax due to later entry to ETS	Tax-liable emissions under CPI BAU [1-4]	Tax-liable emissions under CPI with abatement [2-3]	NZU tax rebates for electricity costs and weed control	Grand-fathered NZUs to large industry	Tax payable under BAU emissions [(5)-(7)-(8)]	Tax payable under abated emissions [(5)-(7)-(8)]
Millions of tonnes CO ₂ -equivalent										
Electricity	33.5	3.0	30.4	13.2	20.3	17.3	0.0	0.0	20.3	17.3
Transport	80.1	0.4	79.7	15.5	64.6	64.3	0.0	0.0	64.6	64.3
Non-transport liquid fuels	19.0	0.5	18.5	3.8	15.2	14.6	0.0	0.0	15.2	14.6
<i>Non-liquid stationary energy use</i>	<i>40.3</i>	<i>1.2</i>	<i>39.1</i>	<i>16.3</i>	<i>24.0</i>	<i>22.8</i>	<i>14.3*</i>	<i>16.1**</i>	<i>-6.4</i>	<i>-7.6</i>
<i>Industrial processes</i>	<i>22.2</i>	<i>0.7</i>	<i>21.5</i>	<i>8.8</i>	<i>13.4</i>	<i>12.7</i>	<i>5.7*</i>	<i>8.9**</i>	<i>-1.2</i>	<i>-1.8</i>
Industrial total	62.5	1.9	60.6	25.1	37.4	35.6	20.0	25.0	-7.6	-9.4
Agriculture	203.1	0.0	203.1	203.1	0.0	0.0	0.0	0.0	0.0	0.0
Waste	7.0	0.0	7.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0
Solvent and other product use	0.3	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Totals excluding deforestation	405.5	5.9	399.6	267.9	137.5	131.7	20.0	25.0	92.5	86.7
Deforestation	21.0	14.1	6.9	0.0	21.0	6.9	0.0	0.0	21.0	6.9
Subtotal	426.5	20.0	406.5	267.9	158.5	138.5	20.0	25.0	113.5	93.5
Forest weed control	0.8	0.0	0.8	0.0	0.8	0.8	0.8	0.0	0.0	0.0
Totals	427.3	20.0	407.3	267.9	159.3	139.3	20.8	25.0	113.5	93.5

Addendum: reconciliation with *Framework Table 7.6* p.116:

Totals excluding weed control from above	426.5
add: 20 Mt of high-scenario deforestation	20.0
<i>Framework Table 7.6</i> total projected emissions	446.5

* Allocated pro-rata on electricity consumption ** Allocated pro-rata on emissions

4.4 What Exactly is Traded under the ETS?

Regardless of the name of the scheme, whatever it is that will be traded, it is not emission rights. The new local unit, the NZU, is not a “right to emit carbon”, because there is no restriction on the volume of emissions. Local firms will have the right to emit greenhouse gases to any level they please without having to hold any NZUs at all, provided they instead acquire Kyoto currencies to cover those emissions.

It follows that limiting the number of NZUs issued will make no difference to the volume of emissions that local firms can or will undertake. Because no scarcity (in the economist’s sense) is created, the price of the NZU will have nothing to do with clearing a market in which emissions are limited (capped).

What, then, does the Government mean when it talks of “the trading of a limited number of emission units, whose price will be determined by supply and demand”¹⁴⁹?

To answer this question it is necessary to ask what gives the NZU value at all. The NZU will not be a right to emit; **the NZU will be a tax voucher**. One NZU enables the holder to pay New Zealand emission tax on one tonne of CO₂-equivalent emissions.

This means that when the Government gifts NZUs for free, what it is handing out is tax relief, not emission rights. For an emitter who receives gifted NZUs, the tax will not bite at all for that level of emissions. This means that when NZUs are “allocated” to major emitters (the Government’s preferred term for gifting), this is equivalent to being given, in cash, the cost of buying vouchers with which to pay the emissions tax.

For a non-emitter who receives gifted NZUs, the transaction amounts to a windfall wealth transfer, equal to the market value of the NZUs when they are sold.

When an emitter buys an NZU, they will not be purchasing any right to emit. They will simply be choosing to pay their emission tax in NZUs rather than one of the four Kyoto currencies. The NZU will have value only as a substitute for those Kyoto currencies. So long as the Government remains willing to accept Kyoto currencies to cover local emissions, the NZU can never be worth more than competing Kyoto currency units of equivalent quality.

The role of the complex ETS architecture is partly cosmetic (to enable the new emissions tax to be painted as an emissions trading scheme) and partly substantive, as a fiscal instrument to carry through a massive redistribution of wealth within New Zealand. The latter effect is the subject of Chapter 6 below.

¹⁴⁹ *Framework* p.4.

5. Much Ado About Very Little

The ETS has been billed as the Government’s central response to concerns about the effects of climate change. Examining what the scheme does to mitigate emissions is obviously a key test of the proposal.

5.1 ETS Makes Minimal Difference to Gross Emissions

Remarkably, the ETS documentation does not provide an explicit estimate for the overall scale of reduction the Government expects to result from the ETS, or even a range of outcomes. It presents instead the lame justification that this is too hard a task.¹⁵⁰ However the documentation does set out some expected sector-specific changes in emissions in response to ETS-induced price changes. This chapter examines the likely impact of the ETS over the first commitment period for each significant sector, drawing largely on the sector response assumptions set out in the ETS *Framework* document.

Gross Emissions
With ETS

< 2%

Reduction compared
to BAU projection

5.1.1 Agriculture

Agricultural livestock emissions, accounting for 49% of New Zealand’s gross emissions, are exempted under the ETS for all of CP1. Thus the ETS has no direct impact on the nation’s largest source of emissions.¹⁵¹ The Government proposes to include the agriculture sector in the ETS from 2013, but even then with an exemption for 90% of its 2005 emissions, declining to a zero exemption only in 2025.

(1) Projected Emissions for CP1 under BAU (Mt)	(2) Rate of reduction at carbon price of \$30/t	(3) Proportion of CP1 during which reduction is effective	(4) Total reduction in emissions over CP1 (Mt): (1)x(2)x(3)
203	-	0	0

¹⁵⁰ *Framework*, pp. 103 and 104: The document states “it is difficult to forecast its impact to a high degree of accuracy” but does not present even an approximate total.

¹⁵¹ The ETS framework document points to secondary impacts of the regime that could lead to emission reductions but the chief one identified, a slower rate of conversion of forest land to dairying, does not of itself mean there will be a slower rate of growth in dairying, as the document infers. The change may simply mean other land is converted in its place that was formerly more costly than forested land.

5.1.2 Transport Fuels

All transport fuels are exempt for the first year, but from 2009 all units sold will be priced to reflect the full cost of coverage under the ETS. The total effect of the scheme on transport emissions is estimated to be a reduction of 0.4 Mt, or 0.1% of total emissions, based on the *Framework* document assumptions.¹⁵²

(1) Projected Emissions for CP1 under BAU (Mt)	(2) Rate of reduction at carbon price of \$30/t	(3) Proportion of CP1 during which reduction is effective	(4) Total reduction in emissions over CP1 (Mt): (1)x(2)x(3)
80	0.7%	0.8	0.4

5.1.3 Non-Transport Liquid Fossil Fuel

Roughly a fifth of liquid fossil fuel use goes to non-transport purposes.¹⁵³ While there are opportunities for displacement as plant and machinery are replaced, the ability to respond to price over a five-year timeframe will be limited. Even assuming a rate of response five times that for transport use, this yields a reduction of just 0.5 Mt or 0.1% of total emissions.

(1) Projected Emissions for CP1 under BAU (Mt)	(2) Rate of reduction at carbon price of \$30/t	(3) Proportion of CP1 during which reduction is effective	(4) Total reduction in emissions over CP1 (Mt): (1)x(2)x(3)
19	3.6%	0.8	0.5

5.1.4 Waste, Solvents and Other

These sources of emissions are exempted for the full period from 2008 to 2012, so the ETS has no impact.

(1) Projected Emissions for CP1 under BAU (Mt)	(2) Rate of reduction at carbon price of \$30/t	(3) Proportion of CP1 during which reduction is effective	(4) Total reduction in emissions over CP1 (Mt): (1)x(2)x(3)
7	-	0	0

¹⁵² *Framework* lists BAU emissions of 80 Mt (p 114) and a 0.6% rate of reduction at a price of \$25/t (p 106) which has been extrapolated to a rate of 0.7% for a price of \$30/t. Total emissions comparison is based on 426.4 Mt over CP1 (that includes 21 Mt of deforestation).

¹⁵³ *Framework* pages 114 and 116. Total is derived as: 99-80 = 19 Mt.

5.1.5 Electricity Generation

All electricity generation is exempt for the first two years, but from 2010 all will be priced to reflect the full cost of obtaining permits under the scheme. The Ministry of Economic Development has undertaken some “preliminary modelling” that suggests the ETS will lead to recognisable reductions in emissions from generation. The extent of emissions reduction seems optimistic in the face of the strategic responses electricity market participants routinely devise when faced with such cost changes, and the declared position of Genesis Energy with respect to the operation of its Huntly station. The modelling was also carried out before the Government decided to ban the construction of new fossil-fired generation plant for the coming decade. Accepting for present purposes the MED’s modelling, emissions would be reduced by 3.1 Mt, or 15% of total emissions over the relevant three year period.¹⁵⁴

(1) Projected Emissions for CP1 under BAU (Mt)	(2) Rate of reduction at carbon price of \$25/t	(3) Proportion of CP1 during which reduction is effective	(4) Total reduction in emissions over CP1 (Mt): (1)x(2)x(3)
34	15%	0.6	3.1

5.1.6 Stationary Energy & Industrial Processes (excludes electricity generation)

Stationary energy applications (excluding power stations) and industrial processes are expected to account for some 62 Mt of emissions during CP1.¹⁵⁵ These are exempt for the first two years, but from 2010 permits will need to be bought for all emissions that are not covered by permits gifted to the relevant companies.

A ceiling on the gifting of permits to these industrial sectors has been proposed at 90% of 2005 emissions. Within this, individual larger firms can apply for varying levels of permit allocation, but firms with less than 50,000 Mt of emissions per year are to be excluded. It is also proposed that large firms will receive compensation for the effect of increased electricity costs resulting from generators having to secure emissions permits (along with compensation for other costs of less significant value).¹⁵⁶ The net effect under the scenario in the ETS documentation is that large industrial producers will receive from the Government more permits than their total

¹⁵⁴ *Framework*: BAU emissions are derived from the graph on p 106 to be 6.7 Mt per annum, reducing to 5.7 Mt per annum under a carbon price of \$25/t. MED modelling for the specific years in question from 2010 to 2012 shows total emissions for the sector dropping from 20.3 Mt to 17.2 Mt – a 15% reduction. The same figure is taken to be an adequate reflection of a \$30/t cost due to the factors already mentioned. Total emissions comparison is based on 426.4 Mt over CP1 (including 21 MT of deforestation)

¹⁵⁵ This is 74 Mt (as specified on p 116 of *Framework*) less the 34 Mt for power generation calculated above, plus 22 Mt of emissions projected for industrial processes (*Framework* p.114).

¹⁵⁶ “The government proposes that a free allocation of NZUs be provided to industrial producers for direct energy emissions (such as gas and coal), **for increases in electricity costs**, and for industrial process emissions” (emphasis added). *The Framework for a New Zealand Emissions Trading Scheme*, September 2007, p 92.

volume of emissions, once they are compensated for increased electricity costs. The elements of this analysis are complex and are fully detailed in Chapter 6.

While in theory a business manager will still calculate that any carbon saved provides a direct financial saving under this formula, experience indicates that unless the firm is large and energy intensive, management will rarely scrutinise energy bills – often less than 2% of total costs. Given also that firms will on average be paying a very small proportion of the cost to the nation of their emissions, for only three of the next five years, the prospective savings from this category amount to very little. We use a generous assumption of a 5% saving on all emissions (not just those which industrial producers must meet the cost of); under this the total effect of the ETS on these emissions would be -1.9 Mt, or a 0.4% reduction in total national emissions. This compares with a study prepared for the Government on efficiency savings opportunities in stationary energy (other than for power stations) that identified just 0.8 Mt of emission reductions as being both available and economic to implement by 2010.¹⁵⁷

(1) Projected Emissions for CP1 under BAU (Mt)	(2) Rate of reduction at carbon price of \$25/t	(3) Proportion of CP1 during which reduction is effective	(4) Total reduction in emissions over CP1 (Mt): (1)x(2)x(3)
62	5%	0.6	1.9

5.1.7 Total Gross Emission Reduction

Bringing together the savings identified from the individual sectors, under generous assumptions as to the effect of the ETS, during CP1 the scheme seems likely to save at best 5.9 Mt (less than 2%) of projected gross emissions excluding deforestation (which is the subject of the next section); see Table 5.1.

¹⁵⁷ COVEC, *Sustainable Energy Value Project: Evaluation of options for intervention in the stationary energy sector*, February 2007, p v.

Table 5.1 - Changes in Gross Emissions from ETS

Sector	Projected Emissions for CPI under BAU (Mt)	Reduction due to ETS (Mt)
Agriculture	203.1	0
Transport Fuels	80.1	0.4
Non-transport Liquid Fuels	19.0	0.5
Electricity	34.0	3.0
Stationary Energy & Industrial Processes	62.0	1.9
Waste, Solvent and Other	7.3	0
Total	405.5	5.9

5.2 LULUCF and the ETS

5.2.1 A 20 Mt Saving from the Package of Announcements

When the ETS proposal was announced in September 2007, no clear quantitative estimate of the impact on emissions of the ETS was provided in either the array of documents handed out on the day, or the accompanying press releases from a full lineup of senior ministers. An estimate was however to be inferred from the construction of the Climate Change Minister’s speech notes:

The updated estimated deficit is 45.5 million tonnes, up from 41.2 million. ... The good news is that New Zealand can cost effectively reduce our emissions substantially **through the policies we are announcing today**. My estimate is that **what we have now announced** will pull this back to around 25 million tonnes or less. (Emphasis added.)¹⁵⁸

The minister’s speechwriter here invites the listener to do the maths and come away thinking that implementing the ETS will *directly* result in a (45-25 = 20 Mt) reduction

¹⁵⁸ Climate Change Minister David Parker, *Emissions Trading Scheme Announcement*, 20 September 2007. The sentence construction is not an aberration, as the same framing was used in other statements to this effect on the same day, including one to Parliament. For example, in answer to a Parliamentary question from Greens co-leader Jeanette Fitzsimons, the minister stated: “The revision of the net projection report showed that **without today’s announcement** New Zealand’s greenhouse gas emissions would have increased for that 5-year period from 2008 to 2012, from where they were previously projected at 41.2 million tonnes up to 45.5 million”. Questions for oral answer, Emissions Trading Scheme—Greenhouse Gas Reduction, 20 September 2007.

in emissions. However, that is not really what is being said. The words “the policies we are announcing today” refer not only to the ETS itself but also to the simultaneously-announced forestry package which, by means of a carefully-designed linkage to the ETS, makes forest owners liable for the full cost of deforestation during CP1. Of the 20 Mt reductions foreshadowed in the Minister’s speech only the small portion listed in Table 5.1 is to be a reduction in non-forestry emissions. The rest is to come from a projected fall in deforestation.

5.2.2 Deforestation Savings

A dramatic fall in projected deforestation appears to be the only significant policy-induced environmental effect during CP1. Whether it is strictly due to the ETS, and the chances of the projection proving accurate, are moot points.

For several years prior to the ETS announcement, the Government had stated that it would meet the costs arising from any deforestation up to 21 Mt over the five years of CP1 – a figure based on historic rates of deforestation. Just how that 21 Mt “right to deforest free of charge” would be allocated among forest owners was not spelt out. If it were to be allocated on a first-come-first-served basis, this would have set up an incentive to cut trees early (as foresters would be competing to be first to collect the limited quota of free cut available). The new policy announced in September 2007 eliminated the right to deforest free of tax. Instead, all “pre-Kyoto forest” owners are to be given pro-rata shares of a special issue of 21 million of the new carbon-tax-credit voucher, the NZU.

In this way, forest owners still stand to receive (via the gifted NZUs) a sum of money corresponding to the emission tax exemption that was previously on offer. However, with the exemption itself removed, the incentive effect is very different. Individual forest owners will receive, via their pro-rata package of NZUs, only a small portion of what they will have to pay under the ETS if they cut down their trees, and they will get this windfall payment regardless of whether or not they deforest, which makes it irrelevant to the deforestation decision. Effectively, all forest owners now face the full cost of the carbon released by felling trees. MAF estimates that this cost is sufficiently high, relative to the gains from harvesting, to deter much of the 21 Mt of deforestation currently projected to impact on the Crown’s accounts.¹⁵⁹

This is a more climate friendly way for Government to provide the degree of compensation earlier promised, by arranging a direct payment to forest owners. The NZU is the mechanism selected to deliver the financial transfer, in a way that de-links it from deforestation incentives and avoids any fiscal cost for the Government.

No projection of the precise effect of applying the tax to the 21 Mt of deforestation emissions covered by the Crown is provided in the ETS documentation or the minister’s statements. However, it can be presumed to account for the difference between the Minister’s 20 Mt of projected total abatement during CP1 and the 5.9 Mt

¹⁵⁹ The level of emissions actually projected to result in the current net position report is higher at 41 Mt, but as the Government only acknowledges a 21 Mt liability the remaining 20 Mt is reported separately.

of gross emissions reductions by other sectors of the economy shown in Table 5.1 above. On this basis, it can be inferred that the Government is assuming that about 14.1 Mt of the previously-projected 21 Mt of deforestation will not occur. This represents a saving of about 3.3% of total national gross emissions including deforestation.

(1) Projected Emissions for CP1 under BAU (Mt)	(2) Rate of reduction at carbon price of \$30/t	(3) Proportion of CP1 during which reduction is effective	(4) Total reduction in emissions over CP1 (Mt): (1)x(2)x(3)
21		All	14.1

An updated survey of forestry industry intentions released in February 2008 suggests that the impact of the ETS will be a little less than projected in those September statements. It indicates that under the ETS as presented, some 12,000 ha would still be deforested,¹⁶⁰ emitting about 10 Mt and thus resulting in a saving of 11 Mt of the 21 Mt, rather than the 14.1 Mt assumed above. More significantly, the survey also asked about forest owner intentions if some unspecified greater “flexibility” in the ETS rules were to result such that planned conversion of central North Island land in particular could proceed more economically. While the lack of specificity of the change of rules that would apply makes it difficult to assess the significance of the results, they nonetheless indicated that under those conditions, 37,000 ha would be deforested over CP1, enough to exceed the 21 Mt of emissions targeted by the Government through the ETS.¹⁶¹ Given that no change of policy has been signalled by the Government, we retain the minister’s 20 Mt total abatement figure and the implied deforestation savings, noting however that they appear to be optimistic on current information.

¹⁶⁰ Bruce Manley, *2007 Deforestation Survey*, University of Canterbury, February 2008, p 4.

¹⁶¹ Bruce Manley, *2007 Deforestation Survey*, University of Canterbury, February 2008, p 4 and 9.

5.2.3 Total Emission Reductions

Table 5.2 sums up the abatement projections discussed in the above sections.

Table 5.2 - Changes in Total Emissions – Including Deforestation

Sector	Projected CP1 emissions under BAU (Mt)	Reduction due to ETS <i>including</i> deforestation gains (Mt)	Reduction due to ETS <i>excluding</i> deforestation gains (Mt)
Agriculture	203.1	0	0
Transport fuels	80.1	0.4	0.4
Non-transport liquid fuels	19.0	0.5	0.5
Electricity	34.0	3	3
Stationary energy & industrial processes	62.0	1.9	1.9
Waste, solvents and other	7.3	0	0
Total to here	405.4	5.9	5.9
Deforestation	21.0	14.1	
Total	426.5	20.0	5.9

It is the anticipated deforestation gains that allowed Minister Parker to claim that “we expect to about halve our liability under the Kyoto Protocol to about 25 million tonnes or less.”¹⁶² If a non-specialist were to work from that figure alone, it would imply that the nation would be only 8% over 1990 emission levels, rather than the 31% described in chapter 2 above.

This “net-CP1 v gross-1990” measure of an 8% overshoot does not provide a fair or informative representation of New Zealand’s greenhouse-gas emission performance post 1990, nor of the contribution the ETS will make. When the numbers are compared on a ‘like with like’ basis, the degree to which the ETS limits the rise in gross emissions is very limited.

On a straight gross-emissions basis (which excludes deforestation and land use changes in general), the ETS is projected to deliver just 5.9 Mt of reductions in emissions over the first commitment period, bringing them down from the 405.4 Mt currently projected to 399.7 Mt, still a 29% excess over the 1990 benchmark and only 2% below the business as usual projection.

Gross Emissions
After ETS

29%

Excess Emissions Over
1990 Baseline

¹⁶² Climate Change Minister David Parker, *Emissions Trading Scheme Announcement*, 20 September 2007.

The gross measure is paramount not just because New Zealand's Kyoto grandfathered permit allocation (the "Assigned Amount") is calculated from it, but also because it provides a like-with-like comparison. It will be the key measure in any properly constructed international comparison looking at burden sharing across Annex I countries during CP1, because very few other countries with emission reduction commitments have any significant forestry credits to claim.¹⁶³ Just as in 1997 (when New Zealand first sought to include forestry offsets), so in the coming negotiations over the post-2012 regime, other developed nations will want some assurance that New Zealand is committed to making significant cuts below business as usual, or paying others to do this for them, rather than simply coasting on a windfall of largely pre-planted (relative to the 1997 negotiations) forests.

To date New Zealand has escaped serious sanction for its performance because the construction of league tables tends to focus on performance under the Protocol rules, and lacks a focus on agricultural emissions.¹⁶⁴ Sophisticated competitors to New Zealand's agricultural exporters will in future be more adept in highlighting these points of difference, and have already shown a clear willingness to use such figures in 'knocking' advertisements – most recently with respect to food miles. Gross-emission comparisons cannot be quietly tip-toed around, because the source data are all in the public domain and the focus on them will grow steadily stronger.

5.3 Conclusion

A meaningful reduction in gross emissions is what any policy advanced under the climate change banner must ultimately deliver. On its own, the ETS delivers very little during CP1. Using the projections and ancillary information provided in the *Framework* document, and making generous allowances otherwise, only some 5.9 Mt of gross emissions seem likely to be cut. The most readily identifiable contributors to this underwhelming performance are:

- the complete exemption for the agriculture sector which has some of the largest and lowest-cost abatement opportunities (further described in chapter 8 below);
- the extensive exemptions and rebates for large industrial processors; and
- the delays in introduction of other sectors to the scheme and failure to bring into place complementary policies in time for investment decisions to be taken now that will impact on the first commitment period.

Introducing the Climate Change (Emissions Trading and Renewable Preference) Bill to the House on 11 December 2007, the Hon Trevor Mallard noted that "[r]educing greenhouse gas emissions below 'business as usual' levels is the objective underlying the emissions trading scheme,"¹⁶⁵ but he had nothing further to say about how the scheme would lead to lower emissions. Green Party co-leader Jeanette Fitzsimons described the likely effects as negligible: "The Government estimates emissions

¹⁶³ Forest-sink credit opportunities mostly lie in developing countries that currently do not have emission reduction targets.

¹⁶⁴ See in particular Germanwatch: <http://www.germanwatch.org>.

¹⁶⁵ http://www.parliament.nz/en-NZ/PB/Debates/Debates/d/f/2/48HansD_20071212_00000817-Climate-Change-Emissions-Trading-and-Renewable.htm

trading will reduce transport emissions by 0.3 percent; the statistic disappears into the margin of error in any calculation.” ACT leader Rodney Hide agreed: “Jeanette Fitzsimons said that this bill will have an almost negligible effect on New Zealand’s carbon dioxide emissions. That is absolutely true. This bill is a political thing so that Parliament, the Government, and the political parties can say they are doing something. But the actual impact is quite small.”

6. “Let Them Eat Carbon”

The allocation of the ETS scheme’s costs and benefits is strongly skewed, so that small and medium firms (SMEs) and households bear the overwhelming share of costs, and the scheme creates costs which add up to a sum far in excess of the country’s Kyoto deficit.

Faced with a policy package as complex and opaque as the ETS, an essential exercise is to “follow the money”. This chapter therefore works through the projections and assumptions contained in the *Framework* document, to show where the money goes during the first five years of the scheme. It identifies who is to pay the ETS costs, and who is to receive the benefits.

6.1 Government Gifting of NZUs

The story begins with the issuing of free NZUs by the Government. The following injections of NZUs are planned.

6.1.1 Kyoto Forest Owners

Owners of exotic forests established after 1989 (“Kyoto forests”) will be able to gain the full NZU equivalent of the value of the carbon their trees absorb.

International carbon credits in the form of RMUs will accrue to the Government for sequestration of carbon in New Zealand’s Kyoto forests, and the Government will be able to use these to cover a corresponding volume of New Zealand’s gross emissions. Forest owners opting-in to the ETS will be given a matching number of NZUs¹⁶⁶, which are not internationally-acceptable Kyoto units but will be saleable for cash in New Zealand to local emitters seeking to pay their emission tax with NZUs.

Full devolution of sequestration credits by the issuing of NZUs, and imposition of an emission tax on deforestation, are consistent both with the original 1997 understandings between Government and forest owners, and with the principle that polluters should meet the full social costs of their emissions while carbon sinks should receive the full value of the benefit they deliver to society (and the biosphere). Gifts of NZUs are one valid means of making the latter transfer, if the ETS is to be the means of pricing emissions in New Zealand. The NZUs going to forest owners would be a financial gain that has the potential to be commensurate with the value of the international credits earned as a result of sequestration by their forests.

Kyoto forest owners will thus have the option of joining the ETS in order to be credited for all carbon absorbed in their growing forests, while at the same time being liable to pay the tax on all carbon released due to deforestation on their land.

¹⁶⁶ MAF *Forestry in a New Zealand Emissions Trading Scheme* (2007), p.31; Ministry for the Environment, *Projected Balance of Emissions Units during the First Commitment Period of the Kyoto Protocol*, September 2007, p.27 Table 11.

The official projection is that Kyoto-eligible “removals by forests” will amount to 79 million tonnes of CO₂-e during the five years 2008-2012¹⁶⁷. A proportion of Kyoto forest owners may well decide not to come under the ETS, so the volume of NZUs issued for forestry sequestration could be less than the 79 million RMUs expected to be secured by the Government. This is nevertheless likely to be the largest source of supply of NZUs into the market.

Owners of forests planted under the Permanent Forest Sinks Initiative (PFSI)¹⁶⁸ and of forests transferred into the PFSI¹⁶⁹, are already entitled to receive AAUs for carbon sequestered in their permanent forests, and these credits are included under the ETS allocation.¹⁷⁰ In addition, forest owners within the existing East Coast Forestry Project¹⁷¹ will have the option of joining the ETS and receiving NZUs for carbon sequestered¹⁷². No estimate is available of the number of NZUs that may be injected into the market by these routes.

Because no official figures are available on the anticipated actual number of NZUs to be issued, in the remainder of this report we shall work with an overall figure of 79 million, corresponding to total projected sequestration. It should be noted that this is an upper-bound, and the actual figure could be significantly lower.

6.1.2 Owners of pre-1990 exotic forests

Owners of “pre-1990” exotic forests will be gifted a notional 21 million NZUs as at January 2008, divided up pro-rata on the basis of forested area¹⁷³. A further 34 million NZUs will be gifted in 2013 for the Second Commitment Period, bringing the total to 55 million NZUs.

This provides the Government with a substitute mechanism for delivery of its previous promise to take direct liability for up to 21 million tonnes of deforestation during CP1. Under the ETS, individual owners of these forests who undertake deforestation will be directly liable for the corresponding emission tax, while pre-1990 forest owners as a group will have 21 million NZUs gifted to them.¹⁷⁴

Calculating how many of the 21 million NZUs notionally issued for CP1 will actually enter the ETS market is somewhat complex. Units will be allocated on a pro-rata per-hectare basis across all forest. However, those allocated to areas of forest that are

¹⁶⁷ Framework, Table 7.5 p.115.

¹⁶⁸ <http://www.maf.govt.nz/forestry/pfsi/>

¹⁶⁹ MfE *Projected Balance* 2007 p.66.

¹⁷⁰ MAF 2007 p.42; *Forestry* p.39.

¹⁷¹ <http://www.maf.govt.nz/forestry/east-coast-forestry/>;
<http://newzealand.govt.nz/record?recordid=1103>

¹⁷² MAF *Forestry* 2007, pp.42-43.

¹⁷³ MAF *Forestry* 2007, p.27.

¹⁷⁴ At the time of writing, the Government is apparently still considering the precise form of allocation, notwithstanding what has been proposed. Options apparently also include: targeting those who bought their land before 2002, and “those landowners, many of them Maori, who for one reason or another were unable to join the “chainsaw massacre”, the scramble to deforest before the start of this year when the liability kicked in” Source: Brian Fallow, *Can't see wood for trees*, NZ Herald, February 14, 2008.

exempted may not be issued¹⁷⁵, so fewer than 55 million NZUs will actually be distributed in the 2008 and 2013 tranches combined. Further, of the 1.2 million hectares of pre-1990 exotic forest¹⁷⁶, at least 31,000 ha¹⁷⁷ with 3,000 owners¹⁷⁸ are expected to be exempted, but still to be the source of at least 9.4 Mt CO₂-e of deforestation emissions¹⁷⁹ over the period 2008-2020. The Government will withhold 9.4 million NZUs to cover these emissions. It may also withhold some other NZUs to cover deforestation of forests with areas under 2 hectares.¹⁸⁰ In addition, the Government itself holds 400,000 hectares of pre-Kyoto forests under Crown Forest Licences¹⁸¹, which will be “notionally” allocated roughly 15.6 million NZUs¹⁸². Of the 55 million NZUs to be issued in the 2008 and 2013 tranches, therefore, possibly as few as 30 million will actually pass into private or public-authority¹⁸³ hands. Assuming¹⁸⁴ that allocation of units between the 2008 tranche and the 2013 tranche is in the ratio 21:34, this would suggest that only about 11.5 million NZUs¹⁸⁵ will be issued to owners of pre-Kyoto forests as at January 2008.

If a decision is taken to include indigenous pre-Kyoto forests in the ETS, then a further 3.1 million NZUs would be allocated to forest owners in 2008 and a further 5 million NZUs in 2013.¹⁸⁶

There is, therefore, a speculative range¹⁸⁷ for the number of NZUs that will actually be gifted to pre-Kyoto forests in CP1. For a first look at wealth transfers we shall work with the widely-circulated figure of 21 million, but with the *caveat* that the actual figure is likely to be lower.

