

Projects to Reduce Greenhouse Gas Emissions in New Zealand

1. ABSTRACT

New Zealand is actively seeking to control its emissions of greenhouse gases in the spirit of the United Nations Framework Convention on Climate Change (1992) and to meet its obligations under the Kyoto Protocol (1997) that New Zealand ratified in 2002. At that time the government also instigated a climate change policy package to help achieve both its obligations for the Protocol's first commitment period and the long-term climate change goal being that "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".

This paper discusses one of these policies: the government's Projects to Reduce Emissions programme. It includes the background to this programme as well as its relationship with the Kyoto Protocol project mechanisms. It also looks at two early projects pre-dating the programme: two wind farm projects which were supported by the government in 2002. The paper goes on to discuss the first project tender round held as part of the programme in 2003 for which the incentive was four million Kyoto Protocol emission units sometimes called "carbon credits".

This exploratory first tender round was completed in December 2003 and project agreements offered to the successful applicants. Its success is indicated by the programme winning both its class and the Supreme Award in the 2004 *BearingPoint* Innovation Awards for innovation in the New Zealand public sector.

Outcomes and lessons from the first tender were reported back to Ministers and refinements agreed for a second tender round with an increased budget of six million emission units. The second tender was open from 30 August to 15 October 2004.

The paper concludes with a discussion of trends in international emission unit markets and the way forward for this programme.

Key Words: *Greenhouse gas, global warming, projects, baselines, additionality, emission units, Kyoto Protocol.*

2. INTRODUCTION

2.1 Background to the Kyoto Protocol

During the late 1980s, widespread concern about the risks of greenhouse gas emissions¹ from human activities, resulting in adverse global climate change, led to a coordinated international response. In 1990 the United Nations General Assembly established the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change (INC)². The **United Nations Framework Convention on Climate Change** (UNFCCC) was drafted and then adopted by the INC on 9 May 1992 at the United Nations Headquarters in New York. The UNFCCC was opened for signature at the June 1992 Earth Summit held at Rio de Janeiro, and entered into force on 2 March 1994.

In Article 2 the objective of the Convention is outlined as "...stabilisation of greenhouse gas

¹ Internationally the main greenhouse gas is carbon dioxide (CO₂). Others covered by the UNFCCC and Kyoto Protocol are methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride. For compliance purposes, the non-CO₂ gases are converted to tonnes of CO₂ equivalent (tCO₂(e)) based on their 100-year global warming potential (see IPCC (1995) for details).

² A guide to the many acronyms and terms used in the climate change field can be found at http://unfccc.int/essential_background/glossary/items/2639txt.php

concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.” (UNFCCC 1992)

In Article 4 2(a) developed countries commit to adopt policies and take measures to limit anthropogenic emissions of greenhouse gases and to protect and enhance their greenhouse gas sinks and reservoirs. This section also included a commitment by developed countries to aim to return their greenhouse gas emissions to 1990 levels by the end of the decade.

The supreme body of the Convention, the **Conference of the Parties (COP)**, first met in early 1995 in Berlin. At that meeting (COP-1) Parties reviewed the adequacy of developed country commitments and decided they were inadequate for achieving the Convention’s objective. Another series of meetings led to the final negotiation of the **Kyoto Protocol** (UNFCCC 1997) at COP-3 which was held in Kyoto in December 1997.

This Protocol requires a legally binding commitment from the industrialised countries (referred to as **Annex B** countries) to reduce their greenhouse gas emissions to specific targets during the Protocol’s **First Commitment Period** from 2008 to 2012 inclusive (often referred to as **CP1**). The commitments for individual countries were differentiated, ie negotiated individually with consideration of their emission growth and ability to mitigate.

The aggregate total of these commitments would mean that Annex B countries reduce their emissions by 5.2% below 1990 levels. Each Annex B country will receive an allocation of **Assigned Amount Units (AAUs)** equal to its target emissions for the commitment period.

Each Annex B country will need to retire AAUs to cover its actual emissions in CP1. These countries will be permitted to trade emission units among themselves using the Protocol’s provision for **International Emission Trading (IET)**. Article 17 of the Protocol defines this mechanism.

The Protocol was opened for signature on 16 March 1998, and signed by essentially all members of the United Nations including the United States, Russia, the European Union, Australia and New Zealand.

The Protocol’s rules specified that it would only enter into force if and when it was ratified by at least 55 Parties to the Convention, including enough of the countries with quantified targets to account for at least 55% of the total 1990 CO₂ emissions from the **Annex 1** countries³. Formal entry into force was to occur 90 days after these conditions were met.

By 2000 most of the signatory countries had ratified or indicated their intention to do so. This included all of the European Union countries, Japan, Canada and New Zealand. Although they were signatories to the Protocol, the United States and Australia indicated they did not intend to ratify it.

From 2000 to 2004 it was clear that the Protocol would only enter into force if it was ratified by the Russian Federation, which had 17.4% of Annex 1 1990 CO₂ emissions. The Russian instrument of ratification was deposited with the United Nations on 18 November 2004, ensuring that the Protocol would enter into force on 16 February 2005.

2.2 New Zealand domestic policy prior to the Kyoto Protocol

In July 1994 the New Zealand government announced a domestic climate change policy package intended to enable it to meet its Framework Convention obligations. The 1994 package relied jointly on sink enhancement and emission reductions, with an aim to stabilise net CO₂ emissions at 1990 levels by 2000, and to maintain them thereafter.

The 1994 policy announced a programme of **Voluntary Agreements (VAs)** for large energy using industries and the electricity generation sector, and the intention to bring in a carbon tax (or charge) on CO₂ emissions if net emissions were not

³ Annex B to the Kyoto Protocol lists the countries that agreed to accept quantified emission limitations under the Protocol. It differs slightly from Annex 1 (to the Convention) due to political changes in Eastern Europe during the 1990s.

on track to meet the aim of emission stabilisation following a review to be held in 1997⁴.