¹⁷⁵ MAF, *Forestry*, p.28.

¹⁷⁶ MAF, *Forestry*, p.26.

¹⁷⁷ MAF 2007 p.28 worked example shows 55 - 9.4 = 45.6 MtCO₂-e of units being allocated to no-exempt forest owners at a rate of 39 MT CO₂-e per hectare, implying non-exempt area of 45.6m ÷ 39 = 1.169 million hectares. This in turn implies 1,200,000 – 1,169,000 = 31,000 hectares exempt. If the two-hectare exemption involves significant deforestation not included in the 9.4 Mt CO₂-e (see footnote 184 below) then the exempted area would be correspondingly increased.

¹⁷⁸ MAF 2007 p.24 footnote 4.

¹⁷⁹ MAF 2007 p.24; see the preceding and following footnotes regarding uncertainty over how the MAF calculations treat deforestation of *de minimus* forests.

¹⁸⁰ MAF 2007 p.24 is unclear regarding whether the two-hectare forests are included or excluded in calculating the 9.4 Mt CO₂-e of projected deforestation emissions. The expression used there is “under this exemption”, which (if read literally) would apply only to forest owners with over two hectares who have applied for and secured exemption. The *de minimus* two-hectare threshold appears to be a separate exemption.

¹⁸¹ MAF 2007 p.29.

¹⁸² 400,000 hectares x 39 NZUs per hectare = 15.6 million NZUs.

¹⁸³ MAF (2007) p.29 states that 20,000 ha of pre-Kyoto forest is held by “public authorities” not subject to the restriction of Crown Forest Licences; the corresponding NZUs will be tradeable under the ETS.

¹⁸⁴ In the absence of any information on this issue in the Government’s ETS documentation to date.

¹⁸⁵ 30 total x 21/55 = 11.5.

¹⁸⁶ MAF (2007) p.10 and p.26.

¹⁸⁷ From a minimum of 11.5 million up to a possible maximum of 24.1 million if indigenous forests get 3.1 million and exotic forests 21 million.

6.1.3 Landowners Undertaking Weed Control

A further small source of NZUs is the allowance made for weed control. Proper land management inevitably includes some removal of “forest weeds” such as wilding pines, and it would not be desirable to have this activity deterred by the prospect of having to pay emission tax on the weed control process. To address this, landowners removing weed trees will be allocated a maximum of 0.8 million NZUs, on application, over the period 2008-2012.¹⁸⁸ This is a straightforward tax rebate, since NZUs will not be issued unless deforestation actually occurs, and these NZUs will therefore not be available for sale to other parties.

6.1.4 Large Industrial Producers

The Government plans to issue a total of 45 million NZUs¹⁸⁹ to large industrial operations, defined as companies with annual emissions over 50,000 tonnes of CO₂e¹⁹⁰. The gifting is to comprise two separate forms of assistance:

- Roughly 20 million NZUs will be handed out to qualifying large firms to compensate them for the increased electricity costs they will face once the wholesale price has been driven up by the new emission tax on thermal generators¹⁹¹. The allocation will be pro-rata on the basis of electricity use.
- 25 million NZUs will be gifted to large industry as a rebate of the emission tax on their direct emissions. This covers both the stationary energy sector and emissions from industrial processes. “Industrial process” emitters¹⁹² are provisionally to be gifted NZUs equal to 90% of their 2005 actual level of emissions¹⁹³, which were 4.336 MtCO₂-e in that

¹⁸⁸ Framework, Table 6.1 p.75; Ministry of Agriculture and Forestry, *Forestry in a New Zealand Emissions Trading Scheme: Engagement Document*, September 2007, p.25.

¹⁸⁹ Framework p.116 Table 7.6 note (d).

¹⁹⁰ Framework p.93, and p.95: “an eligibility thresholds of 50,000 tonnes of CO₂ equivalent emissions per year is designed to target free allocation towards larger, more emissions-intensive firms. The Government expects this threshold to lead to allocation being limited to a relatively limited number of firms.”

¹⁹¹ The rationale for this gifting is explained in Framework pp. 86 and 91, in particular on p.91 the sentence: “When designing transitional assistance measures it is useful to give joint consideration to the treatment of direct emissions from stationary energy, direct emissions from industrial processes, and indirect emissions associated with the consumption of electricity” [emphasis added]. The provisional estimate of 20 million NZUs was provided by the Treasury (Email to the Sustainability Council, 11 December 2007.).

¹⁹² Ministry for the Environment, *Projected Balance of Emissions Units During the First Commitment Period of the Kyoto protocol*, September 2007, p.21 lists six major industrial processes that come under this heading: iron and steel production, aluminium smelting, production of hydrogen, cement production, lime production by calcination of limestone, and production of ammonia and urea.

¹⁹³ Framework p.92 states that 90% of 2005 emissions would be treated as “a total envelope of assistance” for a free NZU allocation to cover “increases in electricity costs” as well as emissions.

year.¹⁹⁴ This implies the free allocation of 11.707 million NZUs for the three years 2010-2012.¹⁹⁵ There is scope for this figure to be higher or lower depending on the detail of negotiations between Government and the largest industrial firms, which may result in (a) exemption of all or part of some firms' emissions under Negotiated Greenhouse Agreements¹⁹⁶; or (b) enhanced allocation of NZUs over the 90%-of-2005 rate.

Stationary uses of energy in large industry are also to receive a grandfathered allocation for the three years 2010-2012 of 90% of 2005 emissions, which accounts for the remainder of the 25 million grandfathered NZUs - about 13.3 million. By implication, large-industry 2005 emissions from stationary energy use, which are buried in the categories "non-transport liquid fuels" and "non-liquid stationary energy use" in Table 4.2, were in the vicinity of 4.93 Mt¹⁹⁷ out of the 2005 total emissions of 12.2 Mt for those sectors in the National Inventory Report. Applying the same ratio, 40.4%, to the two sectors' projected CP1 ETS-liable emissions of 37.4 Mt (Table 4.2) gives a provisional estimate of 15.1 Mt for large-industry stationary energy use (including liquid fuels) during CP1.

6.1.5 Total Gifting

Summing up, the Government proposes to issue up to 103.1 million NZUs to forest owners¹⁹⁸, plus 0.8 million for weed control, plus 45 million to large industry, a total of up to 148.9 million during the first five years. The exact final figure cannot be known until further details are made public regarding forest exemptions from the ETS, the extent to which Kyoto forest owners opt to enter the ETS, and whether indigenous forests are included or excluded.

Table 6.1 sets out the various NZU gifting tranches for CP1 and shows the notional value of each at the current world market price of \$30 per NZU.

¹⁹⁴ Ministry for the Environment, *New Zealand's Greenhouse Gas Inventory 1990-2005: The National Inventory Report and Common Reporting Format*, July 2007, p.iv and p.34.

¹⁹⁵ $90\% \times 4.336 = 3.902$ million NZUs per year. $3 \text{ years} \times 3.902 = 11.707$.

¹⁹⁶ Allocation of NZUs to firms with NGAs is foreshadowed in MAF (2007) p.41 and MfE (2007) p.46. The number of NGAs, their terms, and the potential scale of exemptions granted and/or NZUs promised is not on the public record. NGAs are reported to have been entered into since 2003 with New Zealand Refining Company, Oceana Mining, Comalco, and others. No contingent liability for NGAs appears in the Crown's *Financial Statements*.

¹⁹⁷ $13.3 \div 0.9 \div 3 = 4.93$.

¹⁹⁸ ≤ 21 million to pre-Kyoto forests, ≤ 79 million to Kyoto forests for sequestration, and a possible 3.1 million to owners of indigenous forests.

Table 6.1

Recipients	Lower-bound figure	Upper-bound figure	Estimate used hereafter	Value at \$30 price, \$ million
	Million NZUs			
Owners of pre-Kyoto forests	11.5	24.1	21	630
Owners of Kyoto forests	not available	79	79	2,370
Landowners removing forest weeds	0.8	0.8	0.8	24
Large industrial operations	45	45	45	1,350
Totals	not available	148.9	145.8	4,374

All NZUs will be “bankable”¹⁹⁹ – that is, they will be able to be held to cover emissions in the period after 2012. Hence the demand side of the market in which NZUs will be sold will include both local emitters seeking cover for their CP1 emissions, and any party wishing to hold valid emission-tax credits post 2012. Section 4.3 above estimated that 139.3 million tonnes of emissions will be subject to the ETS during CP1; this implies that to clear the market either the total issuance of NZUs will have to be less than the 146 million in Table 6.1, or there will have to be substantial demand for units to “bank” for use post-2012.

6.2 Winners and Losers Under the ETS

Table 6.1 estimated that the total market value of NZUs to be issued free during CP1 could be around \$4.4 billion. However, not all the gifted NZUs will be sold, since a substantial number of the 45 million issued to large industry, and all of the 0.8 million issued for weed control, will be used directly by the recipients to pay their emissions tax. All gifted NZUs are wealth transfers to the recipients, but only some of the benefits of the gifting will accrue in cash, while others accrue in the form of avoided tax costs. Exemptions from liability for emissions tax under ETS, similarly, confer an implicit benefit. All of these are wealth-transfer effects flowing from the ETS which need to be taken into account.

Calculating the magnitude of cash transfers under the ETS is straightforward and is undertaken in this section. The next section, 6.3, accounts for covert transfers due to the effect of exemptions and rebates in giving implicit subsidies to some sectors at the expense of others. The calculation of these transfers is less transparent and more reliant upon assumptions. The two sets of calculations are combined in section 6.4.

The first calculation of wealth transfers considers only the actual cash transfers that will be received by ETS “winners”, and identifies the “losers” as those from whom the cash is transferred. The cash transfers comprise the proceeds from selling-off gifted NZUs that are in excess of the recipient’s tax requirements, plus other windfall receipts arising due to the impact of the ETS on electricity and liquid fuels prices.

¹⁹⁹ *Framework*, pp.40-41. Note that this includes NZUs issued to forest owners, notwithstanding that the RMUs received by the Government will not be bankable beyond CP1.

- **Clear cash winners:** will be large industrial enterprises, all generators of renewable electricity, most fossil-fuel electricity generators, and forest owners.
- **Potential cash winners,** whose gains will depend on the extent of market imperfections, are: the upstream suppliers of fuels – the oil, gas and coal companies.
- **Clear cash losers:** are those purchasers of electricity and liquid fuels not protected by rebates - households, and small-medium firms across the economy in industry, transport, commerce and primary production.

6.2.1 Large Industrial Firms

Large industry is to receive 45 million gifted NZUs, an amount considerably greater than the projected direct emissions attributable to those firms.²⁰⁰ As noted previously, this is essentially due to the rebate for extra electricity costs these firms face being paid via NZUs. Whether the full 45 million NZUs will in fact be provided in the end is a matter still being negotiated but we have treated this as a firm number for the purposes of the calculations. It is the electricity rebate that accounts for the sector making an implicit profit on the introduction of the ETS.

To estimate the cash windfall from these NZUs it is necessary to estimate the actual emissions likely for large industrial firms, and to subtract this from the 45 million. “Industrial process” emissions subject to the ETS, which are 100% attributable to large companies, are projected to be 12.7 Mt²⁰¹ during CP1. The large-industry share of projected 2010-2012 emissions from “stationary energy use” and “non-transport liquid fuels” was estimated above to be 15.1 Mt²⁰². (This figure can be confirmed, albeit with difficulty and to only a first-order approximation, from other sources in the public domain²⁰³.)

Adding this 15.1 Mt of emissions from large-firm stationary energy use to 12.7 Mt of “industrial process” emissions gives the total ETS-liable emissions to be covered by large industrials as 27.8 Mt. Subtraction of these 27.8 Mt of ETS-liable emissions

²⁰⁰ This over-issuing of gifted NZUs relative to likely emissions accounts for the otherwise perplexing negative-tax figures for the industrial sectors in Table 4.2.

²⁰¹ Table 4.2 column 6, abated liable emissions.

²⁰² A small amount of liquid-fuel emissions by large industry in 2009 is missed by this approach, but offset by the inclusion of small-firm emissions in the selected industrial sectors.

²⁰³ ICF, *Analysis of the Potential and Costs for Greenhouse Gas Emission Reductions*, April 2007, p.25 Table 6, indicates 2010 projected emissions for iron and steel, the oil industry, and coal processing, adding up to 1.71 Mt, or 14% of total “industrial” emissions. Multiplying by three gives a rough 2010-2012 projection of 5.13 Mt. For the other large-industry sectors not separated out by ICF, *Energy Data File* June 2007 p.21 shows an energy balance for the economy in calendar 2006 from which it can be calculated that food processing (dominated by meat and dairy), wood, pulp and paper, and non-metallic minerals (mainly cement) accounted for 22.7 PJ of fossil fuel use, or 23% of an industrial total of 93.48 PJ. Applying this percentage to projected 2010-2012 stationary-energy emissions of 37.4 Mt would give a figure of 8.6 Mt. The very crude total of around 14 Mt that results from these indirect calculations is of the same order of magnitude as the figure of 15.1 Mt derived more directly in the text.

from the 45 million gifted NZUs leaves 17.2 million NZUs as the windfall of saleable units, worth roughly \$516 million, as shown in Table 6.2.

Table 6.2: Estimated windfall cash gain for large industrials

	Mt	Value at \$30, \$m
Large-industry free NZUs	45.0	
Minus: stationary energy emissions	15.1	
Minus: industrial process emissions	12.7	
Residual: surplus NZUs	17.2	516

6.2.2 Renewable Electricity Generators

Although the Government will collect emission-tax vouchers only from fossil-fuel-fired and geothermal generators of electricity, the electricity market structure ensures that the wholesale price of all electricity generated will rise by the same amount, even though two thirds of annual generation is from renewable resources²⁰⁴.

At the margin of the market, fossil-fuel generators will have their costs raised by the amount of the emissions tax, and will pass on this additional cost to the prices they bid into the wholesale market. Generators using renewable resources (hydro, wind, geothermal) will receive the same higher price as the thermal generators, and will be able to add the extra cash to their profits.

Fossil-fuelled electricity generation in 2006 produced 8 million tonnes of emissions in generating 14,321 GWh of thermal electricity.²⁰⁵ MED projections are for emissions to be a total of 20.3 million tonnes under business as usual over the three years 2010-2012 when the ETS will apply to the electricity sector.²⁰⁶ This is reduced to a projection of 17.3 Mt when a carbon charge of \$25/tonne is imposed (Table 4.2). To buy enough carbon credits to cover 17.3 million tonnes of emissions at \$30/tonne would cost \$519 million.²⁰⁷

The Government estimates that at a carbon price of \$25/tonne CO₂e, the price of electricity will rise by \$14 per MWh.²⁰⁸ This figure, however, when applied to estimates of the amount of projected fossil-fired generation derived from MED modelling, is too low to raise sufficient revenue to pay for 17.3 Mt of emissions. The MED estimates that under a \$25/t carbon tax, 77% of electricity would be renewable in 2010, up from 66% in 2005 and rising to 79% in 2015.²⁰⁹ On this basis, a reasonable estimate of fossil-fuelled electricity generation for the three years 2010-2012 is 30.1 GWh (22.3% of a total of 134.9 GWh²¹⁰).

²⁰⁴ The points made in this section are all to be found in *Framework* at the top of p.86.

²⁰⁵ Geothermal generators also emitted a small amount of GHGs.

²⁰⁶ MED, *Emissions Pricing on Electricity*, MED excel file, table 2.

²⁰⁷ For the purposes of this calculation, the MED's estimate of the impact of a \$25/t charges is taken to be the same as that for a \$30/t charge.

²⁰⁸ *Framework* p.111 Table 7.2.

²⁰⁹ MED, *Emissions Pricing on Electricity*, MED excel file, table 6.

²¹⁰ Estimated from five-yearly projections in *Energy Outlook to 2030*.

To raise \$519 million of revenue from 30.1 GWh of generation requires a wholesale price increase of \$17.25/MWh, unless generators use windfall profits on renewables to cross-subsidise their fossil-fuelled generation, which they have no incentive to do under the electricity wholesale market structure.

As noted, thermal generation is expected to be only 22.3% of total electricity supplied during the period when electricity will be subject to the ETS emission tax. Over 2010-2012, this means that although the price increase of \$17.25/MWh will raise a total of \$2,327 million²¹¹ of extra revenue for generators, only \$519 million of this will be needed to buy carbon credits. The other \$1.8 billion will accrue as pure profit on renewables-based generation.

The \$2.33 billion extra revenue to be collected from electricity consumers to cover 17.3 million tonnes of emissions is equivalent to a tax of well over \$130 per tonne CO₂-e of emissions from the electricity sector. This is even allowing for the relatively high level of abatement that MED modelling attributes to the ETS²¹².

The only mitigating factor for small consumers in this story is that, of the 6,000 MW of renewable generating capacity, over two-thirds is state-owned, so that the extra profits go to Government as revenue, potentially benefiting consumers in their other role as taxpayers.²¹³ The remainder of the windfall profits – several hundreds of millions of dollars - will go to privately-owned generators such as Contact Energy and Trustpower.

6.2.3 Oil Companies and Other Energy Suppliers

The ETS emission tax on both liquid and non-liquid fuels will be largely collected from large-scale suppliers at upstream “points of obligation”²¹⁴. These suppliers – the oil companies, fossil fuel electricity generators, coal miners, and major gas producers – will have to purchase the required vouchers from some source, and may be able to exercise a degree of market power to capture for themselves some of the windfall gains being created by the ETS.

A well-established lesson from the early years of the European ETS is that firms in this position can raise their product prices by the full international price of carbon, citing the “opportunity cost” of carbon credits, but may be able to exercise power as dominant purchasers in the local market to drive down the price of at least some of the NZUs they buy. To the extent that this is done, the gains to forest owners and large industry would be reduced, with the benefit transferred to the energy supply companies. Whether this situation develops or not will depend to a considerable

²¹¹ 134.9 GWh times the \$17.25/MW price rise.

²¹² The ten-year ban on new fossil-fired generation plant that the Government announced separately as a part of its Energy Strategy is separate from the ETS, and its effects are not included in the modelling work referred to.

²¹³ *Framework* p.86.

²¹⁴ For details see *Framework*, “Annex”, pp.130-138.

extent on the detail of ETS market regulation, and the stance adopted by Government to keeping the price of NZUs tightly linked to that of the Kyoto currencies.

6.2.4 Motorists and Other Road Users

All those using liquid fuels, whether for transport or for other purposes, will pay higher prices for petrol, diesel, and other liquid fuels to the extent necessary to cover the new emission tax. This group of losers includes both individual motorists and transport operators, though the latter will be able to pass part or all of the cost on to their customers.

Projected emissions from transport fuel use over the four ETS-liable years 2009-2012 (after abatement) are 64.3 Mt (Table 4.2). At a carbon price of \$30/t, the additional total cost of fuel for transport users comes to \$1.93 billion.

6.2.5 Electricity Consumers

As already noted, the ETS-induced rise in the price of electricity over CPI means consumers will pay an extra \$2.3 billion from 2010 to 2012. This can be divided between the extra cost of thermal electricity (\$519 million) and the extra cost of “green electricity” generated from renewables (\$1.8 billion).

A further provisional breakdown can be made between electricity purchased by large industrial companies and that used by the rest of the economy. Large industrial use accounts for roughly 30% of national electricity consumption²¹⁵. For the period 2010-2012, large industrial use is projected on this basis as 40,464 GWh out of total generation of 134,880 GWh. With the wholesale electricity price raised by \$17.25/MWh under the ETS, large industry therefore picks up \$698 million of the tab for increased electricity prices, while the other \$1,629 million falls on small firms and households.

In the absence of any non-arbitrary way of allocating fossil-fuel and renewables-based electricity across users, large industry is here allocated 30% of each. Hence large industrials are estimated to pay \$156 million extra for thermal electricity and \$542 million extra for “green” electricity, a total of \$698 million. Small-medium firms (including agriculture) and households pay \$363 million extra for thermal electricity and \$1,265 million extra for “green” electricity, a total of \$1,629 million.

²¹⁵ For the March year 2006, the sectors meat and meat products, dairy products, paper and paper products, petroleum refining, petroleum and coal products, non-metallic mineral products, iron and steel, and basic non-ferrous metals used 10,509 GWh of a national total of 37,394 GWh, just over 28%. The energy balance for calendar 2006 in *Energy Data File* June 2006 p.20 shows a total electricity use of 46.51 PJ for the sectors food processing, wood pulp and paper, non-metallic minerals and basic metals out of a total for the economy of 135.64, a ratio of 35%. 30% for large industrial users lies clearly in the range thus identified.

6.2.6 Small-Medium Firms & Households - Stationary Energy & Liquid Fuels

Firms emitting less than 50,000 tonnes per year will lie below the threshold for gifting of NZUs, and will have to pay higher prices for the emission-causing inputs they purchase in order to carry on their activities. The two categories “non-transport liquid fuels” and “stationary energy use” incorporate a wide range of activities in commerce, manufacturing, construction, agriculture and fisheries, as well as residential energy use by households. With ETS-liable abated emissions projected at a total of 37.4 Mt²¹⁶ for these sectors (Table 4.2), of which large industrial firms account for 15.1 million (Table 6.2 above), the liable emissions of small-medium business and households make up the remaining 22.3 Mt. The cost of purchasing tax vouchers at \$30 each to cover these emissions comes to \$669 million.

6.2.7 Deforesters

Owners of pre-1990 forests who deforest their land are to be liable to pay tax on the resulting emissions. After taking abatement into account, these emissions are projected as 6.9 Mt (Table 4.2). The cost of purchasing NZUs or other Kyoto units to cover these comes to \$207 million.

6.2.8 Summary

Table 6.3 sums up the list of winners and losers in relation to cash transfers of wealth under the ETS during CP1. The losers pay out an extra \$5.1 billion, and the winners receive a total of \$5.3 billion. The missing \$0.2 billion comprises purchases of NZUs by parties wishing to bank them for use beyond 2012, and/or possible overstatement of the number of NZUs that will actually be issued to forest owners; Table 6.3 assumes the former in order to balance the accounts.

Large industrial operations appear both as winners to the extent of \$515 million worth of saleable NZUs, and losers to the extent of \$698 extra costs of electricity purchased.²¹⁷ Relative to the total amounts involved, large industry emerges not too far off cash-neutral overall from the ETS, bearing only a \$183 million net cash cost, a tiny proportion compared to the \$4.2 billion of net levies on the rest of the economy.

Pre-Kyoto forest owners collectively appear as winners to the extent of \$630 million worth of NZUs, and as losers to the extent of \$206 million of emissions tax on deforestation, a net gain of \$424 million.

In summary, the net cash burdens of the ETS are \$0.2 billion for large industrials, \$0.2 billion for agriculture, and \$4.0 billion for the rest of the country, a total of \$4.4

²¹⁶ 14.6 Mt for non-transport liquid fuels plus 22.8 Mt for stationary energy use.

²¹⁷ This assumes that Comalco, which buys its power under a separate contract with Meridian Energy, will be required to pay the additional \$17.25/MWh. If not, then the gain to large industry rises sharply and the loss to households and small firms rises accordingly.

billion²¹⁸. This allocation of 91% of the burden onto relatively dispersed and powerless groups means that the full benefit of the Assigned Amount rebate, plus the windfalls, accrue to the large industrial enterprises and farmers who have lobbied vigorously and successfully for someone else to carry the load.

Table 6.3: Cash Winners and Losers, and NZU Transactions

Sector	Tax-liable emissions after abatement, Mt	Payments, @ \$30/t (\$m)	NZUs sold, million	NZUs bought, million	NZUs used, million
Price of emission credits, \$/tCO ₂ -e		30			
Losers: Pay for emissions					
Road users	64.25	1,928		64.25	64.25
Electricity (fossil fuel) consumers: large industrials	5.19	156		5.19	5.19
Electricity (fossil fuel) users: agriculture	0.62	19		0.62	0.62
Electricity (fossil fuel) consumers: households and small firms	11.49	344		11.49	11.49
Small business (stationary energy use incl non-transport liquids)	17.49	525		17.49	17.49
Agriculture (stationary energy use incl non-transport liquids)	4.82	145		4.82	4.82
Deforesters	6.85	206		6.85	6.85
Sub Total - NZUs/Kyoto units paid for	110.71	3,321		110.71	110.71
Losers: Pay for electricity generators' windfall profit					
Renewable electricity consumers: large industrials		542			
Renewable electricity consumers: agriculture		65			
Renewable electricity consumers: households and small firms		1,200			
Sub Total - generator windfall paid for		1,808			
Total ETS-related billings		5,129			
Banked NZUs/Kyoto units (balancing item)		194		6.45	
	NZU Giftings, million	Sale value @ \$30, \$m			
Winners					
Kyoto forest owners	79.00	2,370	79.00		
Non-Kyoto forest owners	21.00	630	21.00		
Large industry excess of NZUs over emissions	17.16	515	17.16		
Sub Total - Disposable NZU Giftings	117.16	3,515			
Electricity renewables generators' windfall profits		1,808			
Large industrials use gifted NZUs to pay tax					27.84
Total ETS Cash Receipts for Winners		5,323	Totals:	117.16	138.55
				Banked NZUs	6.5
				NZUs issued	145.0

As these estimates cover just the first five years of the scheme and the Government has foreshadowed ongoing “allocations” of NZUs well into the post-2012 period to

²¹⁸ This differs from the gross billings of \$5.1 billion in Table 5.3 due to the netting-out of the \$0.5 billion cash value of large-industry’s disposable NZUs and \$0.2 billion in deforestation charges presumed to be paid through gifted NZUs. Both these items are transfers which are to be realised through the sale of gifted NZUs to other parties, meaning that they are double-counted in Table 6.3.

assist emitters (not just forest owners), there are many billions of dollars of wealth transfers still to come in those future periods.

6.3 Of Subsidies and Cross-subsidisers

A second calculation of winners and losers places a value upon the avoided tax costs enjoyed by emitters in the New Zealand economy insofar as the ETS relieves them of having to contribute towards the cost of meeting the country's Kyoto liability, whether that relief arises from exemption of their emissions from the ETS during CPI, or from tax rebates delivered as gifted NZUs.

Short-run economic efficiency requires that emissions be priced so as to fully internalise at the margin of each agent's activity the environmental costs of its emissions; while long run efficiency requires all emission costs to be internalised, so as to provide efficient signals for future investment and technology choice. (In a market economy, unless the full cost is signalled, agents have an incentive to expand production of emission-intensive goods and services beyond that which is economic for society as a whole, and to choose inefficiently emission-intensive techniques of production.)

The New Zealand ETS aims at moving even to short-run-efficient pricing only after the first Commitment Period: "... by the start of 2013 all major sectors of the New Zealand economy will be exposed at the margin to the international price of emissions at the margin for all operations."²¹⁹ Long-run-efficient pricing is not to apply until 2025.²²⁰ In the interim, the exemptions and rebates built into the ETS imply a particular pattern of burden-sharing with respect to the cost of meeting the CPI Kyoto liability. As it has no basis in economic efficiency, the Government's proposed allocation of the burden becomes an issue of equity (fairness).

The issue of fairness in burden-sharing has as its mirror-image the question of how to apportion, across the New Zealand community, the benefit of the collective rebate that the nation as a whole receives in the form of its Assigned Amount. The Government's proposed allocation of outright ETS exemptions and NZU rebates (both derivatives of the Assigned Amount) has the effect of lifting the Kyoto burden from exempted sectors and recipients of NZUs, leaving the task of paying for the country's excess emissions on the shoulders of the remainder of the community.

This outcome can be framed in terms of a set of implicit cross-subsidies from those who pay, to those who do not pay in proportion to the emissions for which they are responsible. To measure these transfers, a "fair shares" counterfactual benchmark is needed, relative to which the ETS allocation of Kyoto costs can be evaluated.. Such a benchmark is provided by the widely-accepted "Polluter Pays Principle", which has the additional advantage of being based upon the requirements of long-run economic efficiency.

²¹⁹ *Framework* p.6.

²²⁰ *Framework* p.9.

6.3.1 Allocating Responsibility for Excess Emissions

This section offers an assessment of what could be a fair basis for allocating responsibility for the nation's excess gross emissions²²¹. A good starting point in principle is that each party should bear the financial responsibility for the cost to society of its own emissions. This is known as the Polluter Pays Principle, and is a foundation-stone of OECD advice on environmental policy in its member countries (including New Zealand).²²²

The cost to society of greenhouse gas emissions over the 2008-2012 period, in practical terms, is the cost of **excess emissions** relative to New Zealand's Assigned Amount. A fair allocation of this under the Polluter Pays Principle would be one that met two criteria:

- Taxpayers should not shoulder any part of the Kyoto bill. There is no reasonable construction under which emitters collectively should not bear the full cost for all emissions in excess of the nation's 1990 levels.²²³ Not requiring this as a bottom line would amount to a direct subsidy to emitters, using hard taxpayer cash. The ETS envisages collecting some emission tax in Kyoto currencies that can be used to cover the nation's excess emissions, but this is an indirect and non-transparent means of relieving taxpayers of the eventual cost of buying Kyoto currencies to cover the nation's Kyoto deficit.
- The Kyoto bill should be allocated to emitters in a way that causes the financial burden to fall in proportion to their shares of total emissions²²⁴. The architecture of the ETS violates this principle. Any description of the ETS as "fair" is indefensible in terms of the Polluter Pays Principle. The Government's *Framework* document conspicuously does not defend the ETS as fair; it says only that the scheme "has a strong focus on inter-sector equity" and explains that this means that "**some** contribution is made by all sectors" [emphasis added]²²⁵.

There are two main options for allocating the Kyoto burden for CPI "in proportion to emissions". One is backward-looking; the other is forward-looking.

²²¹ The issue of how to allocate the credits received from the UNFCCC for forestry is dealt with separately in the next section. Because sink credits are funded offshore by the allocation of tradeable RMUs, notwithstanding that the local cash to pay for them is to be raised by gifting and sale of NZUs, they do not belong in a PPP-based analysis of the fair allocation of liability for gross emissions.

²²² See *Recommendation of the Council on the Implementation of the Polluter-Pays Principle* <http://webdomino1.oecd.org/horizontal/oecdacts.nsf/Display/C4D6B3E4F6BE9051C1257297004F86DA?OpenDocument>.

²²³ Note also that so long as the Government's receipt of RMUs for forest sinks is passed through to forest owners, taxpayers remain neutral.