For the 1997 review the test for the success of policies required:

- significant actual CO₂ emission reductions on business as usual, with at least 20% of total improvement coming from emission reductions (the other 80% coming from forest sinks); and
- New Zealand to be on track to achieve net CO₂ emission stabilisation by 2000.

A revision to forest model procedures (identifying increased sequestration in 1990) and lower than expected new planting rates combined to make net stabilisation in 2000 less likely (Wakelin and Te Morenga 1995). Decisions on the use of a carbon charge were deferred for reasons including uncertainty about the nature of the Kyoto Protocol (then under negotiation) and subsequently its detailed rules and likelihood of entry into force.

The use of natural resources in New Zealand, including the potential climate change effects of CO₂ emissions, were governed by the Resource Management Act (1991) (RMA).

In the mid-1990s, the Minister for the Environment "called in" the Electricity Corporation's gas-fired Taranaki Combined Cycle (TCC) power station air discharge consent and issued a consent which included a general CO₂ mitigation obligation. For subsequent similar consents, the regional consenting authorities did not follow the TCC consent model (Brasell 1996).

The Minister for the Environment then established a "Working Group on CO₂ Policy" which produced a discussion document in June 1996 (Ministry for the Environment 1996). In its conclusions it emphasised the importance of least-cost measures to reduce emissions as part of a durable global response.

It was considered that this required the use of an economic instrument⁵, rather than subsidies or

⁴ This and other details of policy as it developed over time are discussed in New Zealand's National Communications under the UNFCCC, which are available at <http://unfccc.int>

regulatory interventions. In particular the report promoted the use of emission trading, using tradable carbon certificates covering both emissions and sinks, as an alternative to continued reliance on the RMA to manage the climate change impacts of CO₂ emissions.

Officials' papers on the design of economic instruments followed, covering the alternatives of an emission charge (Treasury 1997) and emission trading (Ministry for the Environment 1998) and domestic policy options (Ministry for the Environment 1999).

2.3 New Zealand domestic policy following the Kyoto Protocol

In 1999, the government announced its intention to ratify the Kyoto Protocol and policy development continued. There was development of, and then extensive consultation on, a wide range of policy options from late in 2000 until mid-2002. The government agreed a confirmed climate change policy package in October 2002, passed the Climate Change Response Act in November 2002, and lodged New Zealand's instrument of ratification on 19 December 2002.

The confirmed policy package⁶ can be broken into three broad categories. The first category is a set of **foundation policies** that were already in place or in development, contributing to climate change outcomes but with other drivers as well. The second category includes policies for specific sectors and a range of **non-price measures** such as policies for small and medium enterprises and a voluntary agreement with users of SF₆. The final category is **price-based measures** made up of a planned **emission charge**, **Negotiated Greenhouse Agreements (NGAs)** and **Projects to Reduce Emissions**. These instruments are

⁵ An economic instrument generally takes either of two main forms – an externality (often called "Pigovian") tax which puts a predetermined price on emissions (like New Zealand's planned emission charge) or a cap-and-trade system in which the total allowable emissions are determined in advance, and the price paid will depend on the cost of abatement to reach that target. In a broad sense the Kyoto Protocol applies the cap-and-trade concept on a global scale.

⁶ A summary is available at <http://www.climatechange.govt.nz/resources/info-sheets/policy-in-brief.html>

described in more detail below, and the Projects to Reduce Emissions programme (PRE) is the subject of this paper.

New policies, and specifically the price-based measures, are being implemented to help ensure that New Zealand meets its obligations under the Kyoto Protocol as well as contributing to New Zealand's long-term climate change goal. They incorporate the notion of placing a marginal or across-the-board cost on emissions consistent with the market that the Protocol is intended to create. These measures involve significant economic costs and their full implementation was made conditional on the entry into force of the Protocol, which has taken longer than initially expected.

Article 3.3 of the Protocol requires countries to account for the net changes in greenhouse gas emissions and removals by sinks from direct human-induced changes for afforestation, reforestation and deforestation since 1990. The net effect of this Article for New Zealand is a significant additional allocation of emission units beyond those initially allocated.

It is optional for Parties under Article 3.4 of the Protocol to similarly take responsibility for grazing land, cropland and forest management activities. Current New Zealand policy is not to do this, and consequently abatement measures do not focus on these elements of land use or land use change.

2.4 Foundation policies

There are several foundation policies and strategies already in existence that support the government's climate change objectives. These include the:

- National Energy Efficiency and Conservation Strategy (NEECS)
- New Zealand Waste Strategy
- New Zealand Transport Strategy
- Growth and Innovation Framework
- Sustainable Development Programme of Action which includes a Sustainable Energy Framework released on 27 October 2004

Actions being taken by the Energy Efficiency and Conservation Authority (EECA) and other agencies to make progress towards the energy efficiency and renewable energy targets of the NEECS will make an important contribution to greenhouse gas

emission management. The actions foreshadowed in the Waste Strategy, particularly a National Environmental Standard for landfill gas emissions now implemented (Ministry for the Environment 2004), will contribute to reducing waste sector greenhouse gas emissions.

2.5 Non-price measures

A range of non price-based measures have been introduced or are under development. These include the development of business opportunities associated with climate change, and a public awareness campaign. Non-price measures focusing on particular sector emissions were also introduced to encourage emissions reduction and adaptation to the effects of climate change. Specific sectors identified for policy attention include:

- agriculture
- forestry
- local government
- small and medium enterprises
- users of synthetic gases, including HFCs and SF₆

Activities include research, voluntary commitments, and communication as appropriate for particular sectors⁷.