²²⁴ If some firms or sectors are to be given transitional or permanent relief from paying their share, this can be framed and accounted for in terms of explicit subsidies, the funding of which can be similarly transparent.

²²⁵ *Framework* p.9.

Assumed Historic Entitlements

One approach is to assume that each sector or major firm should be charged only for the growth in its emissions over the 1990 level, which implies a presumption that the sector or firm has some form of entitlement to its base year level. In effect, this approach would “grandfather” the country’s free Assigned Amount on the basis of 1990 sectoral emissions. This would be inappropriate for a number of reasons:

- a) The Kyoto Protocol sets a forward-looking target for New Zealand as a whole, and issues the New Zealand Government with sufficient Kyoto credits to meet that target. Any overrun must then be met through the purchase of credits on world markets. All greenhouse gases are treated equivalently, with no ‘jam jars’ for any sector or type of gas.
- b) If the Government were to allocate ‘prior entitlements’ the effect could be to reduce the pressure on sectors with lower rates of growth since 1990 to make savings, regardless of their potential for saving. This would in turn reduce the incentives nationally for least-cost abatement across the economy.
- c) It would usher in a fractious debate about which sectors were advised when, and who made investments on the basis of what signals, all of which would seriously divert attention from the key goal of stimulating emission reductions.

Pro-rata Sharing of New Zealand’s Total Emissions

The alternative is to charge for emissions on a going-forward basis, in proportion to the total actually emitted during CP1. This is arguably the better methodology as:

- a) It makes no presumption of prior property rights to historic private shares in a global commons (the right to release greenhouse gases into the atmosphere) that New Zealand may ultimately be allocated to work within in future periods after 2012;
- b) It is consistent with a charging basis whereby all emitters face a common price for each equivalent unit emitted, for all quantities emitted (the requirement for long-run economic efficiency).

The second approach is adopted in the following calculations. To calculate the “fair shares” benchmark, a tax is notionally charged on each tonne of projected emissions from each sector over CP1 (modified for officially-projected ETS abatement²²⁶). The lump-sum Assigned Amount rebate is then allocated pro-rata on the same basis. This gives the counterfactual “fair allocation” benchmark that is used to estimate cross-subsidies.

²²⁶ This is unsatisfactory since abatement under a better-designed emission tax would be greater than under the ETS. Consequently the results in this section are preliminary only, using the same set of abated-emission projections for both the ETS and the counterfactual.

6.3.2 Scale of Implicit Subsidies

As noted above, the counterfactual for evaluating implicit subsidies is the net tax (after rebates) that would be payable by each sector if responsibility for national gross emissions were allocated on a pro-rata basis, and the Assigned Amount (net of the 7.5 million AAUs pre-committed by Government to PREs) were allocated as rebates on the same basis. The analysis is carried out for the economy excluding forestry (because of the special status of forestry under the Protocol), which is taken up in the next section. The gross emissions are from Table 4.2, and are those projected by Government, less the minor abatement the ETS is expected to induce, meaning that tax is notionally collected on 399.6 Mt of emissions, shown in the first column of Table 6.4.

After deducting 7.5 million AAUs which Government has promised to give to “Projects to Reduce Emissions”, the Assigned Amount available to be allocated in rebates is 302 Mt of credits, the pro-rata allocation of which for CP1 is shown in column (3) of Table 6.4. Subtracting these sectoral rebates from total emissions leaves in Column (4) the emissions on which tax would be payable under the counterfactual “fair allocation”, if the aim is to recover the full cost to the nation of its Kyoto overshoot. The ETS, in contrast, requires payment of tax on the emissions shown in Column (6)²²⁷.

In the final column of Table 6.4 appear the implicit sector-by-sector subsidies (+) or taxes (-) resulting from the ETS, measured against the “fair allocation” benchmark. The overall implicit subsidies and taxes do not sum to zero largely because of the exclusion of deforestation (part of LULUCF) from this set of accounts. The balancing item of \$327.4 million of ETS net subsidy to the sectors listed in Table 6.4 comprises basically the omitted payments for deforestation emissions, plus the small mismatch between the fair-allocation total revenue and that resulting from the ETS.

²²⁷ Note that deforestation emissions are not included in this column.

Table 6.4: Implicit Taxes and Subsidies Relative to “Fair Shares” Benchmark

Sector	1	2	3	4	5	6	7	8
	CP1 emissions projection (abated), excluding deforestation and weed control	Proportion of national emissions	Share of Assigned Amount rebate excl PREs	Share of Kyoto burden excluding deforestation, under pro-rata rebates [(1)-(3)]	Cost @ \$30/tonne CO2e [(4) x \$30]	Required surrender of credits under ETS (Tables 4.3 and 5.2)	Value @ \$30/tonneCO2e [(6) x \$30]	Implicit subsidy [(5)-(7)]
	Mt	%	Mt	Mt	\$million	Mt	\$million	\$million
Agriculture	203.1	50.8	153.5	49.6	1,488.3	0.0	0.0	1,488.3
Transport	79.7	19.9	60.2	19.5	584.1	64.3	1,927.5	-1,343.4
Electricity generation: large industrial share 30%	9.1	2.3	6.9	2.2	66.9	5.2	155.7	-88.8
Electricity generation: agriculture share 3.6%	1.1	0.3	0.8	0.3	8.0	0.6	18.7	-10.7
Electricity generation: other users 66.4%	20.2	5.1	15.3	4.9	148.1	11.5	344.6	-196.5
Stationary energy and industrial processes: large users	44.8	11.2	33.8	10.9	328.1	-17.2	-514.8	842.9
Stationary energy: agriculture	6.1	1.5	4.6	1.5	44.6	4.8	144.7	-100.0
Stationary energy: small users	28.2	7.1	21.3	6.9	206.9	17.5	524.6	-317.6
Waste, solvents, and other	7.3	1.8	5.5	1.8	53.2	0.0	0.0	53.2
Total of items accounted for	399.6	100.0	302.0	97.6	2,928.3	86.7	2,600.9	327.4
Balancing item: deforestation and ETS under-recovery							327.4	327.4
Total	399.6	100.0	302.0	97.6	2,928.3	86.7	2,928.3	0.0

Notes to Table

- Column 1: Projected emissions for CP1 from p 114 of ETS document, less estimated abatement as detailed in Table 4.3.
- Column 2: Proportion of national emissions for CP1 each sector (calculated from column 1)
- Column 3: Assigned Amount of 309.5 million AAUs, minus 7.5 million AAUs committed to PREs, allocated across sectors in the form of pro-rata rebates on the basis of projected emissions.
- Column 4: Residual emissions for which each sector is financially responsible after rebating the Assigned Amount.
- Column 5: Cost of the tax liability at \$30 per tonne CO2-e.
- Column 6: Volume of credits required by ETS proposal, including scenario on p 116 of *Framework*, adjusted for officially-projected ETS-related abatement, from Table 4.3 with stationary energy use disaggregated as in Table 5.3.

6.3.3 Analysis of Cross-subsidies

The last column of Table 6.4 shows the gains and losses by way of implicit taxes and subsidies. These are set out below and the following section integrates the impact of these with the cash payments previously listed.

- **Agriculture:** Pastoral farmers gain a \$1.5 billion subsidy relative to their “fair share” of the Kyoto bill, simply by virtue of being exempted.
- **Transport:** Road users pay \$1.34 billion more than is required to fund their “fair share” of the Kyoto bill.
- **Large Industrial Producers:** Large manufacturers gain an \$843 million subsidy relative to their “fair share” charges for industrial process emissions and stationary energy use; but (on the assumption that 30% of total electricity consumption is accounted for by this sector) there is a countervailing \$89 million paid (via higher prices) towards the electricity sector’s over-fair-share burden. The net impact on large industrials, taking account of both direct and “indirect” (via electricity use) emissions, is a \$754 million subsidy.
- **Small businesses and households (excluding agriculture):** This sector of stationary energy use (both liquid and other fuels) pays \$318 million more than its “fair share” on direct emissions, plus a further \$197 million on indirect emissions due to electricity use – a total payment of \$515 million more than its fair-share allocation.
- **Users of Fossil Fuel Electricity:** Users drawing on generation that produces emissions will pay \$296 million more than their “fair share” of the Kyoto bill. This amount has been disaggregated between large industry and the rest of the economy on the basis of an assumed 30% large-industrial share of total electricity use, and the results are included in the two previous bullet points.
- **Sector Cross-subsidies:** In crude terms, the various cross-subsidies can be thought of as between particular sectors to simplify what is taking place, even if there is no such tagging of the money flows under the ETS. For example:
 - The revenue collected from road users over and above that needed to pay their share of the Kyoto bill (1.34 billion) is roughly equal to the implicit subsidy to agriculture (\$1.38 billion).
 - The additional revenue collected from small-firm and household users of stationary energy and fossil fired electricity (\$514 million) covers 68% of the \$754 million net subsidy to large industry.

6.4 Aggregate Transfers

The two sets of calculations in sections 6.2 and 6.3 above provide two ways of looking at the transfers involved in the ETS as currently proposed. For the purposes of assessing, respectively, the direct cash transfers of wealth and the extent to which the ETS diverges from the Polluter Pays Principle, the first two columns of Table 6.5 summarise the results from the preceding two sections. In both cases the numbers sum to zero (that is, all transfers are accounted for as costs to some and benefits to others).

The third column of Table 6.5 combines the two sets of estimates, while eliminating double-counting. In this column all emission-related burdens (negative signs) or benefits (positive signs) are the net effects (positive or negative) resulting from the “fair shares” analysis, and show the net taxes and subsidies implied by the ETS allocation of burdens relative to a straight pro-rata allocation of emission charges.

The payments by various sectors for the increased price of renewables-based electricity, which go as windfall profits to generators, are taken from the cash analysis in the first column. Adding the two sets of numbers as is done in the third column of Table 6.5 gives the overall sectoral impacts.

When forest owners’ receipts from the sale of NZUs are included, the third column shows a final balance of \$2.8 billion, reflecting the value of these net NZU sales by forest owners. Of this \$2.8 billion, \$2.4 billion is “earned” in the form of RMUs issued by the UNFCCC, and hence is effectively the export income from sale of sequestration on the international market. The 21 million NZUs gifted without any link to sequestration²²⁸ (reduced to 15.1 million by the abatement response to deforestation tax) are not explicitly funded in this analysis, being simply a “helicopter drop” of cash to the sector from Government, funded by the rest of the community.

Some of the transfers will be warranted, and some not. The difficulty presented by the ETS is the lack of transparency, which forestalls well-informed public debate over the merits of individual decisions. The scheme is shrouded in a level of complexity that is quite unnecessary for the purpose of efficiently responding to climate change. Its very nature serves to make very difficult proper public and parliamentary scrutiny of the scale of the huge transfers of wealth the scheme involves.

Relative to the scale of the New Zealand economy as a whole, the ETS results in charges over CPI that are around 0.5% per annum of its GDP of close to \$180 billion. The impact at the macroeconomic level depends a great deal on where the charges fall. The issues this section of the analysis has focussed on is the effects of the charges on the individual sectors that are treated differently in terms of timing and degree of exposure to the tax.

²²⁸ None that is recognised under the Kyoto Protocol rules, given the choices of implementation adopted by New Zealand.

Table 6.5

	Cash transfers Table 6.3	Implicit subsidy/tax Table 6.4	Overall gains and losses	NZUs sold, million	NZUs bought, million	NZUs used, million
	\$ million	\$ million	\$ million			
ACCOUNTING FOR GROSS EMISSIONS						
Road users						
Increased cost of liquid fuels	-1,928				64.3	64.3
Excess ETS burden of tax on gross emissions		-1,343				
Sub-totals	-1,928	-1,343	-1,343			
TOTAL			-1,343			
Small firms and households:						
Fossil-fuel electricity price increase \$17.25/MWh	-344				11.5	11.5
Renewable electricity \$17.25/MWh	-1,200		-1,200			
ETS-liable stationary energy use emissions 22.3 - 4.82 Mt	-525				17.5	17.5
Implicit tax due to excess ETS burden on stationary energy gross emissions		-318				
Fossil-fuel electricity payments in excess of "fair share"		-197				
Sub-totals	-2,069	-514	-514			
TOTAL			-1,714			
Agriculture						
Fossil-fuel electricity price increase \$17.25/MWh	-19				0.6	0.6
Renewable electricity \$17.25/MWh	-65		-65			
ETS-liable stationary energy use emissions 4.82 Mt	-145				4.8	4.8
Fossil-fuel electricity payments in excess of "fair share"		-11				
Implicit tax due to excess ETS burden on stationary energy gross emissions		-100				
Implicit subsidy due to exemption from ETS burden on gross emissions		1,488				
Sub-totals	-229	1,378	1,378			
TOTAL			1,312			
Large Industrial Operations						
Fossil-fuel electricity price increase \$17.25/MWh	-156				5.2	5.2
Renewable electricity \$17.25/MWh	-542		-542			
ETS-liable stationary energy use emissions 15.1 Mt	-453					
ETS-liable industrial process emissions 12.7 Mt	-381					
Credit from 27.84 million gifted NZUs		835				27.8
Sale of 17.16 million disposable NZUs		515		17.2		
Fossil-fuel electricity payments in excess of "fair share"		-89				
Implicit subsidy due to low ETS burden on stationary energy gross emissions		843				
Sub-totals	-182	754	754			
TOTAL			212			
Waste, solvents and other						
Implicit subsidy due to exemption from ETS		53				
Sub-totals		53	53			
TOTAL			53			
Renewable electricity generators						
Windfall profits	1,808		1,808			
Balancing item: banking of NZUs	-195				6.5	
Balancing item: deforestation plus ETS under-recovery		-327	-327			
OUTCOME BEFORE PAYMENT FOR FORESTRY NZUs	-2,795	0	0			
INCORPORATING FORESTRY NZUs						
Kyoto forest owners						
Cash from sale of 79 million NZUs reflecting sequestration	2,370		2,370	79.0		
Non-Kyoto forest owners						
Cash from sale of 21 million NZUs	630			21.0		
Deforestation emissions 6.9 Mt	-206				6.9	6.9
TOTAL	425		425			
FINAL BALANCE	0	0	2,795	117.2	117.2	138.5
				Banked NZUs		6.5
				NZUs issued		145.0

The final results for who wins and who loses from the ETS are set out in Table 6.6. \$6.2 billion of total winners' gains are funded partly by levies on households and SMEs totalling \$3 billion above "fair share" levels, partly by \$2.4 billion worth of sequestration exports, and partly by transfers to the winners from the wider community, due to the interaction of the ETS with the electricity wholesale market.

Table 6.6 Summary of Sector Gains and Losses

	Implicit excess tax	Implicit subsidy	Windfall profits to renewable generators	Net position
	(\$m)	(\$m)	(\$m)	(\$m)
Road users	-1,343	0	0	-1,343
SMEs and households	-514	0	-1,200	-1,714
Agriculture	-111	1,488	-65	1,312
Major industrial producers	-89	843	-542	212
Renewable electricity generators				1,808
Non-Kyoto forest owners				425
Kyoto forest owners				2,370

The end position of the first four of these sectors can be broken down as follows:

- **Transport:** Road users pay \$1.34 billion more than is required to fund their “fair share” of the Kyoto bill.
- **SMEs and households (excluding agriculture):** This sector pays \$0.32 billion more than its “fair share” on direct emissions from both liquid and other fuels, plus a further \$0.19 billion on indirect emissions due to electricity use – a total payment of \$0.51 million more than its fair-share allocation. It also pays \$1.2 billion extra to renewable electricity generators, making total payments of \$1.7 billion beyond that necessary to fund its share of the Kyoto bill.
- **Agriculture:** Pastoral farmers gain a \$1.49 billion subsidy relative to their “fair share” of the Kyoto bill, simply by virtue of being exempted. This is partially offset by \$0.11 billion over-fair-share emissions tax on liquid fuels and fossil fuel electricity, along with a payment of \$0.65 billion to renewable electricity generators, leaving an overall benefit to farmers of \$1.31 billion.
- **Large Industrial Producers:** Large manufacturers gain a \$0.84 billion subsidy relative to their “fair share” charges for industrial process emissions and stationary energy use, if they receive the full 45 million NZUs indicated. However, they pay \$0.09 billion more than their fair share for fossil fuel electricity and \$0.54 billion to renewable electricity generators. This implies a total net benefit of \$0.2 billion, though this remains subject to future negotiations with the Government.²²⁹

²²⁹

The *Framework* document proposes an envelope of 45 million NZUs that Government will use in negotiations with parties that emit 50,000 tonnes or more per annum. Those negotiations have yet to commence and the envelope could readily alter.

Sectors directly rewarded as a result of the ETS are:

- **Forestry:** Kyoto forest owners are rewarded for carbon absorption by the gifting of NZUs which, depending on uptake levels and the price of the NZU, have a value of up to \$2,370 million. Owners of pre-1990 forests receive \$630 million transitional assistance and pay deforestation charges in CP1 of \$206 million, yielding a net benefit of \$425 million.
- **Renewable Electricity Generators:** Owners of power plants selling electricity from renewable sources secure windfall profits of \$1,808 million.

Overall, the cross subsidies set up through the ETS can be summarised as follows:

- **Cross Subsidies between Exempted and Liable Emitters:** Under the ETS, the tax on one-third of the sources of emissions makes up all the revenue, while the remaining two thirds is either exempted or rebated to the point where there is no net tax collected. Road users, small users of non-transport liquid fuels, and fossil fired electricity consumed by small firms and households together account for 33.9% of emissions and bear nearly all the burden of the ETS.
- **Cross-subsidies between Low-cost Abaters and High-cost Abaters:** More than two thirds of the tax to be collected under the ETS comes from a mark-up on transport fuels which have very inelastic demand. The Government acknowledges this will have only a minimal impact on CP1 emissions. The remainder of the net tax collected is also to be placed on sources of emissions – particularly electricity - that are at best only weakly sensitive to price impacts in the short run. In contrast the sector that accounts for half of all emissions, and has easily the lowest short-run abatement costs - agriculture - is completely excluded from ETS for the whole of CP1. This is further discussed in Chapter 8.
- **Cross-subsidies between the Large and the Small:** Even more striking than the transfers of wealth between sectors are the transfers from those who are relatively small and are disproportionately on the receiving end of the pass-through of the costs of the ETS to those who are individually large and organised into influential power blocks for the purposes of lobbying Government for special favours. The taxes on transport fuels and electricity either land directly on individual consumers (as motorists or householders) or can mostly be passed through to them in the form of higher costs by industries serving them. In other words:
 - The big polluters that would be directly affected by an equally-distributed emissions tax, some of which have good opportunities for making reductions in emissions even though they cannot fully pass through the costs, are essentially exempt from tax on their direct emissions;

- Big industrials are rebated the price rises on their fossil-fueled electricity via gifted NZUs, which means the Government ends up collecting no net emissions tax on electricity sector emissions;²³⁰
- The small and unorganised, who in theory ought to be able to rely on an elected government to protect their interests, pick up the overwhelming majority of the Kyoto tab;
- In addition small users (households and small-medium businesses) pay most of the cost of the windfall profits going to renewables-based electricity generators, on top of the Kyoto bill.

These subsidies are only those proposed for the first five years. Subsidies to agriculture alone are projected to stretch out to 2025, with negotiations on the phase out of subsidies to this and other sectors having just commenced.

6.5 Electricity is Revenue Neutral

A design feature of the ETS is that all the ETS tax collected from electricity generators will be gifted to large industrials as a rebate, meaning that the tax take on electricity emissions makes no net contribution to meeting the Kyoto cost. The scheme's carbon-credit revenue target would be achieved just the same if electricity were untouched by the ETS.

In other words, the revenue from the 17.3 Mt of electricity-sector emissions on which generators will be expected to pay tax will be wiped out by an equivalent number of NZUs being gifted to large industrials to compensate them for higher electricity costs. The Treasury has confirmed that these two numbers are essentially equal in the case of the scenario it developed for the framework document.²³¹

This leg of the ETS was designed before the Green Party secured a policy win with respect to the Energy Strategy that largely negated the purpose of taxing electricity emissions. The Energy Strategy's commitment to banning the construction of new fossil-fired plant for the next ten years means that much of the already small impact a price increase would have had on generators' emissions will be delivered instead by direct command-and-control regulation.

The other source of possible savings is the extra price that generators will pay on fuel for existing stations. However, this will make only a tiny difference to emissions. For once a power station is built, the strategic nature of wholesale market bids offered by generators determines when plants actually run and generators are often more concerned about maintaining or securing market share than the cost of producing a marginal unit.

²³⁰ The rebates to large industrials for higher electricity prices are expected to be essentially equivalent to the 17.3 Mt of ETS-liable emissions during CPI.

²³¹ This scenario was based on estimates prior to any ETS induced emission reductions and showed tax being surrendered on 20 Mt of emissions and an equal value of NZUs (20 million) being gifted to major producers as compensation for raised electricity charges. Email from the Treasury to the Sustainability Council, 11 December 2007.

6.6 Pay the Kyoto Bill from General Taxation?

Given the combination of the Kyoto bill falling so disproportionately on households and SMEs, while delivering so little reduction in emissions, an obvious question is why not simply pay the Kyoto bill out of general taxation? If all the benefit of New Zealand's forest sequestration were to be credited to forest owners, the Kyoto bill would be \$3.73 billion, versus total net payments resulting from the ETS of \$4.4 billion (including \$1.2 billion of payments to renewable electricity generators). That is, payment from general taxation would involve \$700 million less. To the extent that forestry credits are not transferred to forest owners, the general taxation option would look cheaper still.

This is of course the solution proposed by a number of major emitters, as detailed in section 3.6.

However, the fact that the ETS rules are so badly skewed that paying the Kyoto bill out of general taxation looks better with respect to the financial cost, and little different in environmental impact²³², does not mean that the general-taxation option is either viable or the best available. It simply illustrates how dramatically the ETS rules need to be rewritten.

When the Cabinet considered the general-taxation option in 2001, it was rejected primarily on the basis that it failed three key tests, which still apply with undiminished force:

Efficiency: This option would not provide any incentives on domestic emissions or activities, except through existing non-price measures.

...

Equity: Such an option would not be equitable to the extent that taxpayers (in the case of GST, final consumers) potentially bear the liability for the emissions of others and can not avoid the tax through reducing their use or production of emitting activities.

...

Environmental integrity: Ratification based only on this option will raise significant concerns internationally and domestically about the environmental credibility of the Government's policy response.²³³

Our proposals for rebuilding the ETS are set out in Chapter 10.

²³² In particular, to the extent reduced deforestation is counted as an ETS gain, this will still be delivered if needed by a different mechanism, as previously planned, so as to limit the Government's exposure to emissions from forestry. This does not depend on the ETS.

²³³ Ministerial Group on Climate Change, *Climate Change: Domestic Policy Options*, Paper to Cabinet Policy Committee, 2001, paras 44 to 47.

7. Little Red Inconvertible

7.1 The Uncertain Market Value of the NZU

It is one thing to announce the creation of a new market. It is quite another to work out in detail how the market will operate, and what problems it is likely to encounter. This chapter turns to the mechanics of NZU trading under the ETS and identifies key problems that can be foreseen from the standpoint of early 2008.

These problems all relate in one way or another to the market price at which NZUs will trade, and the implications for (i) consumers, (ii) the sectors to which NZUs are to be gifted, and (iii) parties who may be able to influence the market to their own advantage.

Because the NZU market is intended to be open to and linked with the world carbon market²³⁴, it might be supposed that the NZU will always be bought and sold at the same price as whichever Kyoto currency it is a close substitute for, with financial arbitrage between NZUs and Kyoto currencies maintaining the exchange rate at a predictable level. However, even casual observation of the foreign exchange market, which has considerable similarity to the proposed NZU market, immediately raises a number of issues, as does consideration of the way financial markets deal in innovative financial instruments such as collateralised debt obligations (CDOs) and repackaged mortgages. Because of the difficulty of unpacking the complex factors that underpin the value of derivative off-balance-sheet financial instruments, which the NZU will be, its market price can be subject to wide speculative swings when negative “news” triggers a flight to quality, which in the NZU context would mean a flight to the “hard” Kyoto currencies.

Three issues in particular stand out, and are the subject of this section:

- First is the convertibility of the local currency, the NZU, against the overseas Kyoto currencies. Suppose that a “flight from the NZU” occurs, with holders of NZUs wishing to swap them for internationally-valid Kyoto units, or for hard cash (with which Kyoto units can be bought). In that case two constraints can arise: there may be no willing buyers of NZUs at the par value; and the New Zealand Government may refuse outright to swap NZUs for Kyoto currencies at par (that is, the NZU could be declared inconvertible). Alternatively Government might exchange NZUs only at a discount to Kyoto currencies (that is, the NZU might be officially “devalued” against the international carbon currencies). It turns out that under the Kyoto rules for CP1, convertibility of the NZU into internationally-valid Kyoto units will be subject to rationing, and may have to be abandoned in the face of pressure on the Government’s Kyoto-currency reserves, unless taxpayer money is used to buy-in Kyoto currency units to accommodate excess supply of NZUs. The problems of maintaining convertibility of the NZU will be similar to those of managing a fixed exchange rate with limited foreign-exchange reserves. Restrictions on the freedom of New

²³⁴ Emissions Trading Group, *Units of Trade in the New Zealand Emissions Trading Scheme*, Ministry for the Environment, December 2007, p.2: “For the first Kyoto commitment period, each NZU will be fully comparable to a Kyoto unit and will be backed by a Kyoto unit in the New Zealand Emission Unit Registry by the end of the true-up period” [i.e. in 2014-2015].

Zealand firms and individuals to engage in international trade in carbon units are almost certain to be imposed by the New Zealand Government from time to time, to protect the Government's holdings of Kyoto-unit reserves.²³⁵ Convertibility is analysed further in section 7.3 below.

- Second is the problem of inflation, if the NZU currency is over-issued relative to the demand for it. The integrity of the NZU as a carbon currency could be undermined at any time if a future government opted to print NZUs as a means of distributing political largesse, to an extent which perhaps might appear sustainable *ex ante* but could prove fatally destabilising *ex post*. But over-issue may emerge equally from the working-out of endogenous market forces. The over-issue question is addressed in section 7.4 below.
- Third is the exposure of the NZU market to strategic behaviour by the large upstream energy-supply companies which will be the dominant purchasers of NZUs, and will have a number of possible ways of extracting excess profits from the market by driving down the price of the NZUs they buy while driving up the price of the emission-intensive goods they sell. Strategic manipulation of the market is covered in section 7.5.

Given the risks of inconvertibility, inflation, and gaming to which the NZU is subject, at least some emitters²³⁶ assembling portfolios of carbon units to surrender at a later date would likely prefer “hard” currency to “soft”, unless the discount on the soft currency is sufficiently great to outweigh the risk of holding it.

7.2 How Will the NZU Market Function?

The price of NZUs will be determined by the interaction of supply and demand in the financial marketplace. Excess supply will drive the price down, and excess demand will drive it up. If there were just one Kyoto currency (AAUs, say) and if the NZU were fully convertible into Kyoto currency with no constraints on the volume of trading, and provided that the NZU is not over-issued relative to the domestic demand for tax vouchers to cover emissions, then NZUs would be priced at the same money value as Kyoto currency. In absence of these three provisos, however, there are downside risks.

The price-equalisation process in a “perfect” NZU market would be driven by purchaser arbitrage between the local and the overseas carbon currency. As a tax voucher, the NZU is to be valid only for the purpose of “covering” one tonne of carbon dioxide-equivalent emissions occurring within New Zealand, and will have no status in other jurisdictions. Local emitters needing to acquire carbon credits to cover their emissions will have the choice between acquiring and cancelling NZUs, or purchasing

²³⁵ This issue arises even more forcefully in relation to JI projects, which are the subject of sections 7.7 to 7.9 below.

²³⁶ In particular, emitters that operate across jurisdictions and seek to manage a global portfolio.

any of the international Kyoto units that are acceptable to pay the ETS tax (AAUs, RMUs, ERUs, and high-grade CERs²³⁷).

Retaining for simplicity the assumption of a single Kyoto currency, a local emitter will have at all times the default option of buying Kyoto currency to cover its ETS obligations. Since New Zealand is a small country, one can think of the world supply curve for Kyoto currency as flat, so that from the viewpoint of a local emitter, the price of Kyoto currency is exogenously fixed. The emitter will have no reason to buy NZUs in preference to the Kyoto currency²³⁸ unless there is some incentive to do so – for example, a discount on price for the NZU. If the NZU ends up trading at a discount to prime Kyoto currency, the domestic emission tax rate will be muted accordingly. In even a “perfect” market setting, the NZU can never attract buyers at a price above the world price of equivalent Kyoto currency; this places an effective price ceiling on the local NZU market.²³⁹

The supply of NZUs into the market will not be determined solely by the New Zealand Government, because of the discretion given to forest owners over whether or not to join the ETS and qualify for NZUs. The supply will, nevertheless, be fixed at any point in time. The combination of a given world price for Kyoto currency and a fixed domestic supply of NZUs would suffice to fix the price in a “perfect” competitive market, provided that NZUs have not been overissued relative to the volume of emissions to be covered. Figure 7.1 shows the textbook market setup. Here the price of carbon units is the world price P_w , the entire issued volume of NZUs OA trades at this price, and local emitters buy AB of Kyoto currency to top-up the available stock of NZUs for the purpose of covering their emissions.

The world price P_w will be determined by international supply and demand for Kyoto currency units²⁴⁰, and will be affected by exogenous (to New Zealand) developments such as Canadian and US participation or non-participation in Kyoto, the treatment of “hot air” AAUs, and the extent to which CDM activity results in a major boost to the supply of the world supply of CERs. All of these issues involve upward or downward shifts of the world supply curve in Figure 7.1. So long as New Zealand emitters are

²³⁷ ICERs, tCERs, and CERs from nuclear power schemes will not be accepted by the New Zealand Government – Ministry for the Environment, *Framework for a New Zealand Emissions Trading Scheme* 2007 p.46, and Emissions Trading Group, *Units of Trade in the New Zealand Emissions Trading Scheme*, Ministry for the Environment, December 2007, p.2 footnote 1.