2.6 Price-based measures

A key price-based measure is an emission or carbon charge planned for no earlier than 2007 and to be set at the lower of the world price of carbon or NZ\$25 per tCO₂(e). It principally covers energy sector carbon dioxide (CO₂) and industrial process greenhouse gas emissions. The charge will not cover on-farm emissions of nitrous oxide (N₂O) from soils nor methane (CH₄) from livestock nor waste sector methane emissions.

It is expected that the point of application will be as early as possible in the energy supply chain eg point of importation, mines, wells or gas processing facilities. Design details for the charge are being discussed with affected parties and the proposals will be incorporated in a consultation paper before final decisions are taken by Ministers.

⁷ See http://www.climatechange.govt.nz/sectors/for_details_and_updates

Application of the emission charge to energy-intensive industries that are exposed to international competition could endanger their competitiveness and risk them losing market share or moving production offshore to avoid the charge (carbon leakage). As a transition measure to mitigate these problems, the government is negotiating NGAs with firms in these industries that meet at-risk criteria.

An NGA is an agreement in which the Crown will provide full or partial relief from the impact of the emission charge in exchange for the firm undertaking to move to world's best practice in emissions management.

The Projects to Reduce Emissions (PRE) programme is the other significant price based policy. An incentive programme, PRE encourages greenhouse gas abatement through actions like increasing renewable energy sources, improving energy efficiency, and encouraging fuel switching to lower carbon fuels. It also applies to other non-energy related forms of emission abatement such as reducing on-farm CH₄ or N₂O and landfill gas CH₄ emissions.

In the PRE programme the government issues Kyoto Protocol compliant emission units as an incentive, in exchange for abatement additional to business as usual. The units will be issued to the project operator on delivery of verified abatement. The units provided are expected to have a value and can be traded on international markets.

Because their development preceded entry into force, design of the price-based policy instruments included appropriate contingency elements to cover the possibility of the Protocol not entering into force. That is, their implementation was conditional upon entry into force of the Protocol.

3. BACKGROUND TO THE PRE PROGRAMME

3.1 Projects and the Kyoto Protocol

The Kyoto Protocol includes two **project mechanisms** as flexibility elements for countries wishing to supplement their domestic emission abatement efforts by investing in abatement outside their own borders. Governments may invest

themselves, or allow companies to do so on a devolved basis.

The first is **Joint Implementation (JI)** as outlined under Article 6 of the Protocol. The government of an Annex B country (or firm/entity in an Annex B country if responsibilities are devolved) can use JI to invest in project activities in another Annex B country. The principle is that if one Annex B country (country A) has fewer inexpensive abatement options at home, then it can invest in projects in another Annex B country (country B) where abatement is cheaper.

Emission units are transferred from country B to country A in exchange for the abatement the project has delivered. The units exchanged under JI are called **Emission Reduction Units (ERUs)**. Essentially an ERU is an AAU with an identifier attached to allow the project to be traced. Country A is called the investor country and country B the host country.

The second project mechanism is the **Clean Development Mechanism (CDM)**, which is outlined in Article 12 of the Protocol and facilitates investment (by Annex B countries) in projects that take place outside Annex B. The difference here is that the host country does not have an allocation of AAUs, since it does not have a target for its emissions in CP1. The units received by CDM investors, called **Certified Emission Reductions (CERs)**, are generated by the project.

Since the host country is not required to supply units from a limited pool and therefore has less incentive to ensure that the abatement is real and additional (see 3.2 below) CERs are only issued after independent review by an authority associated with the UNFCCC (the **CDM Executive Board**).

The New Zealand PRE programme is an example of how JI can be put into practice by an individual Annex B country. New Zealand is hosting projects that will reduce its actual CP1 emissions and hence the size of its obligations to retire units for greenhouse gas emissions during CP1. The New Zealand government allocates emission units to investors in return for delivered abatement in CP1, and these can then be sold to an investor country (or firm) that requires extra units to cover its own expected emissions.

3.2 Additionality

The most challenging and important aspect of any project-based programme is **additionality**. Projects must be activities that would not occur on a business as usual basis. Additionality is a key issue for the host country for projects under JI, and for the issuing authority under the CDM. Literature on projects and the Protocol (Carter 1997, Kartha et al 2002) discusses additionality in terms of two broad and not entirely distinct criteria:

Investment additionality is a requirement for a project to demonstrate that it would not be expected to proceed on a business as usual basis (Langrock et al 2000). Generally this is on the grounds that, without the value of the emission units, it would fail to provide an acceptable commercial return on the required investment. In principle, additionality might also be established by demonstrating that there are substantial non-economic barriers to implementation.

Environmental additionality is a requirement to demonstrate that the abatement offered by a project, as well as being additional to business as usual, is real and has been quantified in a defensible way. Generally this means that there must be a credible counterfactual which shows what would have occurred without the project (Matsuo 2000). It also requires that the project is defined in some clear way, showing what specific emission sources are included and reported through the crediting period to 2012.

The counterfactual (or baseline) for a project might be dependent on some variable that will only be known ex post, and therefore need to be adjusted through the project life (a **dynamic baseline**) – for example an industrial project might have a baseline of emissions that will vary depending on production rates. Alternatively, a **static baseline** might be used, in which the emission profile for the counterfactual is determined ex ante and not revised for the crediting life of the project.

Environmental additionality also depends on careful definition of the boundary of a project. The boundary should include every emission source that contributes materially to the outcome, but only sources that are under the control of the project

operator and can be monitored and reported through its life.

3.3 Australia's project programme

The **Greenhouse Gas Abatement Programme (GGAP)**, run by the Australian Greenhouse Office (AGO), was in operation for several years following its announcement by the Australian Government in 1999. Like the PRE scheme GGAP is project-based, involves an additionality assessment, uses a competitive tender for allocation of the incentive, and involves project agreements (AGO 2003). The earlier GGAP experience was useful in scoping and developing the PRE model.

However, there are some significant differences between GGAP and the New Zealand programme. Firstly, the incentive in GGAP is cash, payable at milestones through the progress of a project. There are extensive claw-back provisions in the project agreement to manage the risk of non-delivery of abatement.

Secondly, GGAP excludes renewable energy projects. Renewable generation in Australia is incentivised by the requirement for generators to have renewable energy certificates complying with the national **Mandatory Renewable Energy Target (MRET)**. The GGAP projects have generally involved opportunities based within industry, the sort of activities that are more likely to be covered by NGAs in New Zealand.

The AGO used a major financial consulting firm to advise on additionality assessment and design documentation for GGAP. Their work and other international examples assisted in developing the additionality framework for the PRE programme.

3.4 The government's high level requirements for PRE

Additionality is a key issue for the government in implementing this programme. Each project and its emission reductions must be additional to business as usual. When setting projects policy the government required potential projects to pass an additionality test to make sure that the project itself and the abatement claimed are additional. Both investment additionality and environmental additionality were considered in making this

concept operational. For more detail see section 4.3 below.

The government also required projects to have a contestable process for allocating units (CAB Min (02) 26/16)⁸. This is to improve the chance of the Crown receiving value for the units supplied as an incentive. The selection of proposals is by a competitive tender overseen by an independent assessment team. The "price" measure is the **request ratio** – the number of units requested relative to the CP1 abatement delivered.

The government also determined that payment of the incentive would be on delivery of abatement by the successful projects. This clarifies that delivery of the abatement is the proponent's responsibility, and obviates any need for claw-back provisions in the contracts. In addition, risks around additionality and delivery of abatement were to be considered as part of the assessment for project proposals.

Both the two early projects (see 3.5 below) and the PRE-1 tender were developed and implemented before there was any assurance that the Kyoto Protocol would enter into force. Consistent with the overall conditionality of price-based measures, the government made it clear that the proponent would bear any associated risk.

3.5 Two early projects

Late in 2001 and early in 2002 the government was approached independently by two energy firms willing to proceed with significant wind farms in the Manawatu if the economics of the proposals could be supported with emission units. The firms were TrustPower with a 36-MW extension to the existing Tararua wind farm, and Meridian Energy with the 90-MW Te Apiti wind farm just to the north of the Manawatu Gorge.

After consideration of the proposals and analysis of their additionality the two early projects were granted eligibility for emission units in February 2003, subject to the firms concluding satisfactory project agreements with the Crown. As this process preceded the PRE-1 tender, it provided

useful experience that assisted policy development. These agreements were concluded later in 2003.

The ability of these two proposals to contribute to near-term electricity supply encouraged the government to support them. The Tararua expansion was completed and started generating in time for winter 2004, and the Te Apiti wind farm first generated to full capacity early in November 2004. Together these two projects have added about 125 MW to generation capacity and 440 GWh/yr to New Zealand's electricity supply.

Meridian Energy also participated successfully in a tender run by the Netherlands Government to purchase ERUs from JI projects (see 5.3 below) thus realising up-front value from its contract for future delivery of emission units.

3.6 The decision to proceed with PRE-1

The high-level decisions around the inclusion of a project mechanism in the confirmed policy package were made by Cabinet on 7 October 2002 (CAB Min (02) 26/16). On 4 December 2002 this was followed by decisions to make the New Zealand Climate Change Office administratively responsible for projects and to hold the first tender round in financial year 2003/04 (POL Min (02) 21/14).

Following a well attended consultation meeting on 28 January 2003 the main details of the projects tender were agreed by Cabinet on 26 March 2003. These included eligibility requirements, assessment criteria, the nature of the incentive, and making the Secretary for the Environment the decision-maker (POL Min (03) 6/4). The quantum of emission units to be made available (four million) was determined as part of the budget process for the 2003/04 financial year.

A Treasury-led work programme determined how contracts were to be established and risks shared between the project proponent and the Crown. These final aspects were approved by Cabinet on 27 August 2003, just before the tender opened (POL Min (03) 21/7).

⁸ This and following Cabinet paper references are available at:
<http://www.climatechange.govt.nz/resources/>

4. THE PRE-1 TENDER

4.1 The tender cycle

The Climate Change Office implemented the first tender round after details of the round were confirmed by Cabinet. Late June 2003 a Project Team was appointed and preparations made, including finalising the details for the tender round.

A workshop, organised by the Energy Federation, and sponsored by NZCCO on 19 August 2003, was used to provide prospective tenderers with advance information, and gave the Project Team some early feedback and indications of the level of interest. Briefings were held just prior to the tender opening (in Auckland, Wellington and Christchurch on 9, 10 and 11 September 2003) to help proponents with preparing their tenders.

The tender documentation⁹ was completed and made available at the time of the briefings. It consisted of a detailed information document incorporating the application form, and a spreadsheet-based "additionality model" which guided proponents through the financial analysis required to establish additionality and allow the tender to be evaluated.

Tenders were open for a six-week period and closed on 24 October 2003. Immediately after the closing date, all the tenders were registered and a preliminary check was made to identify obvious gaps in the information provided by tenderers.

Applicants' assumptions could then be examined for robustness, and in situations where the assumptions were not considered robust, the applicants were given the option to revise their application rather than have a risk tag attached to the application.

The administration process was designed to achieve a high level of integrity and fairness. All enquiries were logged and responses kept consistent. An addendum to the tender document was sent out to all applicants on 7 October 2003 to

⁹ The tender documentation for each round is available at <http://www.gets.govt.nz> when tenders are open; at other times sample documents are placed at <http://www.climatechange.govt.nz>

ensure that information provided to some tenderers as a response to queries was shared with all.