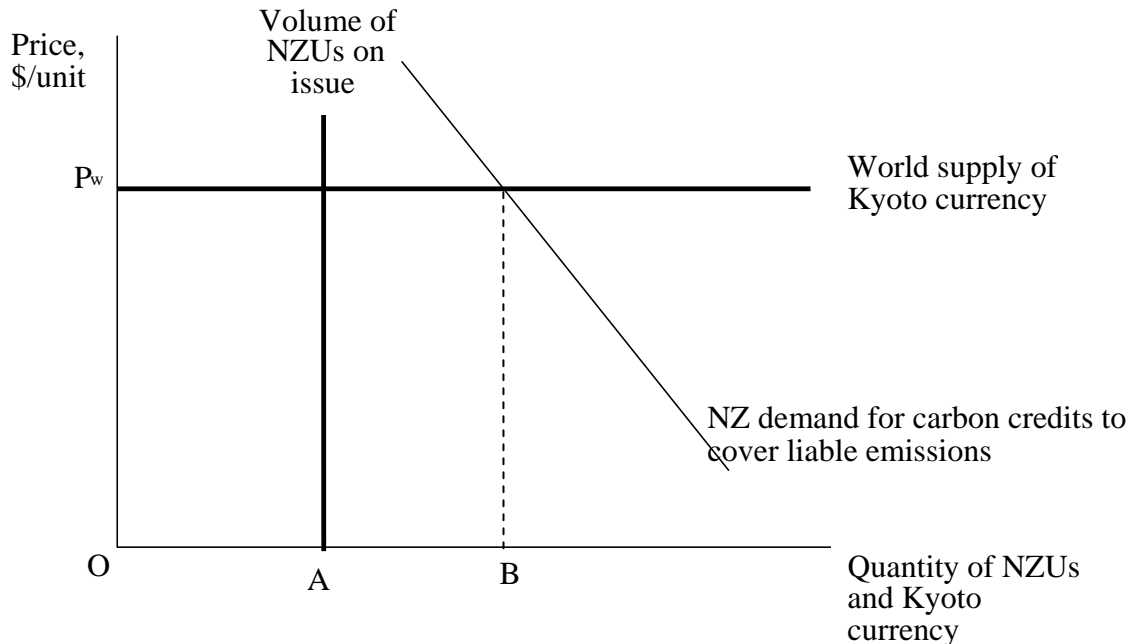
²³⁸ If the NZU is a perfect substitute for Kyoto currency the domestic emitter would be indifferent between the two if they trade at the same price.

²³⁹ It is ironic that one of the most vocal complaints reaching the Government from major lobby groups has been that “lack of liquidity in the market” may drive the price of NZUs too high. This suggests a widespread failure to appreciate the way financial arbitrage works in a small open economy. See for example Emissions Trading Group, *Units of Trade in the New Zealand Emissions Trading Scheme*, Ministry for the Environment, December 2007, p.3. There is a conspicuous lack of any articulated theoretical framework underlying discussion of the issues of market liquidity and possible Government intervention in Emissions Trading Group, *Liquidity and Prices in the New Zealand Emissions Trading Scheme: The Role of Government*, Ministry for the Environment December 2007.

²⁴⁰ World Bank, *State and Trends of the Carbon Market 2007*, http://carbonfinance.org/docs/Carbon_Trends_2007- FINAL - May_2.pdf ; Emissions Trading Group, *Liquidity and Prices in the New Zealand Emissions Trading Scheme: The Role of Government*, Ministry for the Environment December 2007, pp.4-7.

able to utilise Kyoto currency to cover domestic emissions, P_w will always impose an effective price ceiling on the local market.

Figure 7.1



While the clean theoretical result in Figure 7.1 (convergence of the NZU price to the world price of Kyoto currency) is strong in terms of P_w as a price ceiling, it gives no guarantee that the price of the NZU will be sustained at that ceiling. The NZU price will be equal to P_w only insofar as the NZU is scarce relative to demand, and insofar as purchasers of NZUs regard them as perfect substitutes for Kyoto currency and are therefore willing to pay the full world price. Even without over-issue, a discount on the NZU will emerge to the extent that there are significant differences between the NZU and Kyoto currency such that the two are not perfect substitutes in the eyes of purchasers. It is in this sense that the market price of the NZU will be determined by purchaser arbitrage.

Each of the following factors will put a wedge between the NZU and the “hard” AAU Kyoto currency:

- There are in fact a spectrum of Kyoto currencies of varying quality, all of which will co-exist as imperfect substitutes for one another as well as for the NZU. The currencies in most flexible and plentiful supply are (i) CERs, one of which is issued by the UNFCCC for each tonne of emissions reduction achieved by a qualifying project in a developing country under the so-called “Clean Development Mechanism” (CDM), and (ii) “hot air” AAUs already issued to countries in the former Soviet Union and Eastern Europe whose emissions are expected to track below their assigned amounts through CP1. CERs trade at a discount to AAUs when they carry a risk of project failure, which would eliminate or reduce the emission savings of a CDM project and thereby render

the corresponding CER instrument worthless or devalued. In the absence of other market imperfections of the sort outlined below, the NZU would tend to be priced in relation to the CER, because local emitters will always have the option of purchasing CERs rather than NZUs to cover their local emissions. If “hot air” AAUs are allowed to trade and end up at a discount to the CER²⁴¹, they could provide an alternative pricing benchmark.

- NZUs have ultimate value only in New Zealand, since they cannot be used to cover emissions in other countries. For any company operating in several countries (for example, Australia and New Zealand) there will be option value in holding carbon units that can be cancelled in more than one jurisdiction. The NZU will not have this option value.
- The New Zealand market is small relative to the size of the main purchasers of carbon units. The Government has opted in the ETS to place the “points of obligation” for the ETS emission tax in the hands of large upstream companies in the energy sector – oil, gas, coal companies and electricity generators. Even individually these will be large buyers relative to the market. Collectively they could be dominant. *De facto* monopolisation of the NZU market by a buyer cartel is by no means unthinkable; the result of such a development would be to drive the price of NZUs down relative to the price of Kyoto currencies, since no overseas buyer will have any reason to provide a backstop demand for the NZU. The NZU in this context is an imperfect substitute for Kyoto currency because the design of the ETS, and the limits on convertibility (described immediately below), render the NZU highly vulnerable to buyer manipulation of the local market.
- The ability of holders of NZUs to convert them directly to Kyoto currency, and thereby discipline the exercise of market power by buyers, is contingent on the willingness of the New Zealand Government to keep an exchange window open at which NZUs may be swapped for Kyoto currency units. Such a “foreign exchange window” is foreshadowed in the Government’s documentation for the ETS²⁴², but its operation is ringed with explicit provisions for closure if pressure comes on the Government’s reserves²⁴³. The New Zealand

²⁴¹ This seems unlikely given the gold-standard character of AAUs provided that “hot air” is not devalued by regulatory decision at international level. The possibility of hot air trading at a discount is, however, canvassed by the Government in *Units of Trade in the New Zealand Emissions Trading Scheme*, p.4.

²⁴² Emissions Trading Group, *Units of Trade in the New Zealand Emissions Trading Scheme*, MfE December 2007, p.2: “For the first Kyoto commitment period, each NZU will be fully comparable to a Kyoto unit and will be backed by a Kyoto unit in the New Zealand emission registry by the end of the true-up period. This enables participants in the NZ ETS to exchange NZUs for Kyoto units through the registry and sell them offshore.... The government agreed in principle ... to link the NZ ETS with international markets by allowing ... NZUs to be converted to assigned amount units (AAUs) and sold internationally

²⁴³ MAF, *Forestry in a New Zealand Emissions Trading Scheme*, September 2007 p.41: “Overseas sales will be subject to constraints imposed by the Kyoto Protocol’s Commitment Period reserve. This limits the number of New Zealand’s Kyoto units that can be transferred overseas at any time to 10 percent of New Zealand’s assigned number ..., net of purchases.” *Framework* p.44-45: “... Kyoto units covering 90 percent of our assigned amount must be held in the registry at any point

Government's ability to sustain convertibility will be severely limited by the requirement to hold at all times a "Commitment Period Reserve" (CPR). This is a requirement of the Protocol that obliges a party not to deplete the reserve of AAUs gifted by the UN as its Assigned Amount below a 90% holding at any point (as outlined fully in section 7.4).

- In the event of closure of the exchange window, Government's ability to backstop the value of the NZU would depend upon committing taxpayer funds to operate a "purchaser of last resort" window, an option which at this stage has been ruled out.²⁴⁴

With these factors driving a wedge between the NZU price and the already-uncertain world price, the effective tax rate imposed by the ETS will become uncertain and non-transparent, with plenty of opportunities for manipulation by key participants, quite apart from the radically skewed allocation of the tax burden across sectors discussed in the previous chapter. All these considerations add up to a recipe for economic inefficiency.

7.3 Supply and Demand for NZUs During CP1

In the early stages of implementation of the ETS, much will depend upon the willingness of forest owners receiving NZUs to hold onto their units rather than sell them immediately. Because there is a strong speculative element in the world carbon price, an NZU recipient who does not need units for future surrender (which will be the case with, for example, pre-Kyoto forest owners not planning to deforest) must decide whether to bet on higher future prices by holding the units, or to cash up immediately. The price available immediately will be what speculators (arbitrageurs) are prepared to pay for NZUs. Those arbitrageurs will be looking ahead to the emergence of local demand for units to surrender – something that will begin with the oil companies' need to surrender carbon units during the 2009 year in which liquid fossil fuels enter the ETS. Electricity generators will join the oil companies at the end of 2010.

The NZU will be a more attractive option for emitters²⁴⁵ only if it is cheaper (on a risk adjusted basis) than the internationally-traded Kyoto units which they can purchase instead. This will tend to mean that the spot price for NZUs in the marketplace will be tied (at a discount) to the cheapest Kyoto units that are acceptable to the New Zealand Government. This probably means that the NZU will be priced to compete with CERs, the lowest-quality Kyoto units accepted under the NZ ETS. CERs are already priced at a discount to high-grade AAUs in the world market due to a range of factors.²⁴⁶

in time throughout the first commitment period.... If this limit is reached, the registry would effectively close to outgoing international transfers."

²⁴⁴ Emissions Trading Group, *Liquidity and Prices in the New Zealand Emissions Trading Scheme: The Role of Government*, Ministry for the Environment December 2007, p.8 "Option 6".

²⁴⁵ The term "emitter" is used here to refer to economic agents located at "points of obligation" for the ETS.

²⁴⁶ This includes: the risk of non-performance by a CDM project against which the CER units are to be issued, the nature of particular type of emissions savings (the source project), and any specific exclusions or preferences of the country in which the credit is to be surrendered.

The Government has stated that NZU holders will be able to sell onto the world market (via the Government's exchange window) by directly exchanging these for AAUs ("while stocks last" – see section 7.4 below). If the Commitment Period Reserve is depleted, and direct exchange of NZUs with the world market is closed, there will be a market discount on NZUs, especially given the market power enjoyed by the oil companies and electricity generators as ultimate purchasers (as discussed in section 7.6). The political exposure associated with devaluation of the NZU might then induce the New Zealand Government to step in as purchaser of last resort, placing a floor under the NZU price in order to preserve the credibility of the ETS arrangement itself.

In thinking about the demand side of the NZU market it is important to bear in mind that the demand ultimately derives only from those emitters that are or will be subject to the ETS. As NZUs can be "banked" into the period after 2012, this includes those that need units to surrender beyond 2012. However, given the uncertainty over the post-CPI regime, such banking demand will be limited and is likely to emerge only at low NZU prices when "bargain-hunting" speculators may be attracted by the opportunity to hold NZUs for later sale at a profit.

Not only will the day-to-day demand for NZUs be a derived demand; it will also be a "residual demand" in the sense that emitters are always free to buy Kyoto units instead to cover up to 100% of their emissions. If they choose to do so then the demand for NZUs would go to zero. (The same applies also to the demand for bankable units to hold into the next commitment period, when emitters are to have the same freedom of choice).

The task the Government will face in managing the NZU market is therefore far more difficult than may appear at first sight. If a low price emerges early in CPI and NZU holders are reluctant to sell at this price, emitters could turn to the overseas market and import Kyoto currency instead, leaving the NZU market overhung with excess supply. It will not be sufficient for Government to limit its issuing of NZUs to a volume less than projected ETS-liable emissions; over-issue can develop when an initially-sustainable NZU supply becomes excessive relative to demand because the residual demand for the NZU contracts due to competition from Kyoto-unit imports. The Government could then find itself in the position of considering whether to drain excess liquidity off from the market by direct purchase of NZUs on its own account – a procedure akin to an "open market operation" by a central bank in the monetary policy arena.

Hence analysis of the NZU market is as much a macroeconomic matter as it is a microeconomic one. Virtually all analysis of the ETS to date has focused on the microeconomic aspects, and the literature on emission trading schemes is primarily devoted to microeconomics. There are, however, important lessons to be drawn from macroeconomics and monetary economics.

7.4 Limits on Convertibility of the NZU

The Government has stated its intention that NZUs will be freely interchangeable with Kyoto units:

For the first Kyoto commitment period, each NZU will be fully comparable to a Kyoto unit and will be backed by a Kyoto unit in the New Zealand Emission Unit Registry by the end of the true-up period. This enables participants in the NZ ETS to exchange NZUs for Kyoto units through the registry and sell them offshore". (MfE 2007 p.41)

Subject to certain restrictions, NZUs will be interchangeable with Kyoto units. (MfE 2007 p.46).

Insofar as this international convertibility of the NZU is maintained, the early recipients of freely-gifted NZUs will be able to convert them to cash at the prevailing world carbon price – either by direct sale, or by exchanging NZUs for AAUs through the Government and selling the latter. Thus a pre-Kyoto forest owner assured of receiving an NZU and not planning to deforest, should in theory have been able to sell a future claim on its NZU holding on 1 January 2008, at the going world price of around \$30/t CO₂-e, realising \$1,170 per hectare.²⁴⁷

The ability to buy and sell NZUs and to exchange them for Kyoto instruments on an international market will not, however, be unrestricted. The most important restriction is “constraints imposed by the Kyoto Protocol’s Commitment Period Reserve” (MfE 2007 p.46).

The Commitment Period Reserve is a requirement imposed by the UNFCCC on all parties to the Protocol which have committed to emission targets.²⁴⁸ Each party will begin the first commitment period with an “Assigned Amount” of Kyoto units in its registry, in the form of AAUs (the gold standard of Kyoto units). Over time this initial registry holding will be increased to the extent that:

- local carbon sinks earn credits that are entered to the Government’s national registry;
- Government purchases Kyoto units on its own account to top-up the registry holdings;
- New Zealand investors participate in Joint Implementation²⁴⁹ and CDM projects and repatriate the resulting credits to the New Zealand registry;
- New Zealand emitters opt to surrender Kyoto units (which can then be added to the Government’s registry holdings) rather than NZUs to cover their emission tax obligations

Conversely, the registry holding (the Government’s total Kyoto-currency reserves) will be reduced whenever:

²⁴⁷ This calculation, but using a \$15/tCO₂-e price to get an estimate of \$585 per hectare, is to be found in MAF 2007 p.28.

²⁴⁸ OECD Environment Directorate and International Energy Agency, *The Commitment Period Reserve: Information Paper*, 2001, COM/ENV/EPOC/IEA/SLT(2001)13, www.oecd.org/dataoecd/50/20/2468753.pdf; Erik Haites and Fanny Missfeldt, “Liquidity Implications of a Commitment Period Reserve at National and Global Levels”, *Energy Economics* 26 (2004) 845– 868.

²⁴⁹ See section 7.7 below.

- Government exchanges an NZU, on demand, for a Kyoto unit such as an AAU;
- Government allocates AAUs from its reserves to reward selected projects or activities within the New Zealand economy;²⁵⁰
- Overseas investors undertake Joint Implementation projects within the New Zealand economy and repatriate the resulting credits.

To prevent governments from opportunistically cashing up their registry holdings of AAUs (and later potentially defaulting on their obligations), the Kyoto rules for CP1 specify that at least 90% of the initial Assigned Amount must be held in the registry at all times. This means that when trading begins, not more than 10% of New Zealand's assigned amount can be disposed of. At the point where the Government's reserve position becomes threatened by offshore sales of NZUs, or exports of emission reductions through JI projects, or AAU giftings by Government, either the registry would have to be closed to further trade, or the reserves would have to be topped-up to protect the Commitment Period Reserve, by outright Government purchases of Kyoto units at taxpayers' expense. The CPR limit on the extent of Government's disposable reserves is clearly acknowledged in the ETS documentation:

The number of New Zealand Kyoto units that can be transferred overseas at any time will be limited to 10 percent of New Zealand's assigned amount... (MAF 2007 p.9).

If this limit is reached, the registry would effectively close to outgoing international transfers until more Kyoto units (AAUs, CERs, ERUs or RMUs) were transferred into the registry (MfE 2007 p.44).

The New Zealand Government's Assigned Amount is 309.5 million units²⁵¹. The Commitment Period Reserve is 90% of this: 278.6 million units. If more than 31 million units flow out, the trading window will have to close and the NZU will become inconvertible unless Government steps in to add newly-purchased units.

The above discussion raises immediately the question of how close the New Zealand Government may be to the CPR limit at the beginning of 2008. The Assigned Amount is not intact because a number of AAUs have already been allocated to so-called "Projects to Reduce Emissions" (PREs). Under a policy introduced in 2002, AAUs were allocated to approved projects as a means of subsidising investment in emission-reducing activities for which the promoters had secured Government support. A total of 10.6 Mt CO₂-e of AAUs (3.4% of the Assigned Amount) had been committed by the time the PRE scheme was ended in 2005,²⁵² and of these it is expected that 7.5 Mt CO₂-e (2.4% of the Assigned Amount) will actually accrue to successfully realised projects.²⁵³

²⁵⁰ For example Projects to Reduce Emissions, Negotiated Greenhouse Agreements, East Coast Forestry schemes, Permanent Sink Initiative forests.

²⁵¹ *Framework* p.114 Table 7.5.

²⁵² Phylipsen, Dian, and Murray Ward, *Final Report: Lessons Learned from the NZ PRE Scheme: Report for Ministry for the Environment*, Ecofys and Global Climate Change Consultancy January 2007, p.12.

²⁵³ *Framework* Table 7.5 p.115.

Of the New Zealand Government's 30.9 million disposable AAUs, the commitment of 7.5 million to PRE projects leaves 23.4 million units. Undisclosed numbers of AAUs have also been pre-committed to other recipients. In particular, the Government has entered into confidential Negotiated Greenhouse Agreements with large industrial companies, under which an unknown volume of AAUs may be (or may have been) transferred to those companies. Participants in the Permanent Forest Sinks Initiative also have the option to be issued with AAUs for their sequestration.²⁵⁴

With the Government's margin of Kyoto currency over the CPR thus already depleted by well over a quarter, the Government plans to issue, as at January 2008, up to 21 million NZUs to owners of pre-1990 forests. While part of this issue will go to Government entities²⁵⁵ and this is likely to reduce the number actually entering the market, the other recipients of these NZUs will need to consider whether to sell or bank them, since few will need to surrender them during CP1. If all recipients of the 21 million NZUs were to seek to sell offshore, this would account for 7% of the Assigned Amount and would deplete the Government's reserves to the point where the Commitment Period Reserve became threatened.

The Government clearly foreshadows the resulting situation in its ETS documentation:

Temporary closure of the registry as a result of breaching the CPR could constrain the ability of participants in Projects to Reduce Emissions, those in Negotiated Greenhouse Agreements and the Permanent Forest Sink Initiative to sell their Kyoto units internationally. These parties can be protected by maintaining a purpose-built buffer within the CPR, and **closing the registry to other trades** in advance of breaching the actual CPR.... (*Framework* pp.44-45, emphasis added).

What this means is that the ETS faces, from day one of its operation, the risk of a run on the registry. If all forest owner recipients of NZUs at the commencement of the ETS opt to liquidate their holdings by selling overseas, then the New Zealand Government will find itself very early in CP1 with its AAU reserves depleted to the point at which further trade may have to be prohibited, making the NZU inconvertible.

The Government is presumably hoping that local recipients of NZUs and AAUs will sell them locally rather than offshore (or will bank them). However, the risk of NZU inconvertibility and a ban on international trading will be taken into account by market participants. The rational response for an early recipient of an NZU will be to convert it quickly while the market remains open, rather than taking a chance on future convertibility. The risks to the NZU are potentially similar to those facing the New Zealand dollar in June 1984 when capital flight drained the foreign exchange reserves and forced closure of the foreign exchange market, followed by devaluation of the NZ dollar.

²⁵⁴ MAF, *Forestry in a New Zealand Emissions Trading Scheme*, September 2007, p.42. They have the option to take NZUs instead, but have no apparent incentive to take the soft rather than the hard currency.

²⁵⁵ To cover state-owned forests and possible deforestation on small exempted forest areas – MAF *Forestry* pp.24-30.

Finally, the potential for leakage through Joint Implementation projects presents a separate and major threat to the reserves – as discussed in sections 7.7. to 7.9.

In summary,

- There is a risk that holders of NZUs will seek to cash up their holdings by seeking to exchange these for AAUs via the Government. As the Government faces minimum reserve requirements that are thin by comparison to the number of NZUs to be issued, holders of NZUs face the risk that the Government will need to close down the ability to convert the NZU into Kyoto currencies. This in turn will effectively devalue the NZU;
- If the NZU becomes inconvertible, but the Government wishes to protect its market value, then some buy-back window with a posted price will be needed to support the NZU price, at a cost to the taxpayer;
- If the Commitment Period Reserve remains safe against early cashing-up of NZUs, the spotlight will shift to a second major exposure that could over time pose a potentially more severe threat to the CPR, namely abatement exports under Joint Implementation arrangements²⁵⁶.

7.5 Avoiding Overissue

The question of NZU convertibility is directly linked to the danger of over-issuing NZUs, and thereby reducing their value (the same inflationary process that occurs when excessive amounts of any currency are issued).

At first sight there might seem to be two clear thresholds that would enable Government planners to avoid overissue.

The first threshold is the Commitment Period Reserve. Provided that the number of NZUs on issue at any time remains less than the sum of (i) expected tax-liable emissions plus (ii) the remaining margin of reserves over the CPR, then convertibility is safe so long as NZUs are preferred to AAUs or CERs for paying ETS tax. If private-sector emitters instead buy CERs offshore to meet all their ETS liabilities, so that all NZUs arrive at the exchange window to be swapped for AAUs, then the very small margin of reserves over the Commitment Period Reserve becomes the binding constraint.

A back-of envelope exercise using the figures from the preceding section might run as follows:

²⁵⁶ This exposure was the subject of debate back in 1995; see Jonathan Underhill, “\$38 billion carbon rights to New Zealand forests could be sold offshore”, *National Business Review*, 5 May 1995, p.11.

Table 7.1

	Million NZUs
Assigned Amount	309.5
Issued to PREs	7.5
NGAs and PFSI commitments (pure guess)	2
Residual reserves in hand	300
NZUs gifted to pre-1990 forest owners	up to 21
Remaining reserves if all sold	279
Commitment Period Reserve	278.6
Remaining margin	0.4 +

Thus even immediate exchange for AAUs of all the 21 million NZUs to be issued to pre-Kyoto forests might not, at first sight, trigger inconvertibility, so long as NGAs and PFSI commitments are 2 million or less. But 0.4 million AAUs would be a wafer-thin margin for the Government to operate on, in the uncertain environment of Kyoto trading. In practice, as discussed in Chapter 6, the number of NZUs actually coming into the hands of pre-Kyoto forest owners will probably be less than 21 million, and the CPR margin will be correspondingly wider. However, when account is taken of the potential for JI projects to drain off AAUs from the registry at any time during CP1, and of the additional pressure that will come onto the reserves as Kyoto forests earn NZU credits and large industrials put their surplus gifted NZUs on the market, it is difficult to see how convertibility can be sustained other than by large-scale use of taxpayer funds to continually top-up the Government's reserves by offshore purchases of Kyoto units – a backdoor means of underwriting the NZU by acting as a purchaser-of-last-resort at taxpayer expense.

The second threshold is the projected volume of emissions to be covered during CP1, plus some estimate of the demand for banked NZUs to cover post-2012 emissions. Even if the NZU becomes inconvertible, it will still have value locally as a tax voucher, provided that local emitters use it ahead of CERs or AAUs to pay their emission taxes. Here the back-of-envelope calculation starts from the observation that current proposals envisage up to 145 million NZUs being issued during CP1, compared with total ETS-liable emissions which are projected to be (after ETS-induced abatement) 138.5 Mt.²⁵⁷ To prevent an overhang of unsaleable NZUs under these circumstances requires some combination of substantial banking of NZUs to the post-2012 period, and/or low uptake of the NZU offer made to Kyoto forest owners, so that actual NZU issue falls far below the 145 million figure, or less are being put up for sale in the market.

All of the above calculations become almost irrelevant without the provisional assumption above, that NZUs are preferred to Kyoto units for paying the ETS tax. In the *ad absurdum* case, all 138.5 Mt of ETS-liable emissions could be paid for with CERs and AAUs, with all the 145 million NZUs dumped onto a market with no demand other than for banking, collapsing the price to the level at which bargain-hunters are prepared to bank NZUs for resale or use in the period after 2012.

²⁵⁷ Total of 139.3 Mt from Table 4.3, minus 0.8 Mt of weed control which is excluded from the 145 million NZU figure, and emissions from which are fully covered by targeted NZU issues.

There would be a silver lining in that situation: the Government would be assured of its ability to pay the nation's Kyoto deficit, since the inflow to the registry of surrendered Kyoto currencies would more than provide the required international means of payment. The Government would then be able to sell off surplus Kyoto units on the world market for cash, securing a revenue windfall. The other side of this coin would be that the notional wealth transfer represented by the issuing of NZUs would be largely wiped out – a de facto withdrawal of forest owners' reward for sinking carbon.

Amore useful scenario to examine is one in which the Commitment Period Reserve comes under such pressure that the cost of temporarily supporting convertibility is too high and the Government reverts to the backstop option of buying-in NZUs itself in order to maintain the market price. The Government might be able effectively to set a floor price by declaring its willingness to buy at that price, forcing the big emitters to buy from the forest owners directly at the floor price or above.

It is extremely difficult to predict whether or not the inflationary scenario of NZU over-issue will eventuate, but it is possible to enumerate clearly the factors that have to be taken into account when thinking about this question:

- The residual demand for NZUs depends upon the extent to which Kyoto units are surrendered instead of NZUs to cover emissions; in principle, the NZU market should establish a price discount sufficient to induce emitters to use the local rather than the overseas currency for tax purposes;
- The supply of NZUs entering the market will depend upon the extent to which Kyoto forest owners opt to take up the offer of joining the ETS and receiving NZUs as reward for their sequestration of carbon;
- The availability of reserves to maintain NZU convertibility will be threatened if JI projects take off in New Zealand;
- The Government will always have in reserve the option of buying-in NZUs in order to shrink the supply and balance the market. (Under the ETS design, the wealth transfers are to move directly from one part of the community to another without passing through Government's hands – this is the sense in which the ETS takes a large set of taxes and transfers off-balance-sheet from the Government's perspective. Having to buy-in NZUs would put emissions trading back into the Crown accounts unless and until they could be onsold.)

7.6 Opportunities for Cartel/Monopsony Purchase

There are a number of ways in which the ETS as currently proposed is open to strategic manipulation. This section will discuss just one of these possibilities – the potential for oil, coal, gas and electricity companies to exercise monopsonistic power in the NZU market in order to secure extra profits.

Under the ETS, the oil companies will be allowed to pass through, to the ex-refinery prices of petrol, diesel and other fuels, the full cost of compliance with the ETS. This

means that the prices of liquid fuels will be raised by an amount corresponding to the cost of paying tax on the emissions that will occur when the fuel is used.²⁵⁸

The Government expects the ETS to raise the price of petrol and diesel by between 4 and 7 cents per litre²⁵⁹, but this is no more than an estimate and the eventual price rise will be determined by the oil companies. The extent to which some justification process for price adjustments will be imposed upon the companies is not known at this stage, and the Government's track record of engagement with price-control-oriented monitoring of commodities over the past two decades is not encouraging.

To provide a framework for analysis we shall provisionally assume that the oil companies will be subject to some sort of information-disclosure arrangement requiring them to show that the increased prices are justified on the basis of the cost of buying emission credits to cover end-user emissions.

Left free to act strategically within such a framework, the oil companies have two very clear incentives: maximise the price increase (and hence the increase in their revenues) while minimising the cost of acquiring enough ETS-compliant units to cover the relevant emission volumes. Not only are these responses legal under prevailing legislation; they are to be expected, given that company directors have obligations to maximise shareholder wealth.

A potential response to such incentives has been well documented under the European ETS²⁶⁰. Under the New Zealand ETS, the first step would be to use expensive emission units as the pricing benchmark, and to buy enough of these to establish a so-called "opportunity cost of carbon credits". The full amount of this opportunity cost would then be used to set the resale price of oil products, and collected from consumers.

Having thus established a high price benchmark for the products, the next step is to seek out the lowest-cost source of NZUs to surrender against the resulting emissions (except for the small marginal volume of emissions covered by the high-priced credits bought to establish the pricing benchmark in the first place).

Four oil companies, two major electricity generators, a couple of large gas producers, and one major coal company together will dominate the demand side of the market for NZUs. Were they to make arrangements that in some way delivered a single buying desk, or something close to it, these companies would be in a position to bid the NZU down to the price floor - set by forest owners banking NZUs and/or Government acting as a purchaser-of-last-resort. The companies could apply to the Commerce Commission on "market-efficiency" grounds for the formal establishment of such a

²⁵⁸ An alternative to the upstream "point of obligation" approach would be to allow individual motorists to pay for their petrol with NZUs, acquired at the going market price. This sort of decentralised implementation of an ETS would have, at the very least, a more democratic flavour than the current very top-heavy design. For some preliminary thinking along these lines see Simon Terry, *Popular Decarbonisation*, Sustainability Council, 2006.

²⁵⁹ Emissions Trading Group, *Allocation in the New Zealand Emissions Trading Scheme*, MfE December 2007, p.13.

²⁶⁰ See, for example, Jos Sijm, Karsten Neuhoff and Yihsu Chen, "CO₂ cost pass-through and windfall profits in the power sector", *Climate Policy* 6(1): 49-72, 2006.

single purchasing desk. Alternative arrangements, that were less formal and not authorised, could still be legal and might prove effective.

An oil company might thereby be able to raise prices by 7 cents/litre or more while incurring actual additional tax costs that were considerably less on average, with the margin captured as pure profit at the expense of the NZU sellers. While Government could short-circuit this by buying-up NZUs on its own account, this would not be costless and would impinge on the Government's own fiscal balance.

Even without the NZU, the same mechanism would be feasible. Fuel prices could be based on the "opportunity cost" of buying high-price AAUs, while the oil company in fact sought out on the world market the cheapest available CERs or hot-air that met the Government's surrender requirements.