The PRE-1 Project Team¹⁰ processed the applications from the PRE-1 tender, supported by officials and advice from technical consulting firms. The applications were processed in less than six weeks and the recommendations were considered by an independent Assessment Team of four¹¹.

The Assessment Team met twice, firstly to familiarise themselves with projects and the tender documentation, and secondly to consider the applications and the recommendations from the Project Team. They then delivered their recommendations to the Secretary for the Environment for the final decision.

4.2 Eligibility requirements

The tender documentation set out the requirements for project proposals to be eligible. A project must achieve abatement in New Zealand, of greenhouse gas emissions that are covered by the Kyoto Protocol and counted in New Zealand's greenhouse gas inventory.

Very basic requirements are that the tenderer is the actual owner of the abatement project and that the tender is the only one submitted in relation to a particular project.

The request ratio must be 1:1 or less, ie a project must not request more than one emission unit per tonne of actual CO₂(e) abatement offered in the commitment period.

A project must abate a minimum of 10,000 tonnes CO₂(e) during CP1. During the consultation process and particularly at a 28 January 2003 workshop, NZCCO proposed a size threshold of 100,000 tCO₂(e). Potential proponents made it clear that they would much prefer a smaller threshold, and it was reduced to 10,000 tCO₂(e) in the final rules for the first tender round.

¹⁰ The Project Team was led by Bruce McLean and included Peter Mitchell, Dr Ed Hudson, Gary Milne, Ingrid Saxton and Anna Smith.

¹¹ The Assessment Team comprised Rick Christie (Chair), Hilary Weber, Suzanne Snively and Dr Bill Wakelin.

A size threshold was considered important to ensure projects too small to justify their overhead costs would not be included in the tender. The tender preparation involves some cost, but the main concerns are ongoing monitoring and reporting, and the cost likely to be involved in realising value for the emission units allocated to successful projects.

A project could also be ruled ineligible on the basis of serious, "mission-critical" risks that would make its successful implementation unlikely, at least on the basis of the information supplied. This evaluation was done with the help of independent experts as appropriate for the relevant technology and industry sector.

Firms in the process of negotiating an NGA with the government were not eligible to participate in the tender. Firms considering applying for an NGA, but which had not been invited to negotiate one, were eligible. Also, once an NGA is completed and signed the firm will then be eligible to participate in a project tender. A project may not contribute to the firm's efforts to meet its obligations under the NGA – it must be clearly outside the NGA boundary or additional to the NGA commitments. This restriction was intended to avoid any duplication of incentives between the NGA and a project.

Forest sink activities were not eligible, because a separate incentive programme for afforestation was planned.

Projects are required to be additional. In terms of making this a formal eligibility requirement, the tender information document simply specifies that projects must not be "business as usual" and directs tenderers to complete the additionality model.

4.3 Additionality as applied in the PRE tender

The Contract Team assembled to run the PRE-1 tender included a financial specialist, Dr Ed Hudson. He developed a spreadsheet-based additionality model, used in PRE-1 and (with minor updates) for PRE-2, which addressed both the investment and environmental additionality questions. The model is based to the maximum extent possible on the applicants' own key decision-making criteria rather than official estimates of key variables. It is quite detailed, but relatively

straightforward for applicants to fill in, and avoids asking for any information not strictly relevant to the assessment.

The model takes the tenderer through a stepwise process of describing the abatement and financial profiles for the project, and calculates the core criterion (see 4.4). It applies a number of checks such as ensuring that the request ratio is not more than 1:1 before allowing the user to complete and save the calculation.

The model requires the tenderer to set out a year by year emission profile for the project and for a counterfactual situation in which it is not implemented. For some project types the choice of a plausible counterfactual scenario may be quite complex. The model does not offer detailed guidance on this – it is up to the tenderer to provide a convincing case for the counterfactual that they consider accurately reflects what would happen if their proposal is not implemented.

For abatement that is achieved by offsetting thermal electricity generation on the grid, the quantum of abatement is determined by the mix of generation options that would supply the same marginal quantity of electricity on the grid, in the absence of the project.

Determination of this alternative generation mix is largely a function of the characteristics of the electricity market, and not related to the particular project. Therefore, it was clearly sensible to estimate this on a national level, and require proponents to use a standard assumption (Bode and Michaelova 2001). For the first tender the result of this exercise was a standard emission factor of 600 tCO₂(e) per GWh of electricity (Concept Consulting 2003).

Partly as a result of feedback from potential proponents during consultation, the PRE documentation does not allow for dynamic baselines as a likely feature of PRE projects. The assumption of a static baseline approach is based on the view that it is better to limit the financial risks and provide as much certainty as possible, than to achieve the theoretically greater technical accuracy possible with a dynamic approach.

However, this does not mean that projects will necessarily receive the full quantum of units awarded in the tender – this is contingent on delivery of the full offered abatement. If less abatement is delivered, contracts specify that the allocation of units will be reduced in proportion.

4.4 Assessment criteria

For PRE-1, the main ranking criterion or **core criterion** was defined as the ratio of the number of emission units requested to the reductions from the start of the project to the end of 2012 – thus abatement achieved before 2008 was recognised in the ranking, although it did not determine the award of emission units.

For example, a project might propose to start operation at the beginning of 2005, and abate at an even rate through the eight years to 2012. The maximum number of units it could request is equal to the abatement over the five-year commitment period. With that maximum request its core criterion would be 0.625 which would position it well in comparison to projects with a later start date. It might also be able to improve its ranking chances further by requesting less than the maximum number of units.

Projects for PRE-1 that made a contribution to electricity security were ranked ahead of those that were not electricity related. Within each of these two categories they were ranked by the core criterion. This approach was motivated by government concerns about near-term winter electricity supply security.

Risk was also explicitly considered as part of the assessment procedure. If a project had serious risks identified, which threatened its successful implementation but were not at a level that would make it ineligible, a tag would be placed against it and the assessment team would be asked to consider an adjustment to its ranking.

4.5 Outcomes of first tender

There were 46 applications received in the PRE-1 tender, requesting a total of 15.2 million emission units and offering a total of 15.9 million tonnes of CP1 abatement. Thirteen proposals were considered as contributing to electricity security and were ranked above the other eligible ones. Finally,

the top-ranked 15 were within the budget allocation and were offered project agreements.

The 15 successful project proposals were all energy-related and covered a range of technologies as shown in Table 4.1.

Table 4.1 – Successful projects by type

Project type	Number of projects	Units awarded
Wind	4	1,227,414
Cogeneration	1	1,225,545
Geothermal	1	790,923
Landfill gas	2	382,749
Hydro	5	244,100
Biomass	2	117,978
Total	15	3,988,709

One of the 15 successful projects was withdrawn after the tender, and units were then offered to the next eligible tenderer. Both projects were small and this made no material difference to the allocation.

The successful tenderers all bid at, or very close to, a request ratio of 1:1 so the CP1 abatement that these projects intend to deliver is essentially equal to the number of units to be allocated.

The overall success of this programme was noted when it won both its class and the Supreme Award in the 2004 *BearingPoint* Innovation Awards for innovation in the New Zealand public sector.

5. LESSONS FROM THE PRE-1 TENDER

5.1 Response received

When designing the first tender round, although there was extensive consultation with interested parties, officials did not know what project opportunities existed. While the two early projects were useful guides as to issues that needed to be addressed in designing the tender, they did not provide a guide to the number and quality of proposals that would be submitted. The workshops and feedback from industry did indicate a good level of interest.

Thus the first tender (PRE-1) was exploratory as to the number and quality of projects that would be submitted. The actual applications received were confirmation that the programme is viable and

meant that the tender offer was considered a success by government.

The agreements offered to successful applicants will result in almost all the four million units being used if they all proceed as intended. This is fortuitous. However, significant under-allocation could easily happen if a large project happened to cross the budget boundary, and therefore could not be supported.

In the Assessment Team's judgement, a number of significant applications which were either ineligible or failed to rank in the top 15 would be more likely to succeed if they were further developed and bid into a future tender round. This further increased confidence in the PRE model and contributed to the decision to proceed with PRE-2.

5.2 Additionality and contestability

The information required for the additionality test enabled this part of the eligibility assessment to be performed with reasonable confidence.

However the value of the emission units, at currently-assessed levels of around NZ\$10, only contributed a small proportion of the capital required for a typical project. This means that to meet the investment additionality requirement, a project had to be in a rather narrow band between being economic in its own right (and therefore non-additional) and being uneconomic even with the units. Clearly this means that relatively small shifts in the circumstances of a project could change the result of the additionality assessment.

The approach of running a competitive tender was to deliver the contestability requirement that government set for the selection of projects to ensure value for the units that it supplied. It is considered that the basic approach and tender is inherently contestable, but in the first tender the successful firms sought the full reward in units for the abatement delivered over CP1.

There was little effective competition in terms of proponents adjusting their request ratio to only request the amount required to make their projects proceed, in order to secure an allocation ahead of others. This lack of contestability is a potential

problem because it is the request ratio that delivers value to the Crown in abatement terms.

There were several aspects of the PRE-1 tender that could have reduced competitive tension. In particular, the recognition of pre-2008 abatement in the core criterion that was used meant that the core criterion was driven more by the start date for the project than by the request ratio. Bidders would have seen little point in discounting their requests if, in all probability, this was not going to determine the outcome for them. If they had wished to improve their competitive chances by offering the best possible figure, their best strategy would have been to plan for the earliest possible start. Ultimately this might even be an incentive to offer an overly optimistic timetable for project start-up to secure an allocation.

Ranking electricity-related bids ahead of others would clearly have reduced any pressure perceived by the electricity applicants to make their bids more competitive.

The size of the unit incentive (four million units) may have been perceived by applicants in general as being large relative to the likely supply of projects and hence likely to be under-subscribed. In that case there would have been no need to bid below the level of abatement delivered to be successful.

There is no mechanism for price disclosure in this tender process; consequently an applicant would have had little basis for judgement about what request ratios other tenderers were offering.

In addition, the relatively low value of the units offered, partly because of the then uncertainty about the Protocol entry into force, may have indicated to bidders that they needed to seek the maximum possible number of units.

5.3 Value of emission units

The PRE-1 tender was held when there was uncertainty whether the Kyoto Protocol would enter into force. This uncertainty would have been expected to affect the current value proponents put on the contracts they held, and the cash value they might expect to realise in any early forward sale of the units they received.

After concluding a project agreement for the construction of the Te Apiti wind farm (3.5 above) Meridian Energy realised value for its allocation of emission units by participating in the Emission Reduction Unit Procurement Tender or ERUPT, an emission unit purchase scheme run by the Netherlands Government (SenterNovem 2004). Meridian was successful in the third ERUPT tender held in 2003. The prices paid to individual sellers are not made public, but the average price for this tender was €5.40 per unit.

In ERUPT the Netherlands Government took on most of the risk of the Protocol not entering into force, clearly influencing the average price. Now that this risk is gone, future unit prices may rise, increasing the attractiveness of the PRE programme.