While easy to describe, this process is extremely difficult to identify, measure or police, as previous experience with information-disclosure regimes in New Zealand's telecommunications, gas and electricity sectors has shown. As NZUs are bought-up cheaply the cash costs would appear (intermingled with numerous other operating expenditures) in the companies' financial statements. Only strong regulatory disclosure requirements would secure separate accounting for purchases. Once bought, all ETS-compliant units from whatever source could be marked to market and could then appear in the balance sheet priced at parity with the highest-cost Kyoto unit available on the market. The resulting pure profit extracted from NZU holders and/or consumers would disappear into the revaluation reserves.

The above is merely one of numerous ways in which a smart operator with market power will be able to game the NZU market under the proposed ETS architecture. The task of foreseeing all the possible strategic opportunities, and designing regulatory countermeasures in advance, is almost certainly beyond the capability of the New Zealand Government. There is a very real risk, therefore, of an NZU market which is opaque and manipulated, to such an extent that price signals emanating from the market will provide neither reliable incentives and guidance for firms contemplating abatement projects, nor clear public information as to where the costs and benefits of the ETS fall.

The problems outlined in this section are not caused by the NZU *per se*; they will be exposures for any emissions-tax programme that relies upon levying upstream energy suppliers who have sufficient market power to leverage some profit advantage out of the process of measuring and passing-through the costs of the tax. In a small market such as New Zealand with very weak regulatory laws and institutions at the large-company level, any emissions tax relying upon good faith and/or competitive pressure on margins will lack public credibility unless disclosure and policing are completely transparent and effective.

The NZU simply adds an additional level of complexity to an already-difficult area, providing another set of opportunities to conceal actual costs and actual profits behind the limited transparency afforded by general accounting standards and company reporting requirements.

7.7 The JI Mechanism

One of the key Kyoto mechanisms for triggering cost-effective emission reductions is Joint Implementation (JI). This is a process under which an investor in one country that is committed to making reductions under the Protocol (an Annex I party) can enter into partnership with the owner of a potential abatement project in another.²⁶¹ The country which hosts the project must certify the genuineness of the emission reductions achieved, and once this has been done, the project is issued with Emission Reduction Units (ERUs).

The ERU is a UNFCCC-certified unit that is exchangeable with other Kyoto instruments, and that can be added to any country's register of units held for the purpose of complying with Kyoto commitments. Exactly how the newly-created emission credit units are shared between the host-country partner and the overseas investor will depend upon the contract they enter into; for simplicity we shall assume here that all credits are claimed by the overseas investor.

In the course of CPI, investors in all Annex I countries will be seeking out low-cost abatement opportunities wherever they are to be found, whether in non-Annex I countries participating in the Clean Development Mechanism, or in other Annex I countries committed to hosting JI projects. The lower the cost of achieving emission reductions, the greater the payback on the investment in terms of ERUs gained per dollar spent. New Zealand, along with other Annex I parties, will be scoured for low-hanging fruit by keen-eyed investors, and any low-cost emission reductions not taken up by domestic investors will be targets for foreign direct investment via JI.

Under the Kyoto accounting rules²⁶², whenever an ERU is created by a JI project located in New Zealand, the New Zealand Government must cancel one of the AAUs held in the national registry (or an equivalent alternative Kyoto unit – an RMU or CER). That is, every tonne of emission reduction achieved in New Zealand but credited overseas under JI reduces the Government's Assigned Amount, and registry holdings, of Kyoto units by the amount of the achieved emission reductions, leaving the country's net excess emissions unchanged. The emission reductions will be credited to the investing partner's country (for example, Austria or the Netherlands), reducing New Zealand's holdings of AAUs one-for-one with the creation of ERUs²⁶³, while leaving New Zealand's measured excess emissions unchanged.

²⁶¹ This differs from the Clean Development Mechanism where an Annex 1 party invests in a non-Annex 1 country. JI covers Annex 1 to Annex 1 investments.

²⁶² UNFCCC Secretariat, *Kyoto Protocol Reference Manual on Accounting of Emissions and Assigned Amounts*, February 2007, http://unfccc.int/files/national_reports/accounting_reporting_and_review_under_the_kyoto_protocol/application/pdf/rm_final.pdf.

²⁶³ "For an emission reduction project, an ERU must be converted from an existing AAU" (UNFCCC Secretariat, *Kyoto Protocol Reference Manual on Accounting of Emissions and Assigned Amounts*, February 2007, p.60 section 6.1.2). If the ERU is then exported (transferred to the registry of the JI investor's government), the host country's registry will be debited accordingly.

Joint implementation allows Annex I Parties to implement projects that reduce emissions, or increase removals using sinks, in other Annex I countries. Emission reduction units (ERUs) generated by such projects can then be used by investing Annex I Parties to help meet their emissions targets. To avoid double counting, a corresponding subtraction is made from the host Party's assigned amount.

UNFCCC, *Caring for Climate: A Guide to the Climate Change Convention and the Kyoto Protocol*, 2005, http://unfccc.int/resource/docs/publications/caring2005_en.pdf, p.32,

Because the Commitment Period Reserve is defined in terms of the initial Assigned Amount²⁶⁴, such a draining-off of AAUs (via ERUs that are created by JI) will bring the Government's holdings of units down relative to its Commitment Period Reserve. Recall that, as discussed in section 7.4, the Government has already disposed of 2.4% of its AAU holdings to PREs, and cashing-up of gifted NZUs by foresters may eliminate up to a further 7%, in addition to which the Government has an undisclosed amount of liability to provide AAUs to Negotiated Greenhouse Agreements, PFSI projects and East Coast Forestry Projects.

Hence any large-scale move by New Zealand owners of abatement opportunities to "export" their abatement, in partnership with overseas investors, would quickly breach the Commitment Period Reserve unless the Government buys-in AAUs from the world market to replace those drained off to JI. Because NZUs issued to industrial NGAs, PFSI and ECFP are to have priority over all other claimants in international exchange of NZUs²⁶⁵, JI projects could well be denied the ability to repatriate their emission-credit profits unless the New Zealand Government buys credits offshore to top-up its reserves and thereby underwrite the projects, in which case the taxpayer would bear the full cost of paying for the abatement.

The Government has undertaken to ensure, by some unspecified means, that even closure of the registry (inconvertibility of the NZU) does not halt international trading by NGA, PFSI and ECFP parties:

Special provisions will be applied to participants in Projects to Reduce Emissions, Negotiated Greenhouse Agreements and the PFSI to enable them to sell units internationally without constraint by the Commitment Period Reserve. (MAF 2007 p.41)

²⁶⁴ More specifically, "the level of the CPR must equal the lower of *either* 90 per cent of its initial assigned amount *or* 100 per cent of its Annex A emissions in its most recently reviewed inventory... Only Kyoto Protocol units in a registry's retirement or holding accounts counts towards the Party's CPR; units in cancellation accounts do not. If a Party attempts to make a transaction that would result in the registry holdings dropping below the required level of the CPR, the ITL will identify the transaction as a discrepancy and notify the Party to terminate the transaction" (UNFCCC Secretariat, *Kyoto Protocol Reference Manual on Accounting of Emissions and Assigned Amounts*, February 2007, p.43 section 5.2.1)[emphasis added].

²⁶⁵ "When managing the CPR, preference will be given to participants in Projects to Reduce Emissions, Negotiated Greenhouse Agreements and the Permanent Forest Sinks Initiative in order to enable them to sell units internationally" (*Framework*, p.46).

There are no matching undertakings in the ETS documentation for the Government to similarly underwrite the export of either forest owners' NZUs, or ERUs earned by local abatement projects under JI. But having signed up to the Kyoto Protocol and entered into a number of cooperation agreements with other Annex I governments to facilitate JI²⁶⁶, the Government would be placed in an embarrassing position if it refused to allow local firms to capitalise on low-cost abatement opportunities via JI. If the Government issued such a refusal when New Zealand is projected to be unable to meet its Protocol abatement target, this would amount to an acknowledgment that it had failed to price emissions from an activity that are fully profitable to abate and yet it would also forbid an overseas party making the necessary investment. In other words, an opportunity to reduce the world's total emissions would be blocked outright by New Zealand.

7.8 Double-Dipping

Opportunities to undertake emission reductions in partnership with overseas investors, under Joint Implementation, will be open to all firms across the New Zealand economy, whether or not they are covered by the ETS. The implications will differ amongst three groups: large industrials subject to ETS but endowed with gifted NZUs; other parties subject to ETS but with no NZU rebates; and groups such as farmers outside the ETS during CP1.

Take first the case of the very large industrial firms which are to be gifted NZUs under the Government's proposed allocation scheme. Due to the extent of planned free NZU allocations to them, if these operations keep their emissions largely unchanged from 2005 levels, the gifted NZUs will easily cover those emissions at no cost to the emitters. But if their emissions are reduced by means of JI projects, the portion of the gifted NZUs that is no longer needed to meet the ETS surrender requirements (because the firms' emissions levels have been cut) will be able to be sold off for cash. At the same time, the JI projects will earn new ERU credits for the emission reductions and these are also saleable for cash.

Thus a unit of abatement realised by these firms will give a double return. If NZUs and ERUs trade at a world price of \$30/tonne, emission reductions by large industrials that have been gifted NZUs will have a cash value of \$60/tonne if undertaken under JI, versus \$30/tonne if undertaken on a purely-local basis. Many of these operations are branch plants of transnational companies and will be able to enter into JI contracts with their offshore affiliates or parents, capturing the full gains from double-dipping at the expense of the New Zealand taxpayer (who will ultimately have to make up any deficit in the Government's registry holdings of Kyoto currencies at the end of CP1). Unless it blocks the projects from proceeding, the Government will have to pay out the world price to replace the AAUs drained abroad by the JI partners.

²⁶⁶ *Emissions Deal Signed with Austria*, New Zealand Government press release 20 December 2004: "internationally tradable emissions units are available to New Zealand businesses working with partners from other ratifying developed nations to deliver emissions reductions under the Protocol's Joint Implementation initiative. This opportunity is already worth many millions of dollars to New Zealand business...The signing of this arrangement [with Austria] signals the two governments' commitment to encouraging Kiwi business to get involved in Joint Implementation projects with Austria... The governments of New Zealand and the Netherlands signed an emissions trading cooperation arrangement in August [2004]".

When a JI project is undertaken by a small industrial or commercial operation that is subject to the ETS but not in receipt of gifted NZUs, and not undertaking the JI project as an intra-firm arrangement, the double-dipping is more subtle. The overseas partner finances the investment and takes away the ERU credits created, realising its profit on the margin of credits earned over investment costs. The local partner benefits from having an emission-reducing investment in their business undertaken at no cost to them, and gains the benefit of reduced emission tax (fewer credits to be surrendered on the reduced emission volume).

Under this scenario, the New Zealand Government still loses from its registry a volume of AAUs corresponding to the emission saving, while facing an unchanged excess-emissions outcome (the abatement credits are exported with the ERUs, not recorded as a reduction in New Zealand's excess emissions). The overseas JI partner and the local one share, between them, twice the value of the emissions saving achieved²⁶⁷, leaving the Government paying for the double-counted value. The incentive thus created for JI to be the predominant means of pursuing abatement may well be the greatest single threat to the integrity of the ETS, given New Zealand's exposure as a Kyoto-deficit country²⁶⁸.

Under the prevailing Kyoto architecture, the only way the New Zealand Government will have of preventing the problem from arising will be to treat JI as a form of foreign investment subject to domestic regulation, and take steps either to block JI projects beyond a certain volume, or to outbid the overseas entrepreneurs to take over the projects and retain the Kyoto-currency profits in the local registry.

7.9 JI and Agriculture

Perhaps the greatest irony of the ETS is that by excluding agriculture until 2013, the New Zealand Government has separated New Zealand farmers from the chance to sell or redeem credits locally by adopting low-cost abatement technologies. While forest owners reel in tens of millions of NZU credits for their carbon sequestration, farmers are to be left out in the cold with no local market in which to sell their abatement.²⁶⁹ This leaves the international JI market as an obvious place to sell pastoral abatement. By entering into Joint Implementation projects with investors from, say, EU countries, farmers might receive a cash payment from the investor in return for transfer of the

²⁶⁷ One unit less to be surrendered to the New Zealand Government, plus one ERU unit that can be sold overseas.

²⁶⁸ Virtually all JI projects announced to date have been in the Kyoto-surplus economies of Eastern Europe and the former USSR; New Zealand is the sole Annex I country outside this group listed at <http://www.cdmpipeline.org/ji-projects.htm#1>.

²⁶⁹ The Ministry of Agriculture and Forestry, acknowledging the potentially large scope for nitrification inhibitors in agriculture, and having calculated the potential gains to farmers from selling carbon credits derived from their introduction, notes that its calculation "rests on an important assumption that farmers will be able to receive credit for inhibitors under the ETS". See MAF, *Projected Impacts of the New Zealand Emissions Trading Scheme at Farm Level*, <http://www.maf.govt.nz/climatechange/reports/Projected-Impacts-of-NZETS.pdf>, undated (evidently 2008), p.2.

project ERUs to the EU, on top of the already-attractive profits from implementing the new technologies.

The next chapter will develop the theme that the nation's largest tranche of low-cost abatement opportunities is in agriculture. Going into CP1, the group that stands to gain most from implementing new technologies to cut greenhouse gas emissions are pastoral farmers. As awareness of profitable opportunities to utilise nitrification inhibitors, new grasses, and standoff pads spreads through the rural sector, and as research on methane abatement advances to the commercial stage, it will be logical for farmers to ask how they can secure profits not merely from improving their production techniques in cost-effective ways but also from claiming credit for the contribution of these new technologies to reducing emissions.

One of the consequences of leaving agriculture outside the ETS until 2013 is that if some awkward issues surrounding the crediting of agricultural emission abatement are resolved in the course of CP1, farmers could turn overseas to make money on emission reductions that will get them no credit here. In the process New Zealand risks being cherry-picked of its lowest-cost abatement opportunities for no gain in return (additional profits secured by farmers would be offset by the cost to taxpayers of rebuilding the Commitment Period Reserve).

The scale of agricultural abatement opportunities seems likely to exceed the Government's buffer around the Commitment Period Reserve, given the other pressures already on it. The registry would then have to close to new JI transactions unless Government opted to underwrite the projects using taxpayers' funds, gaining nothing on the Kyoto accounts while transferring wealth from taxpayers to farmers.

For the moment, JI projects in agriculture are rendered infeasible by the fact that the Kyoto inventory filings for agricultural emissions have not yet been adapted to take account of emissions reductions through such projects, which means that there is no clear track to the issuing of ERUs to a successful project. This gap is unlikely to persist; at the very least, it would be unwise for the New Zealand Government to rely upon it as a defence against a JI-driven "run on the reserves". This issue is further discussed in section 8.2.3.

Again, the prospect of considerable political embarrassment arises. This time there could be a line of JI investors keen to take a lead in agricultural abatement, with farmer representatives at their side, pointing out that to deny them the opportunity to undertake the project is to set back exactly the emissions reductions the Government is ostensibly hoping to see.

The point of this scenario is that, if and when credits recognised under the Protocol can be secured through agricultural abatement, the policy of completely exempting agricultural emissions for the whole of CP1 becomes much more difficult to sustain politically. The quantity of credits available through the widespread application of nitrification inhibitors alone could force the issue.

A further influence on the transition will be the intervention of grey markets offering carbon credits. These rapidly-emerging voluntary markets cater to those who seek to purchase carbon offsets but do not need the credits to be Kyoto compliant.

If credits recognised under the Protocol cannot be obtained by New-Zealand-based agricultural abatement projects for a particular year, or throughout CP1 due to a failure to secure UN approval for counting agricultural savings under the Protocol, then farmers could still gain from selling their emission reductions on “voluntary markets” such as the Chicago Carbon Exchange, albeit at a discount to the Kyoto currencies. Agriculture’s complete exemption from the ETS until 2013 would, in that case, probably not be politically sustainable.

7.10 Some Final Reflections on the NZU

The Government is creating an off-balance-sheet vehicle, which is to trade in murky and ill-defined markets, exposed to manipulation and the exercise of market power. A major outcome of the exercise will be to transfer wealth into the hands of an inside group of operators, at the expense of the wider community. The market structure is exposed not only to gaming, but also to potential instability because of threats to the convertibility - and hence the value - of the NZU itself. The exercise could be characterised by critics as an attempt to avoid parliamentary scrutiny of a set of transactions designed to enrich favoured sectors by protecting them from a price on carbon. Viewed from this perspective, the NZU presents a threat to the principles of fiscal responsibility.

The consequences of taking major transfers off the government’s balance sheet are clear. When forest owners are gifted 100 million NZUs and sell these to emitters to enable the latter to pay their emissions taxes, then at an NZU price of \$30 the forest owners gain a cash reward of \$3 billion at no apparent fiscal cost. But that \$3 billion must be paid by somebody, just as it would have to be if the Government had handed out the cash itself and collected a corresponding amount from taxpayers. Without the NZU, these forest owners could receive contracts for the future delivery of Kyoto units (RMUs) directly from the national registry, with no hidden consequences.

When large industrial concerns are gifted 45 million NZUs, this is merely a covert way of paying them a subsidy to remove the burden of the ETS from their bottom line and to provide a rebate on their electricity bills. Neither of these transactions requires NZUs; both would be more transparently done with cash. With the NZU, consumers and SMEs will be charged the cost of a corporate-welfare package in higher prices on their purchases from ETS-liable sectors; the same amount could equally well be transferred in cash from general taxation, in the clear light of day.

8. Carbon (Policy) Capture

8.1 Least Chance of Least Cost Abatement

8.1.1 In Praise of a Least Cost Approach

The economically efficient way for New Zealand to meet its Kyoto commitments is to set up incentives that bring forward the required emission reductions at least cost. A central component of this is putting a price on emissions, together with an equal and opposite reward on the sequestering of carbon. There is ostensibly wide support for a least cost approach²⁷⁰ from both the Government and the National Party, and equally from Fonterra and other major stakeholders.²⁷¹

The ETS documentation makes “least cost” a central theme and rationale:

New Zealand is reliant on effective international action, and the best way of supporting it is a credible programme of action to **manage domestic emissions downwards at least cost**.²⁷²

The *Framework* document further speaks of the need to “... address the problem of climate change with a view to: ... ensuring that solutions impose the **least cost on our economy** and way of life”, and states that the ETS “**fosters least-cost emission reduction activities**”.²⁷³ At times it adds the caveat of “producing desired outcomes **at least cost in the long term**”.²⁷⁴

Rhetoric aside, however, the ETS does not set up a mechanism for least cost domestic abatement during the first commitment period. It exempts entirely the sector with the largest amount of cost-competitive abatement potential (agriculture) while bringing in first, and taxing by far the most heavily, the sector exhibiting the lowest amount of short-term abatement potential (transport). New Zealand is to rely mainly on purchasing savings made in other countries to cover its projected Kyoto deficit.

The sectors targeted by the ETS tax are those with the most inelastic demand (that is, the lowest likely response to a tax-driven incentive to reduce consumption and emissions). Transport and electricity generation, which are to bear most of the tax burden, are both characterised by steep short-run abatement-cost curves. Sectors with

²⁷⁰ Least cost and within the rules governing the Kyoto Protocol.

²⁷¹ For example:

- “The overriding question for National will always be: who can reduce emissions at least cost to society and to the economy? We will work to reduce the cost of climate change to businesses, to taxpayers and to the environment.” *50 by 50: New Zealand’s Climate Change Target*, John Key, speech to National Party Northern Regional Conference, 13 May 2007; and
- “In Fonterra’s view, transitional policies need to be designed on the principle that they reduce emissions at the lowest economic cost.” Fonterra, Submission to Government, March 2007, para 7.3 (c), p 8.

²⁷² *Framework*, p 14, emphasis added.

²⁷³ *Framework*, p 17 and 24, emphasis added.

²⁷⁴ *Framework*, p 15, emphasis added.

relatively flat abatement cost curves (i.e. with more low-cost options to reduce emissions) have been exempted (agriculture, waste management) while others have been rebated (industrial and commercial energy use and industrial process emissions).

Such selective targeting of sectors with inelastic demand is the norm for taxes which are intended to raise revenue rather than to change behaviour. The targeting of the ETS would be consistent with the conjecture that the Government's central aim is to raise revenue to finance its anticipated payment of penalties for underperformance relative to the country's Kyoto targets during the First Commitment Period (CP1).²⁷⁵ The tax package is officially expected to have a very small (less than 5%²⁷⁶) effect on the New Zealand economy's emissions and carbon intensity for the 2008-2012 period.

8.1.2 Transport

The ETS is expected to deliver 0.4 Mt CO₂-e of savings as a result of fuel price increases the ETS imposes during CP1, the *Framework* document indicates.²⁷⁷ Against this, the ETS is designed to levy consumers a total of \$1,928 million, assuming a carbon price of \$30/t in both cases. That amounts to a cost to consumers, per tonne of carbon saved, of \$4,820.

Not counted in the above estimate is the technical potential for additional savings that could be made through investment in fuel efficiency measures. A recent consultant report to the Government estimated that 0.36 Mt of savings were available at a price of below \$30/t.²⁷⁸ That would raise expected and potential savings combined to a total of 0.8 Mt for CP1. Even if all the technical potential were to be taken up, the cost to those paying the tax, per tonne of emissions saved, would fall only to \$2,410. Either way, regardless of the precise numbers assumed, the average cost of abatement in this sector is exceedingly high.²⁷⁹

This is not an argument against taxing transport fuels. They should face a price along with all other emitters, if economic instruments are to be used. But if the introduction of different sectors to a tax scheme is to be sequenced, then a scheme which starts with

²⁷⁵ A less charitable interpretation is that the Government believes that the entire climate-change issue will evaporate, and that its goal in the ETS is to minimise the economic impact of whatever token policies it has to implement in the short run to appease international opinion. This would be an application of the so-called "Ramsey principle" of efficient taxation in a world without environmental or other externalities and market failures.

²⁷⁶ 20 million tonnes reduction on gross emissions of 426 million tonnes.

²⁷⁷ See section 3.1.2 for documentation of this.

²⁷⁸ ICF International, *Analysis of the Potential and Costs for Greenhouse Gas Emission Reductions*, 2007, p 125.

²⁷⁹ While the incentive effects of an emissions tax operate in principle at the margin, equalising the marginal cost of abatement across firms and sectors subject to the tax, it is the average cost rather than the marginal cost that is relevant when addressing the question of least-cost abatement in the presence of widespread tax exemptions. Under a universal tax all sectors would face the same tax rate, all would abate to the point where marginal cost equaled the tax rate, and the outcome would be to minimise the economy-wide average cost of abatement achieved. Under the ETS with its complex and arbitrary exemptions and rebates for favoured sectors, the issue is the exemption of sectors with low average abatement cost, and the taxing of sectors with high average cost, both of which raise the economy-wide average cost above the minimum achievable level.

transport fuels, and relies on them for three quarters of the net revenue the tax brings in²⁸⁰, cannot be described as a least-cost arrangement.

8.1.3 Electricity

Savings resulting from an electricity price increase under the ETS are officially estimated as 3.1 Mt CO₂-e of reductions during CP1.²⁸¹ The estimate appears high but is accepted here for the purpose of the calculation which follows. To secure this 3.1 Mt of abatement, the ETS will require (on the figures presented in *Framework*) payments by fossil-fuel-electricity consumers of \$519 million directly (for the tax) if the carbon price is \$30/t. Assessed on this basis alone, the tax cost per tonne of emissions saved would be \$167/t.

However, another \$1,808 million will also have to be paid by consumers to generators of renewable electricity, due to the way the wholesale electricity market operates. This brings the total effective tax cost per unit saved to \$750/t CO₂-e²⁸².

There are likely to be efficiency response options for consumers in the face of the tax, only some of which are incorporated into the Government's modelling. A consultant report to the Government has estimated that about 1.2 Mt of annual savings are available in total from energy efficiency measures by 2010.²⁸³ This appears a relatively low figure, but even if a higher estimate were used, the average cost of inducing abatement in this sector would remain high under any scenario.

Under a least-cost strategy, electricity production would face a common price for emissions, but would contribute relatively little to overall emission reduction, as it is far from being a low cost source of abatement. Electricity would be well down the New Zealand merit-order for sequenced entry to an ETS tax targeted at least-cost emission reduction. As with transport, the motivation for early application of the ETS to electricity generation appears to be revenue-maximisation rather than abatement-cost minimisation; generators are the second-largest source of payments for emissions under the ETS during CP1, and the Government stands to receive most of the windfall profits the ETS brings to renewables-based generation.

It is to be recalled, however, that the total "revenue" (in carbon credits) the Government anticipates securing from fossil-fueled generators is roughly equal to that to be returned, as gifted NZUs, to the major industrial producers as an electricity compensation package, resulting in no net tax take.

In brief, under the ETS the electricity sector will:

- contribute no net emission-tax revenue to help pay the Kyoto bill;

²⁸⁰ Transport accounts for 64.3 of the 86.8 Mt of emissions (excluding deforestation) on which tax is to be collected under the ETS during CP1; see Table 4.2.

²⁸¹ See section 3.1.4 above.

²⁸² (\$519 million + \$1,808 million) ÷ 3.1 = \$750 million.

²⁸³ ICF International, *Analysis of the Potential and Costs for Greenhouse Gas Emission Reductions*, 2007, Table 81 pp. 125, options costing below \$30/tonneCO₂-e.

- make only marginal emissions savings which could be purchased more cheaply elsewhere in the New Zealand economy; and
- force electricity consumers that are not exempted to pay three times as much again as the emissions tax on the fossil fuel used in generation – payments that become windfall profits for renewable generators.

8.1.4 Deforestation

The one sector in which the September 20th package of announcements promotes a clear low-cost abatement option is avoided deforestation. MAF estimates that if deforestation²⁸⁴ is forced to bear its full carbon price, it will be reduced substantially. The *Framework* document states that “it is likely that little of this deforestation would occur if the forestry sector were exposed to the full cost of emissions”.²⁸⁵ A subsequent survey of forest owner intentions suggests that while the ETS can be expected to reduce deforestation levels, there will still be at least 12,000 hectares cleared,²⁸⁶ and thus about 10 Mt of emissions.

There are a number of ways of looking at the cost per unit of avoided deforestation.

As noted previously, the Government had from 2002 made it clear to forest owners that they would be liable for all deforestation emissions in CPI over and above a 21 Mt limit.²⁸⁷ If one considers the Government’s latest specification of the assistance package planned for that remaining 21 Mt as being a part of the ETS scheme, then the 14.6 Mt of savings inferred (in section 5.2.2 above) from a speech by the Climate Change Minister will come at no cost to the taxpayer. This is because what was first proposed as an allowance to fell trees for free has been changed to a pro rata allocation of NZUs to the same value, leaving individual deforestation decisions exposed to the full cost of resulting emissions.

If the 21 Mt assistance package is treated as the cost to the wider community of securing this abatement by forest owners, then the cost is 21/14.6 times the carbon price, or \$43/t assuming a carbon price of \$30/t, on the basis of the ministers estimate. If deforestation equivalent to 10 Mt occurs (leaving 11 Mt as the reduction), the figure is 21/11 times the carbon price, or \$57/t on the same carbon price.

Deforestation would clearly qualify under either figure for early entry into a sequenced tax aiming at least-cost abatement.

²⁸⁴ Emissions due to the felling of trees that are not to be replanted.

²⁸⁵ *Framework*, p 107.

²⁸⁶ Bruce Manley, *2007 Deforestation Survey*, University of Canterbury, February 2008, p 4.

²⁸⁷ “While the ETS proposals have been released relatively recently, the government first signaled an intention to introduce some form of deforestation control in 2002. At that time, the government indicated that it was willing to meet the cost of deforestation emissions in the 2008–2012 period up to a cap of 21Mt of CO₂.” MfE, *Treatment of Pre-1990 Forests in the New Zealand Emissions Trading Scheme*, December 2007, p 1.

8.2 Agricultural Protection Money

A startling observation that emerges from any reasonable analysis of New Zealand's abatement costs is that pastoral agriculture holds by far the biggest set of low-cost abatement opportunities.

It is widely understood that New Zealand's emissions profile is very unusual in the developed world,²⁸⁸ with roughly 50% of gross emissions arising from pastoral farming – dairy, sheep and beef, in that order of importance. It is rapidly becoming equally apparent that the country's cheap abatement opportunities are skewed in the same direction.

The repeated claim, by agricultural spokespersons (and Government officials, until recently), that agricultural emissions cannot be abated without culling livestock and reducing production has proven to be a powerful but false message: a convenient untruth.²⁸⁹ It has served to deflect scrutiny from the agriculture sector and to protect it financially, by providing political justification for not confronting agricultural producers with the fiscal and environmental costs of their activities.

The reality is that there are proven abatement options that are highly cost effective, and a great many more that are still to be properly researched but which hold out very significant promise.

8.2.1 The ICF Cost Curve

Extraordinarily, for a decade after signing the Kyoto Protocol in 1997, the New Zealand Government did not undertake any systematic costing of agricultural abatement options.²⁹⁰ Responses to requests under the Official Information Act on this issue have indicated that the only significant study of agricultural abatement costs to date has been that done as part of an economy-wide report prepared for MfE in April 2007 by ICF International.²⁹¹ The ICF analysis was released with a series of health warnings from MfE,²⁹² and officials have noted that they do not regard the ICF's individual estimates

²⁸⁸ Though quite comparable to certain South American nations.

²⁸⁹ The *Oxford Concise Dictionary* gives one definition of 'untruth' as "the quality of being false", and it is used in this sense.

²⁹⁰ MAF states that: "The cost-effectiveness of these technologies under a wide range of farming practices is not known. There is information showing that some technologies (such as nitrification inhibitors) are cost-effective in some circumstances (such as dairying in some areas). MAF is in the process of undertaking a review that will better enable us to address these issues and to enable the government to come to an informed view as to what emissions reductions can be expected. MAF is also investigating the marginal costs of abatement using different technologies. We expect these reviews to be completed by early 2008". Source: MAF letter to Sustainability Council, 12 October 2007.

²⁹¹ ICF International, *Analysis of the Potential and Costs for Greenhouse Gas Emission Reductions*, April 2007.

²⁹² MfE states: "It is important to note that the aggregate abatement supply curve from this analysis represents the total of sectors examined, *but must not be interpreted as a comprehensive New Zealand abatement supply curve.*" (Emphasis as per original.) MfE, *Important Contextual Note Concerning the Report: 'Analysis of the Potential and Costs for Greenhouse Gas Emissions'*, 2007.

for the agricultural sector as reliable. The Government is currently engaged in a further round of work attempting to refine the analysis.