Proponents were asked to make their own judgements about the likely value of emission units as part of the project financial analysis in the additionality model. While there was some variation in the estimates made, particularly by smaller proponents with less market knowledge or resources, the size weighted average was NZ\$11.50 which was in line with the price indications from ERUPT.

5.4 The assessment process

The Assessment Team acknowledged the work of the Project Team, which enabled them to make an informed recommendation to the decision-maker. In addition they were pleased with the range of proposals submitted, noting that some unsuccessful ones in PRE-1 could, with further development, be worthy of support in future rounds. Also, they noted the difficulty of examining the environmental additionality (ie baseline) of landfill gas projects in the absence of a suitable national environmental standard (such a standard came into force in October 2004). They also recognised the possibility of only a portion of the units being allocated if a significant proportion of successful projects in the tender do not proceed.

A very important measure of the success of the programme will be the proportion of projects granted an agreement that are actually completed, and deliver abatement through the commitment period. Projects can also change in size, for

example if land access or resource consents limit the scale of development, so even if they proceed they deliver less than expected abatement.

Clearly with a “lumpy” portfolio including a few very large projects (the largest single PRE-1 project was allocated about 30% of the unit budget) a few changes might make a substantial difference to the final outcome. It is too early to determine what the likely outcome will be for PRE-1, although the two early wind farm projects are in place and proceeding as expected.

5.5 Sectoral spread and the supply of eligible projects

The intention to rank projects which contributed to electricity security ahead of others appears to have been a significant disincentive to potential bidders in other sectors. This may have been driven by perception as much as reality. Anecdotal indications are that a number of possible proponents outside the electricity sector did not consider participating because of this feature of the tender. This is in spite of the fact that some of their projects did in fact have electricity benefits, albeit indirect, and would have been ranked accordingly. Their perception was that only power generation projects would succeed.

Also, most power generation companies have a history of engagement with climate change issues and an in-house understanding of the market for emission units, as well as the incentive to have a portfolio of new generation options in various stages of development. It is to be expected that other sectors like agriculture or transport may take longer to develop proposals.

Another restricting factor is that the PRE-1 core criterion potentially disadvantaged larger proposals, in any sector, because these can be expected to take longer to begin operation.

Changes subsequently made for the PRE-2 tender (see 7.1 below) have addressed these issues to the extent that they were related to the design of the tender.

For renewable energy projects, it is relatively straightforward to measure the key indicators of abatement (GWh of generation and any associated

emissions). More dispersed actions such as on-farm emissions abatement or energy efficiency investments may incur such high monitoring and reporting costs that the value of the incentive is substantially offset by these costs. Such proposals may also be more difficult to test for additionality.

In spite of these factors, it is important that the programme extends into other sectors over time to support a broad range of abatement activities and maximise its contribution to reducing emissions in New Zealand. Also, once the emission charge is in place, renewable electricity generation will have the benefit of the price differential created by the charge. More renewable generation projects will become business as usual.

6. INTERNATIONAL ISSUES

6.1 The Kyoto Protocol today

The PRE programme, along with other price-based measures, has been operated on a conditional basis ahead of the Kyoto Protocol entering into force. The uncertainty created by this situation was an issue for the programme participants in the initial tender as outlined above.

Since the PRE programme was started, developments outside of the Kyoto framework have given important indications about the future of greenhouse abatement policies. The European Union responded to the uncertainty about the Protocol entering into force by deciding to proceed with an internal emission trading scheme (see 6.2 below) with links to Kyoto mechanisms but not dependent on the Protocol entering into force.

The Australian Government, while not yet agreeing to ratify the Protocol, has a wide range of emission abatement policies including GGAP and the Mandatory Renewable Energy Target (MRET) scheme. Emission trading regimes have also been considered at the state level in Australia. An abatement certificate scheme has been in place for the New South Wales electricity sector from January 2003 (New South Wales Government 2004).

In North America, a number of US state and Canadian provincial governments have proposed a cross-border emission trading scheme. The

McCain-Lieberman Bill proposed that the United States Congress approve a national cap-and-trade scheme, and although this did not pass it achieved significant bipartisan support.

These and other activities indicated that taking action to reduce greenhouse gas emissions, and particularly the use of economic instruments to achieve gains in emission management, was an international trend that was not totally reliant upon the Protocol.

Since the Russian Federation ratified the Protocol, ensuring that it would come into force, the underlying uncertainties around the existence and value of emission units and the PRE programme have been removed. Investment decisions affected by the future cost of emissions may be made in a more stable environment over the next few years.

6.2 The market for emission units

Project proponents ultimately need to sell their emission units, either directly upon receipt, or more likely earlier by way of a forward contract. The demand for units within New Zealand will be limited, because the proposed economic instrument is an emission charge rather than emissions trading (although that remains an option). There may be some demand from NGA firms wishing to supplement their own efforts to meet their commitments, but this is likely to be relatively small. The majority of firms with project agreements will have to sell their emission units internationally.

Uncertainty over the entry into force of the Protocol has delayed the development of emission unit markets until recently. The Netherlands Government ERUPT scheme is an example of a government seeking to purchase project-based units from offshore to complement its domestic abatement actions and enable it to meet its Protocol obligations. An emissions trading cooperation agreement was also signed in August 2004 between the Netherlands and New Zealand Governments to help facilitate the market for New Zealand project units.

Other European governments such as Denmark and Austria are planning or implementing similar project unit purchase schemes, using both the JI and CDM provisions of the Protocol. The Danish

Government is implementing a one billion Danish Krone (NZ\$250 million) purchase programme (Danish EPA 2004).

Another potential market for project units would involve linking to an international emission trading scheme and selling units directly to entities (eg power companies or other heavy industries) that need units to cover their emissions.

The European Union has established an internal **emission trading scheme (ETS)** independently of the Protocol. The ETS covers a high proportion of industrial and energy sector emission sources, and began trading from January 2005. This scheme uses its own emission trading units or **allowances**, with domestic governments retaining the Kyoto Protocol units for national compliance.

Participants in the European Union ETS will be able to purchase ERUs and CERs under the terms of a "linking directive" adopted by the European Parliament in April 2004¹².

Other Annex B countries (Japan and Canada being the most significant) that have ratified the Protocol are likely to establish emission trading regimes as well, although they have not done so ahead of its entry into force. They will also have the option of accepting project-based reductions derived from outside their own borders.

The government has already assisted Meridian Energy to forward sell units from its (early) project agreement by providing letters of endorsement and approval for their participation in the ERUPT tender. The government is also taking action to assist with the marketing of New Zealand project-based units to schemes like ERUPT, and linking to overseas emissions trading programmes like the EU ETS.

7. THE WAY FORWARD

7.1 The PRE-2 tender

The second tender has been carried out on a similar timeframe to the first one, through late 2004. Overall the tender process was the same as for the first round, but a number of changes were made to

¹² Details of the ETS and the linking directive are at <http://europa.eu.int/comm/environment/climat/emission.htm>

build on the experience of the first round and to improve aspects of the tender mechanism.

The total allocation of emission units was increased to six million for PRE-2. This change was made partly on the basis of the experience of the first tender, particularly the possibility that a number of projects that were unsuccessful or ineligible in PRE-1 may well be developed to the point of being successful in the future.

The eligibility criteria include a requirement for a "no double dipping" principle such that firms that have an NGA cannot use support from the PRE programme to help in meeting their NGA commitments. In the first tender, firms in the process of negotiating an NGA could not participate at all. Starting with the second tender, if there are clearly defined activities or parts of the firm that are not covered by the NGA application, or are deemed ineligible for NGA coverage, then projects relating to these activities can be submitted into a tender round.

The ranking criterion and process used in the first tender were adapted in two respects to bring projects forward and to meet the government's aim of achieving a contribution to electricity security before 2008. These were the use of a core criterion that recognised pre-2008 abatement, and the explicit re-ranking of projects that contributed to electricity security ahead of those that were unrelated to electricity.

Both of these features were removed for the second tender round. The core criterion is now the request ratio, or ratio of the number of emission units requested to the abatement offered in the first commitment period (2008 to 2012 inclusive). As in the first round, projects are eligible only if this ratio is 1:1 or less.

The request ratio is an indication of the impact of a project on New Zealand's eventual net emissions position for CP1. It is the measure of the value of a project to the Crown, and therefore has always been the measure on which the Crown would wish to have projects compete for a limited budget allocation of units.

In PRE-1 this competitive aspect of the tender process was obscured by the recognition of pre-

2008 abatement. For the PRE-2 tender this mixed signal has been removed, along with any possible incentive to offer an over-optimistic timetable for implementation of a project.

The electricity emission factor has been revised to 625 tCO₂/GWh, after a review to take into account changes in the electricity market since the first tender (Concept Consulting 2004).

7.2 PRE programme beyond the current tender round

Large scale projects can often take three to four years to get up and running, especially if resource consents and land access are not both secured in advance. As further PRE tenders are held closer to 2008, projects will not be able to be implemented before the start of CP1. This means that the available crediting period will be less than five years. Consequently the ability to allocate emission units for a second commitment period will soon become an important issue for the ongoing viability of this type of programme.

Annex B countries have agreed to a "commitment period reserve" which limits the amount by which they will draw down their reserves of emission units during CP1. Essentially this means that New Zealand will be required to maintain enough units at any time to be able to meet 90% of its requirements to cover emissions. Whether this limitation has any impact on the supply of units that could be used for projects will depend on the overall net position through CP1.

The supply of eligible projects will also be a consideration in deciding the unit budgets for future tender rounds.

The prices that have been paid to date for project-backed emission units have reflected uncertainty about the Protocol entering into force and about the likely demand. If higher prices emerge from this market once the Protocol is in force, this programme will become much more attractive to proponents and potentially attract a wider range of projects. The additionality assessment will also be easier as the value of units will make a greater difference to the viability of a project.

8. CONCLUSIONS

The New Zealand Government's Projects to Reduce Emissions initiative has been strongly supported by New Zealand industry, particularly the electricity generation sector, as exhibited in the first round of projects in 2003.

The emphasis on electricity-related projects as part of the assessment in PRE-1 may have reduced the supply of eligible projects outside the electricity sector. This has been addressed for the second tender round (PRE-2) in 2004.

Contestability of the tender was obscured in the first round because of the emphasis on electricity issues and the recognition of early abatement in the ranking criterion that was used. The government has revised the core criterion and simplified the ranking to ensure greater contestability for the second tender.

The uncertainty associated with ratification of the Kyoto Protocol was a significant factor for this programme through the first tender round and up to the second round. The entry into force of the Protocol should ensure that the PRE initiative achieves increased viability and commercial interest in the future.

The government offered an increased budget allocation of six million emission units for PRE-2. The crediting period for projects is still the five years of the first commitment period, as for PRE-1.

The two projects tenders and the two early projects represent the earliest direct action by the government to manage New Zealand's greenhouse emissions for CP1 and beyond. Along with the other price-based and other measures this programme will be a real platform for change and for meeting New Zealand's international commitments.

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Bill Wakelin has a BE Hons and ME(Chem) and then completed a DPhil at Oxford University between 1964–67 following the award of a Rhodes Scholarship. Following five years' experience as a process and project engineer in the UK he returned to New Zealand in 1972. His career has been largely based on process and in particular waste water engineering and he has been a Director of the University of Canterbury Centre for Advanced Engineering. Bill was part of the four person independent assessment team for the first Projects to Reduce Emissions tender.