There are certainly reasons to be cautious in applying the ICF results. However, as MfE notes, ICF does have wide experience in abatement cost analysis and uses “an internationally recognised methodology that consistently aggregates abatement potentials across the economy”²⁹³. And while there may be doubts about the accuracy of individual ICF estimates, the total identified is likely to be an underestimate, not an overestimate, of the abatement potential in agriculture.

Stepping back from the detail, the standout findings of ICF’s work were that:

- Agriculture accounts for over 60% of the total quantity of emission reductions ICF estimates to be available for \$30/t or less by 2010. (That total was 5.2 Mt per annum).²⁹⁴
- All the potential emission reductions identified by ICF that cost \$30/t or less were estimated to be available at a profit to the farmer, whether or not there is any emissions tax in place.

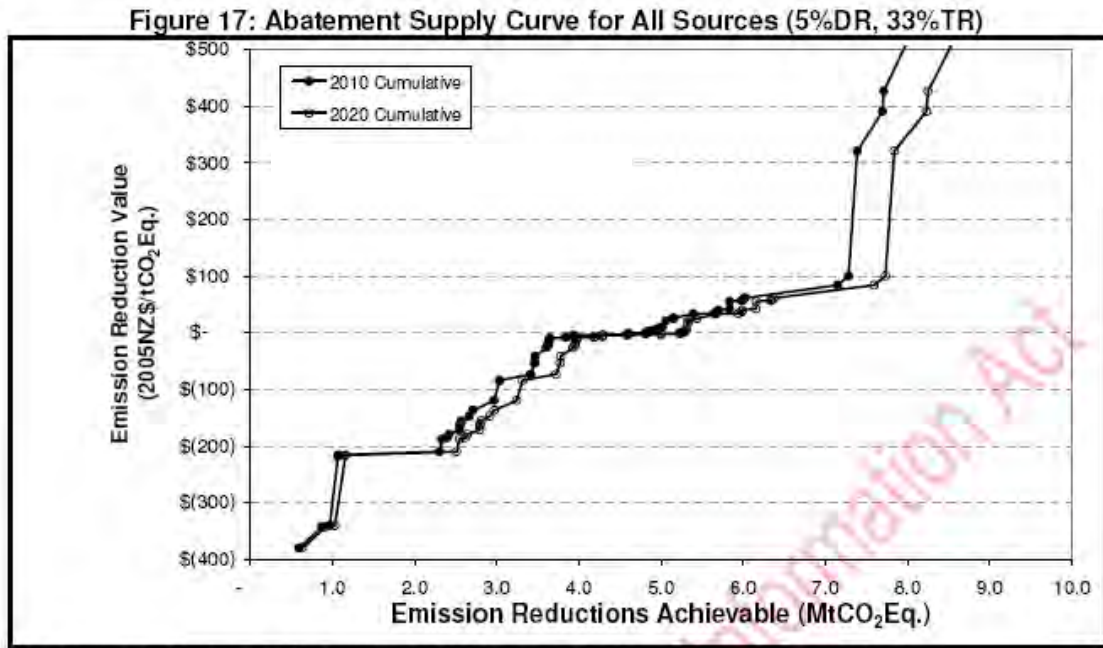
In Figure 8.1, the first chart shows the estimated costs of the annual savings that are available by 2010 and by 2020. Of the 5.2 Mt of savings available by 2010 at a cost below \$30/t, 3.19 Mt are agricultural options.

The agricultural abatement opportunities are shown explicitly in the second chart, with agriculture-related options appearing as bars 8, 9 and 10. “Enteric fermentation” has three negative-cost options saving 1.17 Mt per year. Two “agricultural soils” options are estimated to save 0.79 Mt per year at negative cost, and “PRP manure” (nitrification inhibitors in dairying) is estimated to save 1.23 Mt per year.

²⁹³ MfE, *Important Contextual Note Concerning the Report: ‘Analysis of the Potential and Costs for Greenhouse Gas Emissions’*. 2007.

²⁹⁴ ICF International, *Analysis of the Potential and Costs for Greenhouse Gas Emission Reductions*, 2007, p 125.

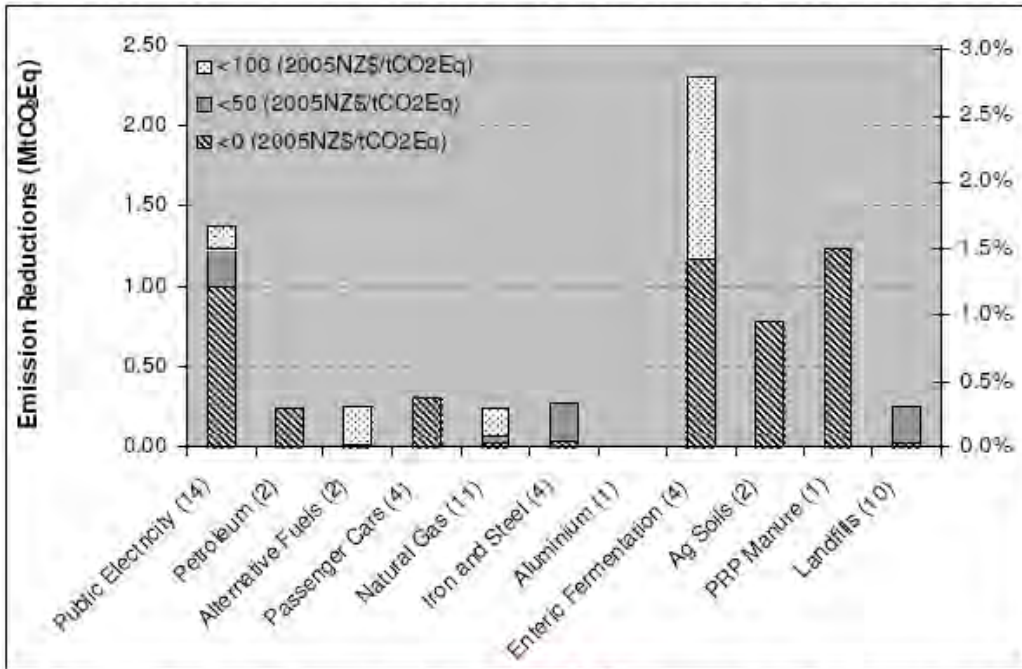
Figure 8.1: ICF's Abatement Cost Curve



Note: Options with breakeven prices greater than \$500 are excluded from this abatement supply curve.

Figure 8.2: Emission Reductions by Source

Figure 2: Achievable Emission Reductions for All Sources (2010, 5%DR, 33%TR)



Note: Parentheses indicate the number of mitigation options with breakeven costs less than \$100 (2005NZ\$/tCO₂Eq.).

The final version of the ICF study was completed for Government in April 2007, before the key decisions concerning the design of the ETS had been taken by Government. Regardless of reservations concerning the 68 individual options that ICF analysed, the results gave a clear indication that any serious search for low-cost abatement opportunities would start with agriculture.

Rather than share this knowledge, the Government resolutely held the ICF report back from public view. The Ministry for the Environment responded to the Sustainability Council's OIA request of April 2007 as follows:

This report will be considered for release ... once decisions on the core elements of emissions trading and transitional measures have been taken, but prior to final decisions being taken on the package.²⁹⁵

Only after the Ombudsman intervened was a copy of the report finally extracted from the ministry, well after the ETS decisions had been announced. It also transpired that the study had been derived entirely from publicly available information and there were no deletions as to its content, implying an absence of good grounds for refusing its release when first requested.

8.2.2 “A Convenient Untruth”

The ICF study was not the only document available to Government that indicated the potential for low-cost agricultural emissions abatement. In June 2007 the Sustainability Council released its report entitled: *A Convenient Untruth*. In order to begin the process of changing perceptions about agricultural options, it considered only peer-reviewed research of abatement potentials for which adequate cost data was also available.

Although methane makes up roughly two thirds of all agricultural emissions and nitrous oxides (N₂O) the remaining third, research into the options for reducing N₂O emissions were much more advanced than those for methane. During the research for the report, it became apparent that there were a series of proven options for abating nitrous oxide emissions. In particular, the use of nitrification inhibitors on dairy land presented an opportunity of significant scale.

Recent results from trials of a nitrification inhibitor across four major New Zealand soil types had shown an average 70% reduction in primary emissions arising from pasture land. A further important benefit was that by helping to retain nutrients in the soil, inhibitors had been found to increase pasture growth by 10% to 15% or more. These gains, and the savings resulting from less fertiliser use, mean that it is generally profitable to use inhibitors even before taking account of the social value of reduced N₂O emissions and reduced nitrate runoff. Ongoing environmental studies will inform its long term environmental effects but the nitrification inhibitors target very specifically the enzyme that facilitates nitrification and the product biodegrades

²⁹⁵

MFE CEO Hugh Logan, letter to Sustainability Council, 30 May 2007.

completely within two or three months.²⁹⁶ Limiting its use to avoid runoff into waterways where nitrification may be disrupted will nonetheless be important.

The Sustainability Council estimated that if inhibitors were applied to all dairy land throughout CP1, total emissions over the five years would fall by 18.5 Mt.²⁹⁷ A subsequent study undertaken for MAF used similar assumptions about the primary effectiveness of inhibitors, but was based on different baseline emission projections and was more conservative with respect to certain other parameters.²⁹⁸ It implied a total saving potential of about 14 Mt during CP1 from the application of inhibitors to all dairy land – equal to the Sustainability Council’s low effectiveness scenario.

Both of these estimates of the potential impact of nitrification inhibitors in dairying were much higher than the ICF estimate for the same option of 6 Mt²⁹⁹. The difference is accounted for by a significant error in ICF’s calculation of the dairy sector’s share of nitrous oxide emissions.

Most recently, MAF has released a brief paper that estimates dairy farmers could immediately profit from the use of inhibitors (irrespective of any emissions charge) while reducing emissions at the same time.³⁰⁰ While it does not quantify the potential savings available, it specifically estimates that if dairy farmers were included in the ETS under the subsidy arrangements proposed for 2013, they would increase their profit under any carbon price modelled by MAF if they were also using nitrification inhibitors.³⁰¹

Even though the analysis employs very conservative assumptions as to the effectiveness of inhibitors and does not allow for feedbacks such as changing land values, these estimates directly contradict the assumption that farmers do have cost-effective options

²⁹⁶ While a long term European study of the use of DCD reported no adverse effects on soil microbial/enzyme activity when used in conjunction with fertiliser application and a four year New Zealand trial has shown concentrations of nitrogen, calcium magnesium and potassium to be unaffected, study of the environmental effects under intensive and long term use in New Zealand remains to be completed and will inform its long term potential. This work underway at Lincoln University includes assessment of any microbial impacts. The Lincoln University scientists leading the research into DCD do not believe the nitrogen fixing is a temporary phenomenon and so subject to latent release. See: Ravensdown, *Ecotoxicology Overview*, 2006, referencing: A Amberger, *Research on dicyandiamide as a nitrification inhibitor and future outlook*, Communications in Soil Science and Plant Analysis, 1989; and Pastoral Greenhouse Gas Research Consortium, *Third annual Report to the Crown on Progress*, July 2006, p 29.

²⁹⁷ Sustainability Council, *A Convenient Untruth*, June 2007, p 17.

²⁹⁸ Landcare Research, AgReserach, and Lincoln University, *Developing Revised Emission Factors for Nitrous Oxides Emissions from Agricultural Pastures Treated with Nitrification Inhibitors*, F.M. Kelliher, T.J. Clough and H. Clark, September 2007.

²⁹⁹ The estimate for emissions in 2010 was 1.23 Mt; multiplying by five gives a figure for CP1 of 6.15Mt. ICF International, *Analysis of the Potential and Costs for Greenhouse Gas Emission Reductions*, 2007, p 125.

³⁰⁰ MAF, *Projected Impacts of the New Zealand Emissions Trading Scheme at the Farm Level*, April 2008. This document assesses the impacts of greenhouse gas charges on the profitability of other farms in addition to dairy units.

³⁰¹ Even if there were no subsidies, dairy farmers would still face only about a 20% fall in profitability on MAF’s figures at a carbon price of \$25/t. This result applies with or without a 10% productivity increase.

to abate emissions. This is the premise the 2004 MOU was founded on, and remains the stated basis for the agriculture sector's exemption from emissions taxes.

There is a range of other options for reducing N₂O emissions that are in various stages of research with respect to effectiveness and cost. While many interact with each others' potential to reduce emissions, there is no problem in principle with combining a number of techniques for use on dairy farms in particular. These include:³⁰²

“Standoff pads”: By ensuring that cattle spend three quarters of their time on such pads during winter months, N₂O emissions can be reduced by 10% at no cost penalty to the farmer. Rates up to double this can be achieved if the effluent collected is not immediately sprayed on the land.³⁰³

New Grasses: Breeding grasses that have a better balance between energy and protein can reduce emissions significantly. Very few peer-review trials have been undertaken in New Zealand but if results obtained in the UK are replicated then emissions can be reduced by between 20% to 30%.³⁰⁴ The cost of the new seed is not significant so the short term economics revolve around the extent to which resowing needs to be brought forward to achieve the emission reductions. On the basis of the preliminary studies to date, it would appear to be a significant source of emission savings.

Supplementary Maize Feed: Feeding cattle a diet less rich in nitrogen is another option. Using maize silage as supplementary feed reduces primary N₂O emissions by 22% although the overall effectiveness is less due to losses in soil carbon arising from growing the maize. This technique's cost-effectiveness varies depending on maize prices.

Use of Nitrification Inhibitors for Crop Growing: ICF estimates that 0.65 Mt could be saved a year by using nitrification inhibitors to mitigate emissions from crops grown with nitrogen fertilisers. ICF estimates this can be done at a profit.

Improving soil drainage: As wet conditions promote release of N₂O, improved drainage and less soil compaction reduce emissions. Study to date suggests reductions in the range of 7% to 10%.

Turning to methane, while research into options for methane reduction generally lags behind options for addressing nitrous oxides, there is little doubt that worthwhile amounts of methane can be abated. Some techniques for reducing methane emissions have proven to be too costly, but equally there are signs that others with very useful

³⁰² For further details, unless otherwise stated, see: Sustainability Council, *A Convenient Untruth*, June 2007.

³⁰³ A more sophisticated version of the same concept is the “herd home”. This is a roofed pad, incorporating a slatted floor and effluent processing basement. In a bid to make “the most natural animal shelter / stand off pad possible”, systems have been developed to ensure effluent is broken down to 'bedding mix' by being exposed to the sunlight, the air and treading effect of the cows hooves. See <http://www.herdhomes.co.nz/portal/>

³⁰⁴ Jock Allison, *Documentation of WSC levels in HSGs in New Zealand and comparison of these observations with published data in Europe*, December 2006, p 4.

savings will be cost-effective. One such example is the supplementary feeding to cattle of various plant matter. An Australian trial that used cottonseed as a supplement resulted in a 12% reduction in methane emissions in absolute terms, and a 21% decrease after allowing for a 15% increase in milk yields.³⁰⁵ Other dietary variations from fish oil to garlic have been reported as having positive effects.

While the extent of savings available from the range of materials that have been experimented with remains to be further tested, for methane the key question tends to be the cost of the input, and hence the price of the carbon it would displace. Getting methane abatement options adopted will therefore rely to a greater extent on emissions being priced than is the case for nitrous oxide options, which are often profitable in their own right. Nonetheless, ICF estimates that 1.17 Mt of methane savings are available annually at a profit.

Other options involve savings of more than one greenhouse gas. The processing of cattle effluent from milking sheds through biodigesters saves both carbon dioxide and nitrous oxides. The biodigester allows biogas to be drawn off – an energy source that can be used to heat hot water and run shed machinery, thus displacing grid power partly generated from fossil fuel. A Canterbury firm, Natural Systems, generates a third of its power requirements in this way and earns money feeding power into the grid when it is not needed in the shed.³⁰⁶ Nitrous oxide emissions are also reduced through the conditioning of the slurry in the biodigester before it is sprayed back on the farm.³⁰⁷

Another potential means of reducing greenhouse gas emissions arises through the storage of carbon in soils. Managing pasture land in non-traditional ways can result in significant increases in soil carbon through the sequestering of carbon from the atmosphere. One proposed means is the building up soil nutrients as a part of a land management programme that relies on optimisation of inputs, including the nature and quantity of fertilisers, stock numbers and food intake. Proponents advocate such management programmes for the improved farm profitability and animal welfare that can be delivered quite apart from gains in soil carbon.³⁰⁸ Managing director of Hamilton based company eCogent states:

Good pasture management is not difficult to do. Some farmers in Australia are actively increasing soil depth and quality in this way, and are earning carbon credits.³⁰⁹ I believe New Zealand farmers could do carbon farming even better.³¹⁰

³⁰⁵ C Grainger et al, *Whole Cottonseeds and Enteric Methane Emissions*, paper to Greenhouse Gases and Animal Agriculture Conference, Christchurch, November 2007.

³⁰⁶ Radio New Zealand, *Rural News*, 18 April 2008.

³⁰⁷ E Pattey, A Crolla and D Dow, *Impact of Biodigestion of Dairy slurry on Nitrous Oxides Emissions After Field Application in Eastern Canada*, paper to Greenhouse Gases and Animal Agriculture Conference, Christchurch, November 2007.

³⁰⁸ Dr Arden Andersen states: “Appropriate nutritional management of the soils naturally eliminates the diseases, weeds and insect pests while increasing yields, profitability, food nutritional value, taste, and shelf-life.” Arden Andersen, *Human health starts in the soil*, September 2006, p 2.

³⁰⁹ This is currently only on so called “voluntary markets”, such as the Chicago Carbon Exchange, and these can not be used to meet Protocol commitments.

³¹⁰ Waikato Times, *Carbon farming takes off credits to be sold on exchange just like Oz*, 8 April 2008.

Carbon can also be sequestered through making and adding to soils a form of charcoal known as 'biochar'. The biochar approach relies on taking biomass and heating it under special conditions to form a charcoal. In this way, the plant takes up CO₂ as it grows and then the pyrolysis process locks the carbon into the biochar.³¹¹ It has been estimated that making biochar from waste biomass could sequester 20–50% of the total carbon originally present in the biomass at a breakeven credits price of \$US\$37/t, offering a carbon negative approach (provided the carbon stays stored for the hundreds if not thousands of years estimated to be possible).³¹²

Preliminary results indicate that biochar amendments to soil appear to decrease emissions of nitrous oxide as well as methane, which is a greenhouse gas 23 times more potent than CO₂. In greenhouse and field experiments in Colombia, nitrous oxide emissions were reduced by 80% and methane emissions were completely suppressed with biochar additions to a forage grass stand, Marco Rondon of the International Development Research Centre and colleagues told participants at the U.S. Department of Agriculture Symposium on Greenhouse Gases and Carbon Sequestration in 2005.³¹³

Both the biochar potential and understanding of soil carbon science are still emergent. However they offer an example of both the potential contribution of non-traditional technologies and the need to better understand the losses and gains of greenhouse gases in complex biological systems.³¹⁴ The Government has recently funded two professorships at Massey University in order to further its study.³¹⁵

8.2.3 Measurement and Calculation of Kyoto Credits³¹⁶

An issue that has differentiated agricultural emissions under the Protocol is that their measurement is not nearly as straightforward as is the case for fossil fuel combustion. Inevitably, proxies for actual on-farm measurements have had to be used to enable New Zealand to estimate its N₂O emissions and report these, as required under the Protocol. Equally, proxies will have to be developed to allow emission reductions to be estimated, relative to what is would otherwise be released.

³¹¹ "This pyrolysis - burning wood in the absence of oxygen - can turn material such as wood chips and crop waste into three main components: gas (methane and hydrogen), a renewable "bio-oil" that can be used as a fuel or for "green" chemical production, and a char that contains roughly 60 per cent of the carbon contained in the biomass." Kent Atkinson, *Govt funds two professors for research in biochar sector*, NZPA, 14 December, 2007.

³¹² Johannes Lehmann, *A Handful of Carbon*, Nature, 10 May 2007, p 143.

³¹³ *Rethinking Biochar*, Environmental Science & Technology Online News, August 1, 2007, http://pubs.acs.org/subscribe/journals/esthag-w/2007/aug/tech/rr_biochar.html

³¹⁴ Updating soil tests from 15 to 20 years ago has shown significant losses in soil carbon in certain instances and scientists are unsure how to account for the losses, indicating also the risks that fuller accounting for soil carbon could also pose for a nation's inventory. L.A. Schipper, W.T.Baisde, R.L.Parfit, C.Ross, J.J.Claydon and G . Arnold, *Large losses of soil C and N from soil profiles under pasture in New Zealand during the past 20 years*, *Global Change Biology* (2007), 13, 1–7.

³¹⁵ Kent Atkinson, *Govt funds two professors for research in biochar sector*, NZPA, 14 December, 2007.

³¹⁶ This description is an updated version of that first provided in: Sustainability Council, *A Convenient Untruth*, June 2007

A key tool in the measurement process is a computable programme developed by AgResearch named OVERSEER. Although devised as an aid to nutrient budgeting, it has been adapted to assist in estimating farm N₂O and methane emissions. As most dairy farmers use this tool and there are moves to seek its universal adoption, a full suite of relevant data is set to become available to the Government with which it could compile filings under the Protocol.

The snag New Zealand faces is that the way it currently reports under the Protocol will not register the savings that are being physically measured on the ground. While New Zealand has developed, and has had accepted by the UNFCCC, a range of country-specific “emission factors”, these do not at present adequately register the effects of N₂O and methane abatement technologies.

This poses a degree of uncertainty over whether New Zealand will be able to gain recognition of the benefits agricultural abatement investments will bring. However, although the nation’s measurement of 1990 emission levels is now finalised,³¹⁷ and with it to some extent the methodology, New Zealand has until 2013 to file a final statement as to the emissions (and savings made) for the first commitment period. Thus there is considerable time to optimise a new methodology for measuring the effect of all major forms of emission reduction techniques, and for then making a case to have a modified reporting framework adopted.³¹⁸ MAF noted the potential need for this in 2005:

There is considerable interest in the potential of new technologies to mitigate on-farm greenhouse gas emissions. For such on farm mitigation technologies to be recognized they need to be incorporated into the national inventory that is reported to the UNFCCC. To be recognised by the UNFCCC, any mitigation options need to meet Good Practice Guidance tests and pass international review.³¹⁹

A basic methodology for incorporating at least the gains from inhibitors was developed by the Lincoln research team in early 2007³²⁰ and this was enhanced through further research completed for MAF later that year.³²¹ It is not certain that a modified methodology will be accepted, but since such a change could be backed by hard evidence of real savings and the change would clearly incentivise uptake, it would seem inconsistent with the objectives of the Protocol for the UNFCCC not to permit such a change. Landcare Research is confident that a modification can be obtained so long as the scientific justification for the change is rigorous.³²²

³¹⁷ They have been repeatedly revised over the years, but were finalised in the 2005 filing sent through in April 2007.

³¹⁸ Fonterra states that “it will require an additional year’s research before use of nitrification inhibitors can be counted in New Zealand’s greenhouse gas inventory” but it is unclear if this will affect the ability to later re-estimate for that year. Fonterra, Submission to Government, March 2007, para 7.1 b.

³¹⁹ MAF, *Agriculture: Briefing for incoming ministers*, October 2005, p 13.

³²⁰ T. J. Clough et al, *Accounting for the utilization of a N₂ O mitigation tool in the IPCC inventory methodology for agricultural soils*, Nutrient Cycling in Agroecosystems, January 2007.

³²¹ Landcare Research, AgReserach, and Lincoln University, *Developing Revised Emission Factors for Nitrous Oxides Emissions from Agricultural Pastures Treated with Nitrification Inhibitors*, F.M. Kelliher, T.J. Clough and H. Clark, September 2007.

³²² Personal Communication, Landcare Research, 1 June 2007.

MAF currently undertakes its financial and policy analysis on the basis that the UNFCCC will accept revised emissions factors for New Zealand, and for the use of nitrification inhibitors in particular.³²³ Exactly why MAF did not act earlier on the need for modifications that recognise the potential of inhibitors and other agricultural abatement techniques to play an important role in New Zealand's Kyoto accounting, and ensure that the methodology finalised in 2007 fully allowed for such abatement measures, is unclear.

8.3 Implications for Policy Design

"We think all sectors can and should do their fair share ... but we also make it explicit that some sectors can do more than others because they have more cost-effective choices, so that has a bearing on when different sectors come in and how tough the cap should be," Mr Parker said.³²⁴

The information currently available points to emission reductions available from the dairy industry being a central part of the nation's package of least cost options. These savings are large in relative terms, with those available from the application of inhibitors alone (at least 14 Mt of costless emission reductions over CP1) equal to more than double the emission reductions anticipated from electricity, transport, and industrial production combined under the ETS. Indeed, inhibitor potential on its own is of the same order of magnitude as the total gains of 20 Mt anticipated during CP1 from the 20 September 2007 policy announcements, with reduced deforestation included.

Equally important is that the agricultural abatement options can be brought in quickly. While many options for reducing CO₂ involve replacement of capital equipment, and so can only be accomplished as equipment is turned over, the major techniques available to agriculture can be cranked up and applied with less than a year's notice. This means that significant levels of savings can still be achieved over CP1. The availability of a cornucopia of cheap and rapidly adoptable agricultural options is a remarkable break for a nation so far out of time, and so far in excess of its Kyoto target.

Agriculture would be the first, not the last, sector to have its emissions priced under a least-cost abatement policy. Exempting the entire sector for the full CP1 period eliminates any pretence at a least-cost objective for the ETS within a meaningful timeframe. The dairy sector has the bulk of the cheap abatement options and is achieving record income levels from soaring milk price payouts. Although sheep and beef farmers face tougher trading conditions at present, the dairy sector has such a wealth of low cost abatement options that a formula for rural mutual support presents itself. If sheep and beef farmers were able to directly secure credits by investing in

³²³ Noted in an introduction to: MAF, *Projected Impacts of the New Zealand Emissions Trading Scheme at the Farm Level*, April 2008, entitled "Release of MAF Report on the Potential Impacts of the NZETS at the Farm Level", p 2: "This assumes that inhibitors, which are not currently internationally recognised, gain recognition and are able to be reflected in New Zealand's Greenhouse Gas Inventory. It further assumes that farmers will be able to receive credit for inhibitors under the NZETS. Government will be seeking to give effect to both of these assumptions"

³²⁴ *Emissions scheme given a timeline*, Vernon Small, Dominion Post, 9 May 2007

abatement options on dairy farms, this could provide a low cost means for them to earn NZUs.

Government officials have argued that even without any incentive from the ETS, farmers will begin to abate during CP1 because they will see the need to begin paying an emissions tax from 2013. This argument fails on at least two counts. First, farmer representatives have succeeded in the past in forcing Government to back down on pledges to tax agricultural emissions, and could expect to do so again. Second, because so many of the measures discussed above can be implemented within a year, farmers would not need to gear up much ahead of 2013, even if they believed that an effective policy would be in place thereafter.

As a major Government review of climate change policy undertaken in November 2005 observed, the bottom line is that:

The absence of a price signal at the farm level means that farmers have no incentive to implement mitigation measures that come at a net cost to their operation even if the cost is small, unless there are other benefits from undertaking such actions.³²⁵

Even options available at a profit, such as those identified above, are often not taken up without an explicit driver. Nitrification inhibitors have been commercially available for more than three years but have to date achieved only about 5% market penetration nationally, and this is for an option backed by the country's two major fertiliser co-operatives.

MAF noted in a briefing to the Government that:

Sustainable development policy must ... move towards full social pricing of natural resources (rather than seeing them as "free goods") and must address the major negative impacts that result from industry activity. Examples include impacts on water quality and the effect methane emissions have on global warming. As far as practicable and appropriate industry is expected to reduce or bear the costs of negative impacts.³²⁶

There is now clear evidence that farmers do not lack practical and cost-effective options - the previous rationale given for their exemption during CP1, and set out in the 2004 Memorandum of Understanding³²⁷ (which made specific provision for exit under changed conditions). The position is that agricultural producers are unwilling to acknowledge responsibility for their sector's emissions, and want their cows to remain sacred. The sector has repeatedly and strenuously sought agricultural protection, and the Government has acceded to the demand.

³²⁵ New Zealand Government, *Review of Climate Change Policies*, November 2005, p 339.

³²⁶ MAF, *Agriculture: Briefing for incoming ministers*, October 2005, p 12.

³²⁷ "There are currently no proven, practical and cost-effective farm practices and technologies to reduce agricultural emissions whether by improving production efficiency for ruminant animals or otherwise. ... The Crown has decided, therefore, that it will bear the cost of the agricultural sector's non-carbon dioxide emissions." Memorandum of Understanding between the Crown and agriculture sector parties, announced 5 February 2004, clauses 1.2 and 1.3.

Fonterra's general manager for sustainability, Mark Leslie, argues against farmers bearing responsibility on the basis that:

It would not be fair for farmers to be accountable for increases in emissions made before they were aware there would be a cap on their greenhouse gases such as nitrous oxide and methane.³²⁸

Federated Farmers president Charlie Pedersen says "if the price of carbon turns out to be \$100 a tonne, as some are predicting, farming will disappear from the landscape". "At that price, there will be no export of food from New Zealand and there will be virtually no viable farms."³²⁹ A more economically realistic approach would note that land prices currently include the value of agriculture's exemption from the ETS, and that if the pricing of emissions causes agricultural profits to fall, land prices would have to adjust accordingly. While unwelcome to landowners, this would not entail the disappearance of farming as an economic activity.

Prime Minister Helen Clark has explained in delicate terms that: "different sectors of the economy are at different stages in their ability and **readiness to reduce emissions**" (emphasis added).³³⁰

Yet the future reality is a carbon-constrained world where a price on emissions will be a normal cost of production. New Zealand's potential is to become a producer of fully sustainable high value premium foods to the world. Pastoral farmers have the opportunity to use simple and cost-effective techniques to become the nation's leading source of abatement. At the same time, they can use this to secure a premium producer position that creates additional added value.

To the extent that growth in pastoral production outpaces the sector's ability to abate its emissions, if emission costs cannot be passed on to end consumers (in whose name the emissions are produced) the outcome would be some reduction in land values and/or changes of land use.

Taking leadership in delivering environmentally sustainable products that pass key tests would be a way of turning threat into opportunity and getting ahead of the competition. The ETS approach amounts to shielding farmers from the winds of change in world markets, and from the opportunities to respond to price and quality signals from those markets.³³¹

³²⁸ NZPA, *Farmers can't carry can for emissions – Fonterra*, 28 June 2007.

³²⁹ RNZ News, *Farmers Fear Emissions Scheme May Hurt Exports*, 19 Apr 2008.

³³⁰ Prime Minister Helen Clark, *Launch of Emissions Trading Scheme*, 20 September, 2007.

³³¹ This thinking was earlier set out in the New Zealand Listener, Simon Terry, *Heat Treatment*, 24 March 2007.

9 From Special Pleading to Strategy

Although the main focus of this report is on the impacts of the ETS during CP1, the international process of negotiating obligations and targets for the Second Commitment Period commencing in 2013 is already underway, following the Bali meeting in December 2007.³³² The ETS does not begin to prepare New Zealand for the next round of emissions reduction targets that will emerge from these negotiations. This section looks at the longer-run consequences of not shifting New Zealand onto a sustainable emissions path.

9.1 An Emissions Obligation Cliff

The Government's climate change website tells New Zealanders that: "We need to shoulder our global responsibilities and cut our greenhouse gas emissions now".³³³

The case for acting with urgency and a clear view of the global context begins with New Zealand's current poor performance and the expectation that emissions during CP1 will run 30% in excess of the Kyoto gross emissions target, with or without the ETS. This is a significant trade and marketing exposure, quite apart from the financial burden that compliance will impose.

The big picture is that future emissions abatement targets are set to get much tighter. Modelling by a range of international institutions suggests that to limit global temperature increases to 2 degrees Celsius above pre-industrial levels will require a cut in emissions of between 50% and 90% by 2050.³³⁴ A 2 degrees Celsius rise³³⁵ is deemed by the European Union and many climate scientists as the limit point above which 'dangerous climate change' would result. The Intergovernmental Panel on Climate Change (IPCC) has in turn recommended for the next commitment period that emissions for developed countries be cut by between 25% and 40%, relative to 1990 levels,

The immediate problem this presents for New Zealand is that if it emerges from CP1 with emissions running more than 30% above 1990 levels (even with the ETS in place),³³⁶ a commitment in the next period to an emissions cut at the lower end of the IPCC range - 25% below 1990 levels - would open up a 55% gap between the starting

³³² http://unfccc.int/meetings/cop_13/items/4049.php

³³³ <http://www.climatechange.govt.nz/nz-challenge/our-responsibility.shtml>

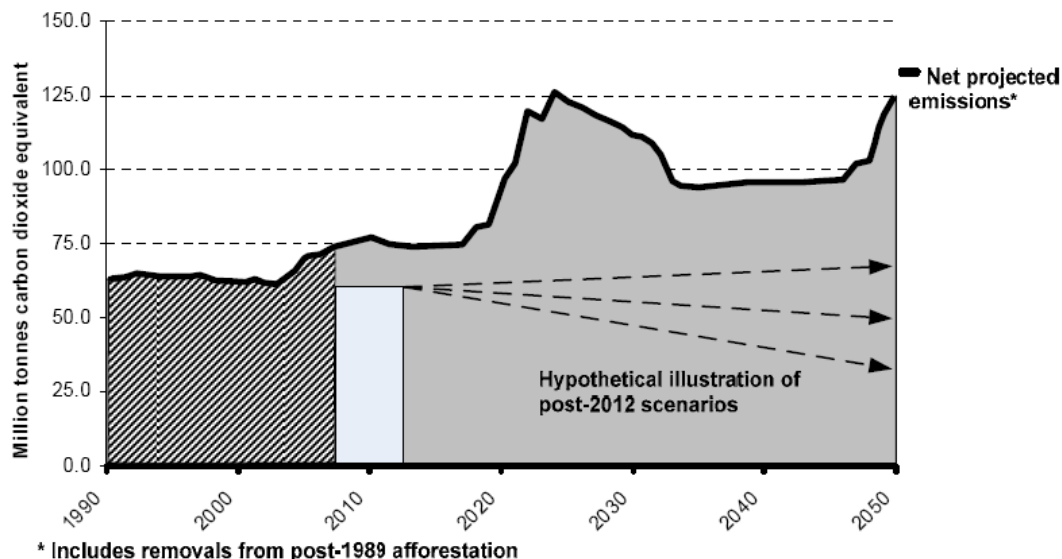
³³⁴ Bert Metz, *Meeting a 2 degree target: Is it possible?*, Netherlands Environmental Assessment Agency, October 6, 2006.

³³⁵ It is thought that to contain temperature rises to such a level, the concentration of greenhouse gases in the atmosphere needs to be limited to no more than about 450 ppm.

³³⁶ The current forecast for 2010, the midpoint of CP1, shows a 31% gross-emissions overshoot on BAU assumptions and 29% after the impact of the ETS. The Government does state that while the ETS is the central response, other programmes will also be added to reduce emissions. However, the projections provide for emissions to keep growing after 2010 so that they will be higher still by 2013 when the new commitment period commences.

point and the target. New Zealand would commence the period staring down from the top of an emissions cliff.³³⁷

To its credit, the Government’s *Framework* document does outline this position quite well, providing the following graphic³³⁸ and statement:



[The figure above] illustrates the fact that, while the projected gap between New Zealand’s Kyoto allocation and expected emissions (under policy settings as of April 2007) is not great in the first Kyoto commitment period, that gap is likely to broaden significantly as emissions continue to rise and (potentially) New Zealand’s emission unit allocation under international agreements falls. ... What these graphs demonstrate is that New Zealand, like many other countries, **needs to engineer a major shift in its economy towards lower emissions or it will face very significant obligations in decades to come.**³³⁹ (Emphasis added.)

Yet the ETS does not “engineer a major shift in [the] economy” during CP1. Other than curbing a tail-end deforestation rump,³⁴⁰ it essentially accepts business-as-usual emissions, and leaves the major emitters largely untouched financially. During CP1 at least, the ETS is not a break with history. It is a continuation of the past.

Starting from the top of the cliff in 2013, New Zealand will indeed “face very significant obligations in decades to come” unless one of two things happen: either

³³⁷ While it needs to be acknowledged that global leaders may not find the courage to agree to the depth of cuts the scientific community is saying are necessary, it would be foolhardy to plan on this basis.

³³⁸ The graphic also shows that there is a peak in forestry planting that will result in a peak in harvesting between 2020 and 2030. This is projected to result in additional net emissions of some 40 Mt a year over that decade – an amount equal to half what the entire New Zealand economy emits today. Under the proposed ETS framework, the credits to pay for that deforestation will be entirely the responsibility of forest owners, so this peak is not a taxpayer liability.

³³⁹ *Framework* document, p 22.

³⁴⁰ All but 21 Mt of emissions were already fully priced before the ETS was proposed.

there is no international agreement to a subsequent target, or New Zealand gets a very soft target for that commitment period. The Treasury is betting on the second of these, and advising accordingly.

9.2 The Next Big Myth: NZ Gets a Very Soft Target

Alongside the myth that there are no cost-effective abatement options in agriculture is the evolving view within Government that New Zealand will be able to get a very special deal from the negotiations that commenced in Bali in December 2007. The two myths are linked at the hip.

A paper prepared by the Treasury at the end of 2007 is the closest thing in the public domain to a strategy for handling future emission reduction commitments.³⁴¹ It usefully sets up a series of decisions that are required to be considered in sequence before examining what level of emissions reduction target New Zealand may face. After outlining the global picture and issues around the rules that may apply in the next commitment period, the paper moves to New Zealand's position and concludes that:

New Zealand should ... be able to negotiate a lower target than other developed countries.³⁴²

The paper does not propose a particular target for New Zealand but estimates that the range of reductions for developed countries as a whole is likely to be between a 10% to a 40% cut on 1990 levels (as opposed to the 25% to 40% the IPCC recommends). It then uses as the base case for 2013-2020 a scenario with a target for New Zealand of bringing emissions back down just to 1990 levels, with a second scenario that envisages a 10% cut on 1990 levels. In other words, Treasury is assuming that New Zealand can emerge from the next round of negotiations with a target little if any more stringent than the current one, while other developed nations take on much stricter commitments.

The basis for the Treasury's position is the following:

With a large agricultural base and high renewable electricity generation, both the potential and the cost of reducing emissions in New Zealand make it comparatively more difficult than other developed countries.³⁴³

That New Zealand has less opportunity than many other countries to move away from fossil-fired generation is indeed correct, as is the observation that this also limits the degree of emissions savings that can be obtained from energy efficiency measures that electricity consumers adopt.

³⁴¹ It was first shared with members of the Government's climate leadership forum and released to the Sustainability Council under the OIA.

³⁴² Ben Gleisner, *A Conceptual Framework to Assist Decision Making on International Climate Change Policy*, NZ Treasury, December 2007, p 15.

³⁴³ Ben Gleisner, *A Conceptual Framework to Assist Decision Making on International Climate Change Policy*, NZ Treasury, December 2007, p 2.

Against this, though not acknowledged in the Treasury paper, New Zealand's position (for CP1 at least) is even more unusual in terms of the extent to which it will be able to offset emissions through forest absorption of carbon. Proportionately, this part of the Kyoto rules will not benefit any other nation to nearly the same degree in CP1. The forestry-related saving of around 15% in New Zealand's case is a benefit of the same order of magnitude as other developed countries expect to achieve from electricity sector savings. The two factors – little electricity abatement but large forestry abatement – more or less cancel each other out during CP1, eliminating this leg of the Treasury case.

(Looking forward, the picture regarding forestry beyond 2012 depends a great deal on the future rules that are agreed. New Zealand will continue to have a significant relative advantage in the availability of land for planting carbon sinks and MAF does not believe that such sequestration will be excluded in future.³⁴⁴ However, the rules around harvested wood products (see section 9.5 below) will influence the scale of deforestation costs New Zealand will encounter as the peak plantings of the 1990s are harvested from 2020 on. These costs could be very significant if harvesting takes place at the rate forecast.)

Agricultural emissions are nonetheless likely to remain the key issue. Here the Treasury advances the following position:

New Zealand's emissions profile is quite different from the world average ... - with about 50 percent of emissions coming from methane and nitrous oxide. As discussed, **the opportunities to reduce these emissions are limited, and mostly very costly.**

...

In the agriculture sector, it is widely agreed that **there are few low cost abatement options.**³⁴⁵

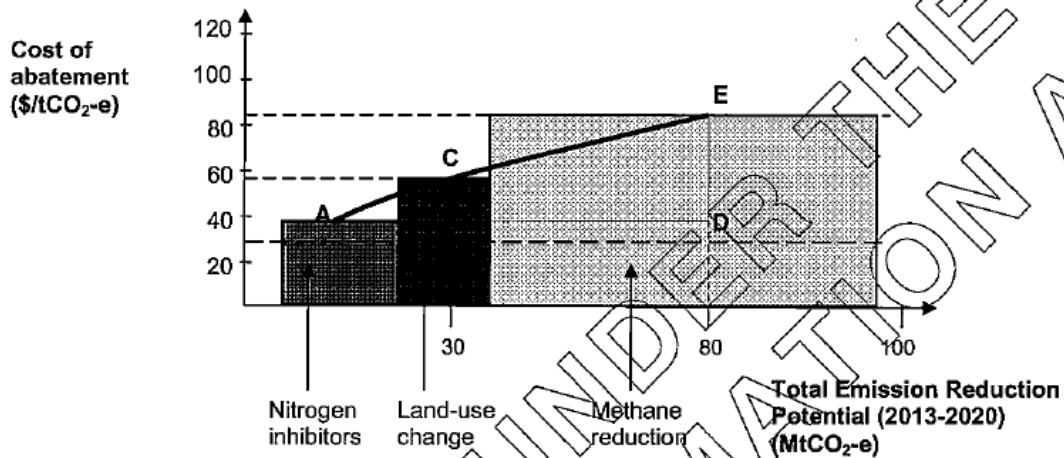
The basis for these statements is quite unclear. When the paper presents what it terms an "indicative abatement cost curve for agriculture" (see below), it gives not a single reference or data point to anchor the indicative costs. A footnote to the diagram states: "the actual costs are unknown".³⁴⁶ This does not mean there is an absence of data. Costs associated with certain options for methane mitigation are indeed "unknown" but, as described in the previous chapter, there are many options for which the costs are simply "uncertain".

³⁴⁴ MAF, Personal Communication, August 2007.

³⁴⁵ Ben Gleisner, *A Conceptual Framework to Assist Decision Making on International Climate Change Policy*, NZ Treasury, December 2007, pp 15 and 16. [Emphasis added.]

³⁴⁶ Ben Gleisner, *A Conceptual Framework to Assist Decision Making on International Climate Change Policy*, NZ Treasury, December 2007, p 16.

Figure 9.1: Treasury’s Indicative Abatement Cost Curve for Agriculture



What the numbers reviewed in section 8 above reveal is that Treasury’s indicative cost curve is so far removed from the data that it gives a misleading basis for decision-making. In particular, rather than the first block of abatement options being available only at a cost above the world price for carbon credits (shown by the horizontal dotted line across the chart), the first block of savings is available at a profit. Instead of nitrification inhibitors being a \$40/t option (as indicated in Figure 9.1) they cost less than \$0/t, with a number of other nitrous oxide abatement options also apparently well below the \$30/t mark (as per the ICF study). Similarly, the notion that methane abatement is available only at \$85/t paints much too pessimistic a view of at least some of the options, given the indications to date.

While the Treasury does state that more work is required “to accurately determine our domestic abatement costs”,³⁴⁷ in political terms this will now come after the details of the ETS subsidy regime have been publicly committed to.³⁴⁸

The premise that agricultural abatement options are generally high cost is incorrect, and is unlikely to be sustainable in the hard-nosed setting of international meetings. Any climate change strategy based on this premise leaves New Zealand very exposed when it comes down to the negotiations over what the nation’s emissions target will be for the next commitment period. The assumption, and the ETS which has been built around it, sets New Zealand up not as a Bali leader, but as a special pleader.

9.3 Subsidies that Refuse to Die

Given the history surrounding climate change policy in New Zealand and the political power the major emitters wield in general, it would be an heroic act of faith to take at face value the promises made for ETS beyond its proposed impacts over CPI. As

³⁴⁷ That work is scheduled to be nearing completion at the time of writing.

³⁴⁸ Although these have been tagged as “in principle” decisions by Government, the political reality is that they take on a life of their own once announced.

currently proposed, the scheme will not touch agricultural emissions for the next five years and large industrial producers will be fully covered by the gifting of NZUs during that period.³⁴⁹ Neither group will willingly relinquish their subsidies after 2012, and both have a history of winning their political battles.

Agricultural emissions are only notionally covered under the ETS. There will be huge ongoing subsidies to the sector unless and until it enters the scheme. For large industrial producers, the key is the sector's generous "allocations" of NZUs.

The point at which the subsidies are scheduled to even begin to come off (2013) is two electoral cycles away, which is so far out in political terms (both for the major emitters and for the Government), that all bets are off as to which makeup of political parties will be deciding how many NZUs are still to be handed out and to whom. The current ETS proposals make no dent in the major emitters' position during CP1. They achieve another long holiday, the Government minimises the political damage from large emitters hyping the allegedly negative effects of the ETS in the media, and all diaries are scheduled for a rematch at the appropriate time.

9.3.1 Statutory Timetables Provide No Check

This process will not be restrained by specifying in statute when a sector is to enter the ETS and what the maximum initial allocations will be. Both the agriculture sector and major industrial producers face detailed provisions of this form in the proposed legislation, with a linear track for phase-out of all subsidies by 2025.³⁵⁰ However, a close reading also reveals the requirement for a review of the ETS within five years³⁵¹ and this review "must consider" among other things whether to "omit" any sector and the implications of any new emissions target New Zealand may have taken on.³⁵² This means the issues are statutorily required to be reviewed regardless. All that the current provisions do is establish the latest diary date for a return of the issue to Parliament.

History to date records that each time the big emitter battalions have lined up against the New Zealand Government and objected to paying some form of carbon tax (two rounds), or the FART tax in the case of farmers (one round), the Government has caved in on every showing. Having to date fought successfully against even modest policies

³⁴⁹ They will receive sufficient NZUs to more than meet their obligations for the emissions they actually produce, this being in part compensation for higher electricity costs they face.

³⁵⁰ See in particular clauses 70, 71 and 68 along with Schedule 3 of the Climate Change (Emissions Trading and Renewable Preference) Bill 2007.

³⁵¹ Section 147(1) states: "The Minister responsible for the administration of this Act must initiate a review of the operation and effectiveness of the emissions trading scheme established by this Act, to be completed within 9 months before the end of each of the following periods: a) the first commitment period".

³⁵² Section 147(2) (b) (vii) states: "Without limiting the scope of the review, a review under subsection (1) must ... (b) consider:

... (vii) the implications (if any) of those obligations with 30 respect to the provisions in subpart 2 of this Part in respect of allocation plans, if New Zealand has undertaken, or is expected to undertake, any international obligations with respect to its emissions and removals that are different from or additional to any international obligations that New Zealand had undertaken when this section came into force, or since the last review carried out under this section;" Climate Change (Emissions Trading and Renewable Preference) Bill 2007.

aimed at reducing emissions, these sectors have the incentive to fight even harder in future because the threat is more immediate and the sums at stake are enormous.

Commenting on the proposed ETS, Taranaki Federated Farmers president Bryan Hocken told a public meeting in April 2008:

Unless we get some common sense back into this country we're going to have another fart-tax (debacle) all over again - and we won the last one.³⁵³

Washington DC led the way in the development of sophisticated industry lobbies. Long time observer Lester Brown notes that:

Once in place, subsidies lead to special interest lobbies that fight tooth and nail against eliminating them, even those that were not appropriate in the first place. In the United States, oil and gas companies are now perhaps the most powerful lobbyists in Washington. Between 1990 and 2004, they amassed [US]\$181 million in campaign contributions in an effort to protect special tax deductions worth billions. ... That such profitable investments are possible is a measure of the corruption of the US political system.³⁵⁴

9.3.2 The Ghost of SMPs

How far can the subsidy process go? In the early 1980s, Supplementary Minimum Prices (SMPs) were paid to livestock farmers to provide minimum guaranteed prices for their production. No matter what the fate of world market prices, exchange rates, or any individual farmer's financial position, SMPs underwrote farm incomes. In turn, these superior returns drove up farm property prices and became built into valuations. When a period of very poor terms of trade arrived and the economy was in dire shape, the SMPs finally were abolished, sending rural property prices tumbling and forcing off the land a number of farmers who had bought high.

The then president of Federated Farmers, Tom Lambie, commented on this chapter of history in 2003, saying: "The wide distortion of market signals almost destroyed the New Zealand economy and led to an exchange rate crisis in 1984".³⁵⁵ He added:

New Zealand farmers reject any return to Government support as it undermines competitiveness and distorts market signals. New Zealand farmers have captured the benefit of being more in charge of their own destiny and less at the mercy of government price/subsidy fixing.³⁵⁶

³⁵³ Ryan Evans, *Emissions scheme 'waste of cash'*, Taranaki Daily News, 17 April 2008.

³⁵⁴ Lester Brown. *Plan B 2.0: Rescuing a Planet Under Stress and a Civilisation in Trouble*, Earth Policy Institute President, 2005, p 77.

³⁵⁵ Tom Lambie, President, Federated Farmers of New Zealand, *There is Life after Subsidies*, 8 May 2003.

³⁵⁶ Tom Lambie, President, Federated Farmers of New Zealand, *There is Life after Subsidies*, 8 May 2003.

Five years on, Federated Farmers and Fonterra are in the vanguard of those demanding modern day SMPs – Subsidised Milk Production in particular – and the forces that can be wielded by the major emitters in general are still formidable.

While the December 2007 Treasury paper cheerfully forecasts a \$5 billion fiscal surplus from the ETS over the period from 2013 to 2020 (based on its assumption of a very soft CP2 target), it concedes that:

...[the assumed allocation of NZUs] within the ETS is however likely to change, with pressure from industry to increase the level of free allocation. This will result in a smaller surplus for Government.³⁵⁷

Similarly, MAF has recently stated that:

The current policy is for the allocation to reduce to zero in a linear fashion over the following 12 years, although longer phase-out options are being considered.³⁵⁸

The implication is that even if evidence of cost-effective abatement options leads to a tougher CP2 target for New Zealand than the Treasury assumes, there is no assurance that the subsidies will be cut accordingly.

9.3.3 Wait for Carbon Border Taxes?

A final question is: won't carbon border taxes eventually make ETS exemptions for export producers unsustainable? A number of industrialised countries are looking at the idea of introducing "carbon equalisation" and there are two faces to this. The first is defensive – as a means of ensuring carbon intensive local industries do not face competition from countries or sectors that have not taken on emission reduction obligations. Imports from those sources could be "equalised" by being taxed at the border on the basis of their carbon content.

The other face is the negotiating chip the threat of border taxes offers to cajole developing nations to take on commitments. While there are a host of obstacles to the introduction of such border taxes, both the US and the EU are actively debating them.

Two separate bills being considered by the US Senate would combine a new national cap and trade system for carbon emissions with charges on imports from countries that do not tax carbon, requiring them to buy US or equivalent emission credits. Although the European Commission recently opposed the adoption of a direct border tax, it has floated the same idea of requiring importers to buy credits.³⁵⁹ France's President, Nicolas Sarkozy, has similarly called for Europe to consider a carbon tariff on products from countries that do not respect the Kyoto Protocol.

³⁵⁷ Ben Gleisner, *A Conceptual Framework to Assist Decision Making on International Climate Change Policy*, NZ Treasury, December 2007, p 18.

³⁵⁸ MAF, *Projected Impacts of the New Zealand Emissions Trading Scheme at the Farm Level*, April 2008, p 7.

³⁵⁹ *Green barricade*, Financial Times, 24 January 2008.

An important feature of these proposals is that they discriminate on the basis of countries, not the products themselves: individual polluters would be deemed to have paid even when the bill is actually covered by the exporting nation's other carbon consumers. So under the ETS, major emitters would be fully shielded so long as New Zealand as a whole pays its dues. Carbon intensive exports would then benefit in a branding sense from the implication that their emissions had been offset, when the ETS subsidies would mean that at best this was only slightly true. Such an arrangement would act as the greatest protection the agricultural sector could hope for from border taxes.

If, on the other hand, border taxes were to be levied by the USA and EU on goods produced with emissions that had not been offset, this would certainly bite. At that point, the major emitters that are principally exporters would be indifferent to paying a local tax or an international one, so long as the local one was recognised globally. However, on the current trajectory for carbon equalisation proposals, New Zealanders will be many billions of dollars worse off if they wait for border taxes to unravel the subsidies.

The last hope of an external check any time soon is that expanded traceability requirements and/or private market standards set by wholesalers and retailers will force the pace on product offsetting. The major UK retailer, Marks & Spencers, has declared that it wants to become carbon neutral and is demanding its suppliers also conform within a few years.³⁶⁰ While UK supermarkets at least are in part trying to “out-green” the competition, it is ultimately customer sensitivity to sustainability issues that drives this. Customers fuel what is termed the “gatekeeper effect”, whereby consumers look to retailers to do the detailed checking for them to ensure products at least meet an acceptable threshold and then ensure that there is adequate labelling to allow them to select for the “food values” they seek to uphold. How these forces will develop and exactly what products they will target over what timeframe is unclear at present, so again this is not a reliable subsidy breaker.

9.4 A Global Commons and Implications of its Allocation

The Kyoto Protocol was explicitly agreed on the basis that developed nations would take up a greater share of the burden of reducing emissions.³⁶¹ They alone would take on binding emissions obligations during CPI. While this was agreed partly in recognition of wealth disparities, the deeper point made by developing countries was that they were not responsible to nearly the same degree for the current warming.

The frequent focus on current individual country emission levels underplays the significance of historic emissions. While the headlines may read “China about to overtake US as biggest greenhouse gas emitter”, the real measure of a nation's impact on the atmosphere is its cumulative share of emissions over time. This is because the main gases that cause atmospheric warming through their increased concentration, break down only slowly once aloft. A typical methane molecule will be exerting a

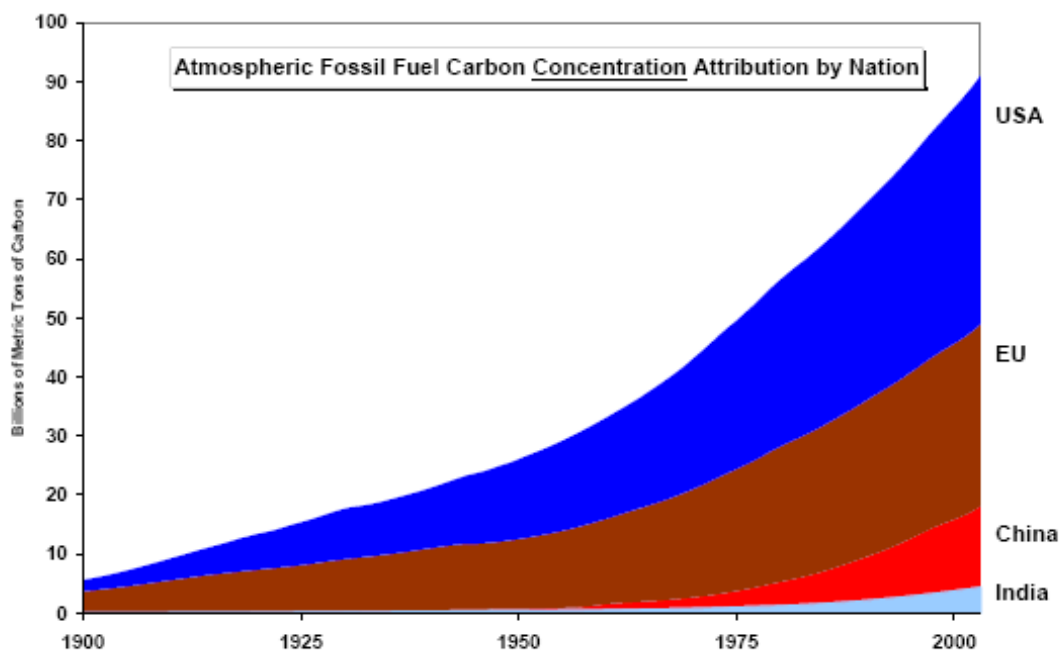
³⁶⁰ Rod Oram, “Don't be fooled by food miles”, *Sunday Star Times*, 10 June 2007.

³⁶¹ See Article 2.3 of the Kyoto Protocol.

warming effect for 9 years after its release while more than a third of CO₂ emitted today will be in the atmosphere in the year 2100.³⁶²

Figure 9.2 shows the historical contributions to greenhouse gas concentrations by today's four largest emitters.³⁶³

Figure 9.2



It is plain from this that developed nations are responsible for an overwhelming share of cumulative historic emissions. Given the direct link between historical responsibility for cumulative emissions and ability to pay, the political case for developed nations to shoulder the bulk of abatement costs is a powerful one.

How great a share developed nations are to bear depends on a myriad of factors, but one stands out above any consideration of what was known when about the effects of climate change and what could have been done in the past. It is that ultimately the atmosphere is a global commons, and that if the atmosphere proves capable of absorbing only certain levels of greenhouse gases on a sustainable basis, then that absorption capacity will need to be shared on an equitable basis to avoid conflict.

This observation is far from new and the general response to it was popularised in the 1980s and 1990s under the slogan of “contraction and convergence”. The essential proposition, of which there are a host of sub-variants, is that capacity to utilise the

³⁶² To evaluate the effect of greenhouse gases on a consistent basis, each is assigned a warming potential by the UN based on its individual ability to cause warming (which varies markedly), multiplied by its expected life span, capped to a terminal date. These values are then expressed as “carbon dioxide equivalent” or CO₂e warming potentials.

³⁶³ Graph “Concentration of carbon from fossil fuel emissions from the four largest emitters”, from: Jay Apt, Lee Gresham, M. Granger Morgan, and Adam Newcomer, *Incentives for Near-Term Carbon Dioxide Geological Sequestration*, Carnegie Mellon Electricity Industry Center, October 2007, p 26.

atmosphere's absorptive capacity is best shared on a per capita basis³⁶⁴. If this were implemented under a cap and trade model, then individuals would be issued permits in equal numbers (up to the limit the atmosphere could sustain) and those individuals or nations that wished to emit to a greater than average degree would need to buy out the rights of others.

While New Zealand's total emissions are a tiny slice of the global burden, it is unambiguously a significant historic contributor of greenhouse gases on a per capita basis. Given this, if international emission targets come to be set more on a per capita basis, and less as a progression from historic emission levels, New Zealand will be even more exposed than it is now.

Just as the Kyoto Protocol provides for a country to exceed its target so long as it purchases offsetting credits, the same would apply under a per capita allocation. Thus the **physical** rate of emission reduction need not reflect the allocation of **financial** responsibility.

For pragmatic reasons, the Kyoto Protocol focused only on flows and left stocks to one side, but stocks matter a great deal because it is not just a question of responsibility for those already aloft. Those still embedded on the ground but vulnerable to release, such as carbon stored in rainforests, are issues that will increasingly make their way on to global agendas.

The Amazon rainforest alone contains a third as much carbon as has been added to the atmosphere since the industrial revolution³⁶⁵ and rates of deforestation have again risen after having declined previously.

The bottom line is that for New Zealand to go forward with its emissions not just far in excess of 1990 levels, but also far above any allocation it could hope to defend in a global-commons debate, would be a very risky strategy. A more prudent and sustainable climate change strategy would place emphasis on preparing for an entirely different carbon cost structure in the national and global economies. A serious climate-change event that captured public consciousness globally could rapidly change the political consensus about what is a sustainable emissions reduction path and what are fair allocations. New Zealand would fail to plan for that contingency at its peril.



³⁶⁴ Geoff Bertram, "Tradeable Emission Permits and the Control of Greenhouse Gases", *Journal of Development Studies*, Vol.28 No 3, April 1992, pp.423-446.

³⁶⁵ Tim Flannery, *The Weather Makers*, 2005.

9.5 A New Carbon Accounting Framework

Once New Zealand is faced with serious emission reduction commitments, a major transition lies ahead. Hopefully, this can at least be partially eased by a principled evolution of the accounting rules.

In an ideal world, research would enhance known methods of emission reduction and discover new ones such that New Zealand farmers and other sectors are able to abate profitably, or at low cost. Failing that, or in tandem with it, export producers would be able to pass on to final consumers all or most of the additional costs of emissions, whether because all major agricultural producers face the same cost structure, or because New Zealand exporters succeed in branding their products as possessing high grade sustainability credentials, earning price premiums which more than compensate for the costs of credits required to offset emissions. To the extent this ideal world does not emerge, the timing of a shift in the global accounting of emissions will become more important still.

The Kyoto Protocol was constructed around a worldview dominated by the emissions profile of the industrial nations that were going to be undertaking the cuts. This led to an early focus on carbon dioxide emissions from fossil fuel use, particularly in electricity generation and transport. Such emissions clearly take place at the point where energy is being harnessed, and since most electricity and transport services are not traded internationally, and are to the benefit of consumers in the country that causes the emissions, the choice of accounting rule does not matter especially much. Thus an accounting and measurement system based on the point in the globe at which the emissions arose was seen as a reasonable approach.

A first-principles assessment suggests that an approach that instead places the carbon obligation with final consumers (and thus their government) is the better framework. This is because it ensures that a price signal is fully passed through the supply chain, avoiding the situation where over-consumption results from the cost of emissions not being priced into the good. For countries like New Zealand with a large percentage of its emissions arising from the production of goods for export, such a point-of-final-sale rule would allow the carbon content embodied in export commodities to flow through to the nation ultimately consuming the good or service. In that way, milk products sold in the UK would carry with them an embodied carbon obligation that the UK government would then need to add to its inventory. On the import side of the ledger, cars arriving from Japan would carry an embodied carbon obligation that New Zealand would need to be responsible for.

Such a form of accounting is more complex to establish and monitor than the present arrangement. However, if it could be set up, and a process for establishing carbon content agreed to for the array of goods that have harmonised customs codes attached, it could become incorporated as part of the routine customs documentation. (In this sense, it relates closely to the carbon border tax proposal, discussed above.)

A test case is that of so called “harvested wood products”.³⁶⁶ Currently, all trees felled are counted in a country’s emissions inventory as if their carbon content vaporised at the time they were cut down. However, for the parts of the trees that are used for sawn timber and other products with decades to run before the stored carbon is released, this is not an accurate representation. It penalises the forester relative to the emissions actually taking place. Negotiations on new rules in this case are ongoing, and the principles established for harvested wood products are important to the wider question of future accounting rules.

For New Zealand, accounting at the point-of-final-sale would mean the nation could export a volume of agricultural products consistent with the willingness of individuals overseas to use their “carbon budgets” to buy foods from pastoral farms rather than foods that have much lower emissions associated with their production. If New Zealand can in fact deliver agricultural products to Europe with a very competitive carbon footprint as Federated Farmers states, then New Zealand farmers should be relatively advantaged under such an arrangement.

Irrespective of relative performance, such an accounting system would ensure that New Zealand farmers and other exporters no longer faced being undercut by suppliers elsewhere that were not subject to similar emissions costs. At each export destination, every producer seeking to sell goods there would face those products being priced up by the same amount per unit of embodied carbon content.

For that reason, it can be expected that agricultural and other export oriented industries will favour such a change. Advocacy for such a new accounting approach would, place New Zealand on the opposite side of the negotiating table from many of its traditional trading partners (such as the US and EU) but would align with the interests of many developing nations and growing markets (China in particular).

Once through the transition, the upside of a revised accounting standard would be that rather than New Zealand needing to reduce its total emissions including those arising from export production, its focus could be squarely on what are its domestically-driven emissions. That could allow for the setting of national reduction targets on a genuine cap-and-trade basis, and devising national plans that did not need to trade off global climate change goals against development of the local economy. Global goals would be set through the global emissions cap and New Zealand would be responsible solely for the carbon emissions incurred to supply New Zealand’s domestic consumption of goods and services.

Taking a lead in seeking the change in accounting convention could give New Zealand a very constructive international role as such advocacy, together with the development of technologies to reduce agricultural emissions, are key factors that could draw developing nations into a future global emissions reduction agreement, the framework for which was laid in Bali in December.

³⁶⁶ See: UNFCCC, *Estimation, Reporting and Accounting of Harvested Wood Products*, 27 October 2003, and Murray Ward, *Harvested Wood Products – A Beginning Guide to Key Issues*, Global Climate Change Consultancy, July 2004

10 Rebuilding the ETS

10.1 What's Wrong with the ETS?

When launching the ETS, the Prime Minister made the following claims for the scheme:³⁶⁷

“The options discussed included a carbon tax and direct regulatory measures. In our view, and that of most of those consulted, an emissions trading system offers the most flexible, effective, fairest, and least-cost option for reducing New Zealand’s greenhouse gas emissions.

In deciding the details of the proposal, the government has been guided by the desire to be fair. That is why we have opted for a scheme which will apply to all sectors of the economy and includes all greenhouse gases.

The economy does need time to adapt to the changes which the scheme brings. As well, different sectors of the economy are at different stages in their ability and readiness to reduce emissions.”

The first paragraph of this quotation contains a good summary of the principles that should guide the design of a policy package to confront climate change. In particular, fairness, and the quest for least-cost options to reduce emissions, are key benchmarks against which we have evaluated the ETS. In its present form, the scheme fails entirely on those counts. It relies overwhelmingly during CPI on taxing sectors with high abatement costs, and as a result can be expected to result in only very limited abatement. It imposes a regressive tax burden on households and firms that are not major emitters, while largely exempting selected groups with political strength. The promised “application to all sectors of the economy” lies in the distant and uncertain political future.

The complexity of the ETS means it will require continual regulatory fine-tuning, and is opaque where it should be transparent. It presents fundamental problems of macro-management, many of them springing from the unnecessary creation of a homegrown carbon-currency unit, the NZU, which will have to be managed like a real-world currency under a fixed exchange rate, and which risks becoming inconvertible into Kyoto currencies – other than for those with pre-confirmed options to convert.

What the Prime Minister described as “different stages in ability and readiness to reduce emissions” is not grounds for exempting sectors or manipulating their effective tax rates. If subsidies or adjustment assistance are warranted for certain emitters or groups of emitters, the appropriate way to deliver these is transparently and in the clear light of day. The Public Finance Act contains provisions for Government spending on industry assistance to be clearly laid out before Parliament and for its consequences to be recorded in the Government Financial Statements. The principles of fiscal responsibility apply to climate-change subsidies as to all other industry support.

³⁶⁷ Rt Hon Helen Clark, *Launch of Emissions Trading Scheme*, 20 September, 2007.

Corporate welfare is not entitled to greater freedom from Parliamentary scrutiny than social welfare.

“Time to adapt” is best provided by ramping-in the new emission tax regime over a period of several years. There is no good reason to delay the start of the ramp longer than is needed to get the tax mechanisms in place. Vocal complaints from large industry about regulatory uncertainty and lack of notice lack credibility; the same interest groups³⁶⁸ that now lobby against effective policy are the same as those which blocked policy progress throughout the 1990s and into the first half of the present decade.

The debate over climate change policy began in the late 1980s and has run for almost two decades. No sector, group, or business now has a legitimate claim to be taken by surprise. There is no excuse for being “unprepared”.

An essential least-regrets test for any policy regime that is to prevail over the coming five years is that it should leave the New Zealand economy and political system in the best possible shape to confront the challenges of CP2. The ETS makes no serious inroads into gross emissions and potentially undermines public willingness to support emissions pricing in future, by imposing burdens and distributing benefits under a pattern that will seem, to many, inequitable. The last point echoes the following passage from a submission before the US Congress last year that highlights the big goals at stake:

Allocation matters to the political success of program, its efficiency, and its distributional outcome. A complex allocation system can cloak unfair and dramatic transfers of wealth. A transparent allocation system will build public confidence in the institution.

... There comes a point where political compromise is the undoing of successful market design.³⁶⁹

How to redesign the ETS to bring it into alignment with principles of good market design and those set out by the Prime Minister is the subject of the balance of this section.

10.2 Eliminate the NZU

The machinery proposed for the ETS is comparatively easy to retool so that reform involves a workable amendment rather than going back to the drawing board. In particular, its central mechanism of a tax that is automatically indexed to the world price for carbon is well worth keeping and building on.

The key change required is to dump the idea of creating the separate NZU and to use solely the existing Kyoto currencies. Such an emissions obligation based on the Kyoto

³⁶⁸ In particular, the Greenhouse Policy Coalition.

³⁶⁹ Dallas Burtraw (Resources for the Future), *Climate Change: Lessons Learned from Existing Cap and Trade Programs*, testimony before U.S. House of Representatives Committee on Energy and Commerce Subcommittee on Energy and Air Quality, 29 March 2007.

currencies was proposed, prior to the design of the ETS, by a range of parties including: the New Zealand Business Council for Sustainable Development, Meridian Energy, and the Environmental Defence Society.³⁷⁰ The concept was first advocated by Murray Ward of GCCC³⁷¹ and the Business Council for Sustainable Development submitted in March 2007 that:

The answer appears to be to simply take advantage of the existing Kyoto emissions market. ... Under this approach emitters are required to purchase Kyoto units (Assigned Amount Units, Emission Reduction Units and Certified Emission Reductions) to cover their obligations and receive such units from the government where they are awarded credits (e.g. carbon sinks).³⁷²

This approach acknowledges the need for access to credits from offshore to allow for the least cost abatement of a global problem. A market that was restricted to domestic abatement options would make emissions obligations more costly to satisfy. As the system will need to cater for the Kyoto currencies in any event, and local abatement options can be credited in Kyoto currencies, why not avoid the additional costs, complexities and risks associated with a New Zealand carbon currency?

The *Framework* document offers two arguments against this approach:

- “the status of Kyoto units after 2012 is uncertain and depends on future international negotiations”; and
- “there are issuance and banking restrictions on Kyoto units during the first commitment period”.³⁷³

The first issue of the status of the Kyoto currencies being uncertain after 2012 is the same for all nations and it is difficult to believe that if a change away from these is made there will not be suitable transfer processes.

The issuance and banking restrictions referred to relate essentially to forestry activities, as the others are common to all potential arrangements. The problem here is that the Government has elected to receive credits for carbon absorbed by forests only in 2014 (rather than annually as it could have).³⁷⁴ The Government is looking for a way to allow the forestry credits to be traded well in advance of 2014 so that domestic emitters can purchase and then submit them to Government to meet their ETS obligations.

³⁷⁰ See the submissions to Government by these parties on the series of climate change consultation documents released in December 2006 to which submissions were provided in March 2007. *Environmental Defence Society Submission on Climate Change Policy 30 March 2007*, p 18; The New Zealand Business Council for Sustainable Development, *Submission on Transitional Measures for the Stationary Energy Sector*, March 2007, p 4.

³⁷¹ Murray Ward, *A New Domestic Policy Proposal*, GCCC, April 2006. He expressed the idea subsequently as: “This is an ‘emissions trading’ version of a carbon charge – but not in the sense of a domestic cap and trade programme; rather in the sense of a direct connection to the international carbon market created by the Kyoto Protocol. ‘Kyoto compliant’ units would include CERs, ERUs, RMUs, EUAs, and AAUs from any country with which New Zealand has a mutual recognition MOU”. Source: Murray Ward, *Climate Change Policy: Plan B*, GCCC, 2007.

³⁷² The New Zealand Business Council for Sustainable Development, *Submission on Transitional Measures for the Stationary Energy Sector*, March 2007, p 4.

³⁷³ *Framework*, p 40.

³⁷⁴ *Framework*, p 40.

While issuing NZUs annually is one mechanism to achieve this, it is far from the only one. The *Framework* document formally considers and dismisses the idea of a currency specific to forestry – “a further domestic unit”. What it acknowledges only parenthetically is that the same thing can be achieved without the creation of any local currency, simply by using futures contracts.³⁷⁵

A futures contract is a promise to deliver something at a pre-specified date – in this case a credit for absorbing carbon that will be formally recognised in 2014. A big proportion of the global trade in Kyoto currencies is in futures contracts, so such an instrument is quite conventional. The Government would issue futures contracts to forest owners who could in turn sell these on to the major emitters who would surrender them back to the Government via the ETS. The fact that the Government is both the issuer and the receiver of the contracts in all cases³⁷⁶ means there is the same risk for the Government in adopting this approach as there is if it creates an NZU.³⁷⁷

Overall, the Government’s arguments for adding extra complexity and opacity by creating the NZU, and not relying solely on Kyoto currencies, are unconvincing. The chief attribute delivered by creation of the NZU is the ability to obscure the provision of off balance sheet subsidies to favoured sectors. Take away the blanket subsidies and the rationale for the NZU vanishes.

10.3 Amending the Draft Legislation

Much of the architecture set out in the ETS legislation now before Parliament could be retained under the new approach. The changes would involve embracing the prescriptions for making an emission tax efficient and effective and building on the valuable idea of collecting the revenue in the form of Kyoto units bought on the open market.

The following would be central planks to be incorporated into the revamped legislation:

- All sectors would enter the scheme at the same date and all would face the same price signal at any time, giving uniform tax incidence across the entire economy and removing loopholes for avoidance.
- The payment mechanism would be that already proposed for the ETS, but without the NZU. All emitters, either actual emission sources, or “points of obligation”, would be required to acquire and surrender to Government recognised Kyoto currencies. This linkage to the international carbon price is the cleanest way of adjusting the tax rate to the world market without any need

³⁷⁵ *Framework*, p 41.

³⁷⁶ Even those holders of the futures contracts that wish to sell overseas will need to exchange them through the Government for Kyoto currencies, just as they would if they wished to convert NZUs.

³⁷⁷ The risk is arguably better as the futures contracts approach offers more potential to frame the instrument to guard against the risk that a forest could burn down or become subject to biological infestation before the UN credits for its absorption were paid out.

for repeated political decisions and with much reduced scope for gaming and market manipulation

- Concerns about providing transitional time for economic agents to adjust to the new regime would be accommodated by bringing the tax in progressively via a “ramp” over the course of CP1. This ramp would provide for a rising proportion of each tonne of emissions to be subject to the tax each year. Eventually, all emissions from all sources will be fully priced, as the ETS documentation proposes.
- The starting proportion, and the pace at which the proportion rises, is a matter for wide consultation, but is ultimately a political decision. Ramping the introduction of such a non-discriminatory, universal emissions tax allows economic actors across all sectors to build up experience and knowledge with the technological adjustments needed for an efficient response. The key to a gentle transition, though, is an early start. Each year that introduction is deferred means a much sharper subsequent impact (through the starting proportion being higher) if the Crown is not to be left covering part of the Kyoto deficit. Deferral also delays abatement effort that ought to be triggered by the tax.
- If the revenue gathered from emitters over CP1 were required to meet the Government’s Kyoto obligations, including payments to forest owners for their sink credits, this would imply an average tax rate over CP1 of about 30% under business as usual, if the tax commenced in 2008, or less if abatement exceeds expectations.
- If more revenue is collected than is required to meet international commitments, the revenue would be recycled. Priority would be given to expenditure that could verifiably and economically reduce emissions,³⁷⁸ while further revenue would be returned via rebates on general taxes.
- To the extent that individual emitters face difficulties as a result of the scheme, and that there are benefits to the nation in providing transitional assistance, this would be provided by explicit cash subsidies, set out before Parliament in the Government’s annual Budget Statement. There is no case for giving industry assistance by adjusting emission-tax rates out of public view.
- Forest owners would be rewarded for carbon sequestration by the Government issuing futures contracts that would trade as carbon credits. These would be accepted under the ETS as equivalent to Kyoto currencies and so could trade in the same way the NZU is intended to trade.
- In place of the current timetable for sector entry and rate of gifting of NZUs would be the principle that all emitters are taxed in the same proportion at all stages. Also specified would be the proportion of emissions that would, for

³⁷⁸ See, for example, Geoff Bertram and Simon Terry, *Smart Investments on the Electricity Demand Side*, Simon Terry Associates, March 2007; and COVEC, *Sustainable Energy Value Project: Evaluation of options for intervention in the stationary energy sector*, February 2007.

each year during CP1, need to be covered by surrendering either Kyoto currencies or Government issued futures contracts.

The carbon challenge is to reshape the economy to recognise the costs of greenhouse gas emissions. The minimum formal expectations are set by an international agreement. Export markets and public concern for future generations are other significant drivers of change. By pricing all emissions to the same extent at all times, costs are shared fairly and the country gains a sustainable strategy for addressing its global environmental responsibilities. The focus should therefore be on finding a consensus on the pace of change the nation as a whole is willing to set: that is, the shape of the ramp. A sustainable pathway to a low-carbon future involves beginning as soon as possible, and requires the wide support that only a fair allocation of responsibility for emissions can deliver.

List of Acronyms

AAU	Assigned Amount Unit, a Kyoto credit issued free by the UNFCCC to countries such as New Zealand, in amounts sufficient to cover each country's negotiated Kyoto target emissions
AJHR	Appendices to the Journals of the House of Representatives, New Zealand Parliament
BAU	Business-as-usual, the projected future path of the economy in the absence of policies to affect emissions
CDM	Clean Development Mechanism, a Kyoto Protocol mechanism allowing industrialised countries with greenhouse gas reduction commitments to invest in projects that reduce emissions in developing countries, as an alternative to more expensive emission reductions in their own countries.
CER	Certified Emission Reduction, a Kyoto credit issued by the UNFCCC to reward Clean Development Mechanism (CDM) projects in developing countries
CO ₂	Carbon dioxide
CP1	The First Commitment Period of the Kyoto Protocol, running for five years from 2008 to 2012.
CP2	The Second Commitment Period of the Kyoto Protocol, commencing in 2013.
CPR	Commitment Period Reserve.
ECFP	East Coast Forestry Project.
ERU	Emission Reduction Unit, a Kyoto credit awarded for one tonne of emission reduction resulting from a Joint Implementation (JI) project.
ETS	Emissions Trading Scheme. This acronym is used generally in this report to refer to the New Zealand scheme. The European Union (EU) also has its own ETS, which is referred to in the report as "the European ETS".
ECNZ	Electricity Corporation of New Zealand.
FNCCC	Framework Convention on Climate Change; see also UNFCCC.
GHGs	Greenhouse gases.

GPC	Greenhouse Policy Coalition.
GWh	Gigawatt-hour, a measure of electricity volume equal to one billion kilowatt-hours.
JI	Joint Implementation, a Kyoto Protocol mechanism under which any Annex I country can invest in emission reduction projects (referred to as "Joint Implementation Projects") in any other Annex I country, as an alternative to reducing emissions domestically.
ICER	Long Term Certified Emission Reduction the amount of carbon sequestered (net baseline) by a CDM project since the last issuance of an ICER. They can be used in the commitment period for which they were issued and expire at the end of the crediting period (20, 30, 40 or 60 years) for which they were issued. They cannot be carried over to subsequent periods. If carbon is lost, ICERs must be replaced.
LULUCF	Land use, Land-use Change, and Forestry.
MAF	Ministry of Agriculture and Forestry.
MED	Ministry of Economic Development.
MEUG	Major Electricity Users' Group.
MfE	Ministry for the Environment
MOU	Memorandum of Understanding
Mt	Million metric tonnes of carbon-dioxide-equivalent emissions
MWh	Megawatt-hour, a measure of electricity volume equal to one million kilowatt-hours.
N ₂ O	Nitrous oxide, one of the greenhouse gases.
NAP	National Allocation Plan, produced by each EU government to determine its targets and allocation of emission credits within the EU's overall Kyoto target.
NGA	Negotiated Greenhouse Agreement.
NZU	New Zealand Unit, the New Zealand Government's proposed emission credit, to be issued by the Government and then accepted back as an alternative to the Kyoto currencies as a means for emitters to cover their greenhouse gas emissions.
OECD	Organisation for Economic Cooperation and Development.

PFSI	Permanent Forest Sinks Initiative.
PRE	Project to Reduce Emissions.
RMU	Removal Unit, a Kyoto credit issued by the United Nations to reward the absorption of greenhouse gases from the atmosphere into “carbon sinks”.
SMEs	Small and medium enterprises. In this report, refers to non-agricultural businesses with less than 50,000 tonnes per year of emissions.
SMPs	Supplementary Minimum Prices for agricultural products, the principal Government subsidy to farmers in the early 1980s.
tC	Tonne of carbon.
tCER	Temporary Certified Emission Reductions under the CDM, are the total amount of carbon sequestered (net baseline) since the CDM project began. tCERs expire at the end of the commitment period subsequent to the period in which they were issued. They can be used in the commitment period for which they were issued. tCERs must be replaced in the commitment period that follows the one in which they were used they must be replaced.
t CO ₂ -e	Tonne of carbon dioxide equivalent emissions.
UNFCCC	United Nations Framework Convention on Climate Change.

Appendix

Mapping the Flow of Cash and Emission units Selected Scenarios

To assist in following what is quite a complex network of transactions outlined in Chapters 4 and 6 of the report, this appendix presents the numbers in the form of a flow chart. The “winners” and “losers” identified in section 6.4 are shown outlined in light blue: Kyoto forest owners, Pre-Kyoto forest owners, large industrials, renewable generators, households and small-medium enterprises, agriculture, and road users deforesters.

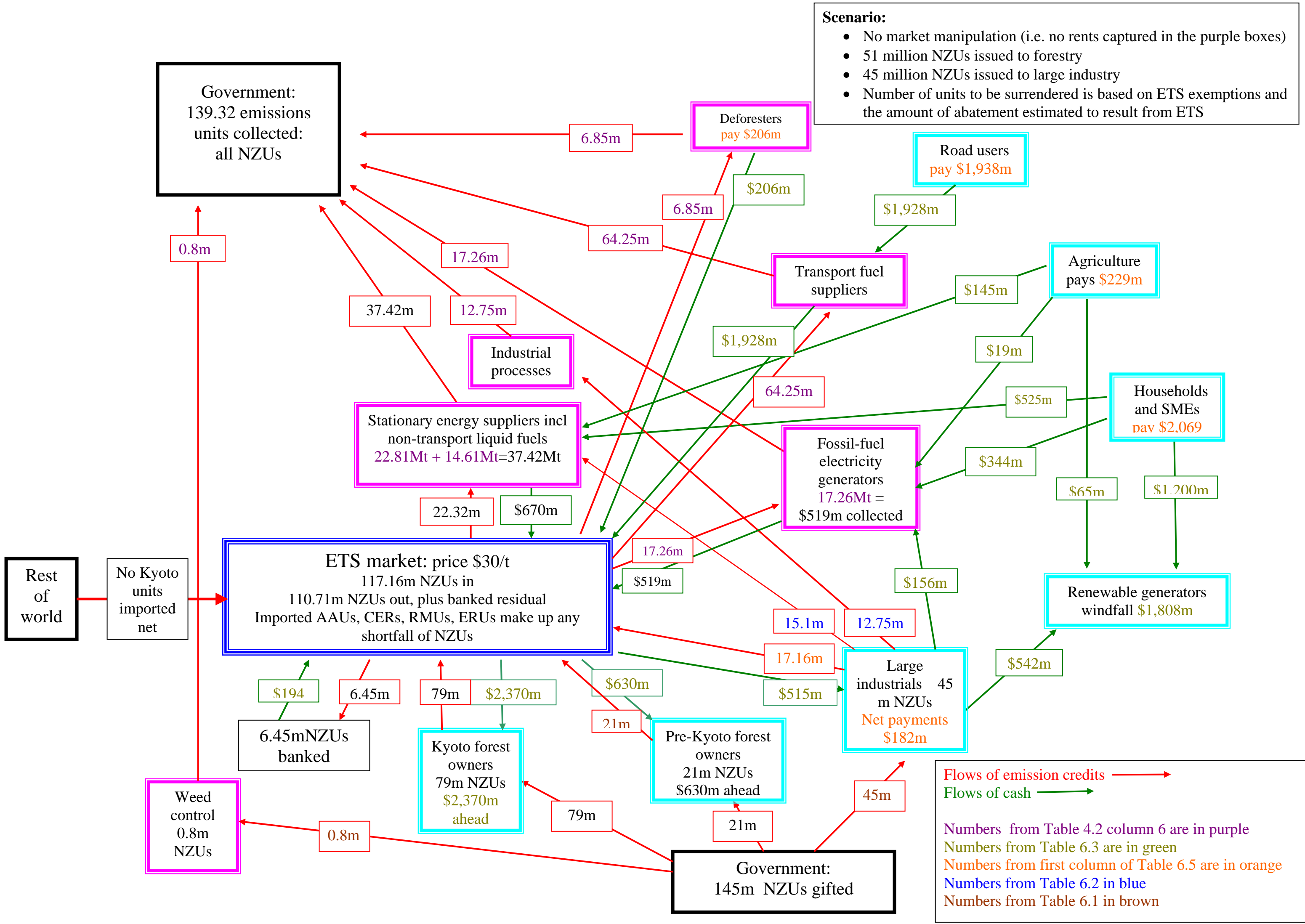
The flows of cash from one sector to another are shown as dark green arrows, while the flows of NZUs and Kyoto-currency units are shown in red.

Major “points of obligation” for the surrender of credits to cover emissions are shown as purple boxes, from which emission credits can be seen flowing along paths which converge at the top left-hand corner of the chart, where the New Zealand Government collects the ETS emission taxes.

NZUs gifted to selected sectors enter the diagram at the bottom, are distributed to the initial recipients, and from there are either passed through to cover emissions or sold into the ETS market at an assumed price of \$30 each. This means that the market is assumed to achieve perfect arbitrage with the world carbon market in which Kyoto credits are bought and sold. This world market appears at the left-hand side of the diagram, with Kyoto units being imported only insofar as there are not enough NZUs in the system to cover all liable New Zealand emissions. The points of obligation are assumed to exercise no market power, so that they act as pure intermediaries passing cash and emission credits through with no markups. JI projects (with their associated exports of Kyoto units) are assumed to be zero.

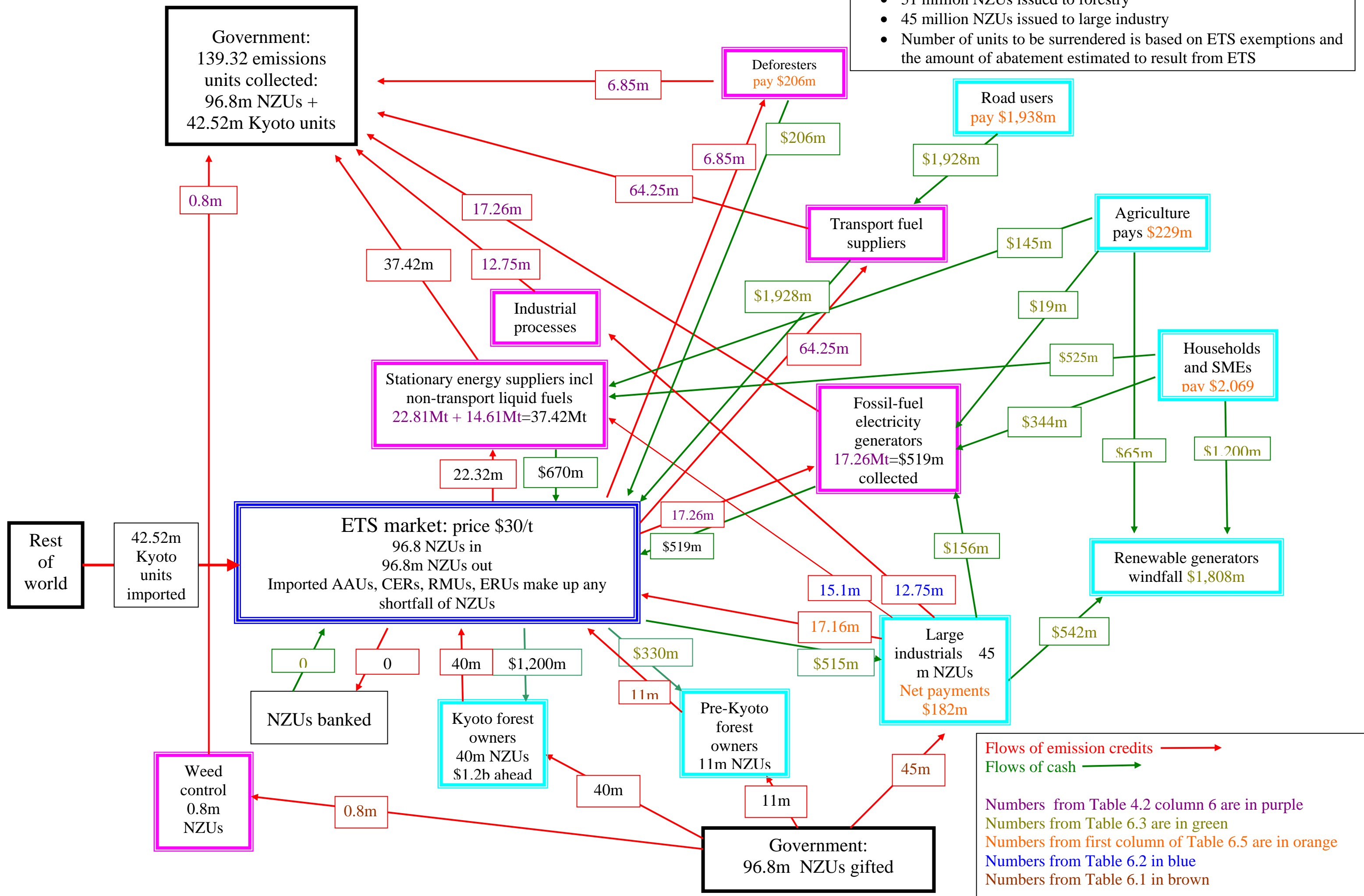
Two scenarios are modelled. In the first, forest owners are assumed to receive the full 100 million gifted NZUs discussed in the *Framework* document: 79 million to Kyoto forest owners to pay for sinks, and 21 million to pre-Kyoto forest owners. In this scenario 145.8 million NZUs are issued, while (after taking account of the abatement effects of the ETS set out in Chapter 5 of the report) only 139.32 million units have to be surrendered to cover the whole of CP1. In this scenario no Kyoto units are imported for surrender, and 6.45 million NZUs are banked for the future.

The second scenario assumes that only about half of the potential forestry NZUs are actually issued. Kyoto forest owners are assumed to take up 40 million NZUs during CP1, and pre-Kyoto forest owners receive 11 million NZUs (see section 6.1.2 of the report). With a total of only 96.8 million NZUs now released into the market, it is necessary to import 42.5 million Kyoto units to cover the 139.3 million tonnes of ETS-liable emissions. In this case the Government ends up with enough Kyoto units to cover the expected Kyoto net deficit.



Scenario:

- No market manipulation (i.e. no rents captured in the purple boxes)
- 51 million NZUs issued to forestry
- 45 million NZUs issued to large industry
- Number of units to be surrendered is based on ETS exemptions and the amount of abatement estimated to result from ETS



Flows of emission credits →
 Flows of cash →

Numbers from Table 4.2 column 6 are in purple
 Numbers from Table 6.3 are in green
 Numbers from first column of Table 6.5 are in orange
 Numbers from Table 6.2 in blue
 Numbers from Table 6.1 in brown