

New Zealand's Innovative Approach to Emissions Trading for Addressing Global Climate Change

by J. David Mobley and Phil Gurnsey

The New Zealand government is committed to creating an economy and a way of life that are environmentally sustainable. Helen Clark, New Zealand's Prime Minister, has stated, "I believe that the pride New Zealand takes in its quest for sustainability and carbon neutrality will come to define our nation in the 21st century"¹ and "I want sustainability to be central to New Zealand's unique national identity."² These statements summarize the direction of New Zealand's response to the issues of climate change and sustainability.

Note: New Zealand's legislation and regulations relative to its Emissions Trading Scheme were still in the proposal stage at the time of publication.

The New Zealand government believes its country can become the world's first truly sustainable nation and has signaled its aspiration for New Zealand to be carbon neutral over time. To achieve these goals, the government has established the following objectives:²

- Carbon neutral in the electricity sector by 2025
- Carbon neutral in the stationary energy sector by 2030
- Carbon neutral in the transport sector by 2040
- Carbon neutral in the total energy sector by 2040

The New Zealand government's climate change and sustainability agenda is presented in more detail in *New Zealand's Climate Change Solutions*² and in the *Framework for a New Zealand Emissions Trading Scheme*,³ both available at www.climatechange.govt.nz.

This article focuses on the government's proposed Emissions Trading Scheme, which would serve as an integral part of New Zealand's approach to achieving its sustainability goals and meeting its commitments under the Kyoto Protocol.⁴

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Background on New Zealand

New Zealand's total greenhouse gas (GHG) emissions are small from a global perspective—less than 0.3% of global emissions, an amount in line with its population.⁴ Nevertheless, on a per-capita basis in 2005, New Zealand had the 12th highest GHG emissions in the industrialized world.³ Moreover, New Zealand's emissions level is forecast to grow as the population and economy grow.⁵

New Zealand does not have the typical GHG emissions profile of a developed country. Figure 1 shows the contribution by GHG in 2006 in carbon dioxide-equivalent (CO₂eq) units.⁶ Although almost 50% of the contribution is from CO₂, this is much lower than most industrialized countries. Methane (CH₄) and nitrous oxide (N₂O) also comprise approximately 50%, which is much higher than most industrialized countries. Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) are relatively insignificant in their contribution.

Figure 2 shows the contribution by major source category in 2006 in CO₂eq units.⁶ New Zealand's energy sector contributes 44% of total emissions, which is low relative to other developed countries that average 85%. Approximately 70% of New Zealand's electricity is generated from renewable sources, such as hydro, geothermal, wind, solar, biogas, and wood.² Figure 2 also shows the emissions from the energy sector due to fuel combustion in 2006 in CO₂eq units.⁶ Emissions from transport accounted for 42% of energy emissions, while energy

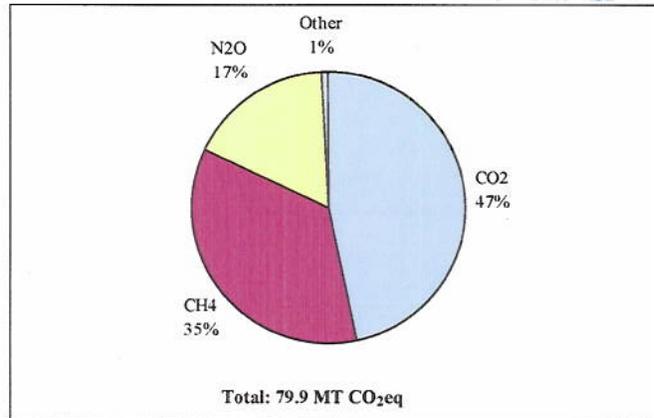


Figure 1. New Zealand's GHG emissions in 2006 (in CO₂eq).

industries (e.g., electricity generation) and manufacturing industries accounted for approximately 28% and 15%, respectively.⁶ Nearly 50% of New Zealand's GHG emissions result from agriculture, much higher than other developed countries, which average approximately 7%. The New Zealand emissions profile is more akin to the emissions profiles of many South American countries.

In addition, Figure 2 shows that the contribution from the agricultural sector is primarily from enteric fermentation (from sheep and cows) and agricultural soils. Agriculture and forestry constitute the biggest land use in New Zealand. Of New Zealand's total land area, 39% is in pasture

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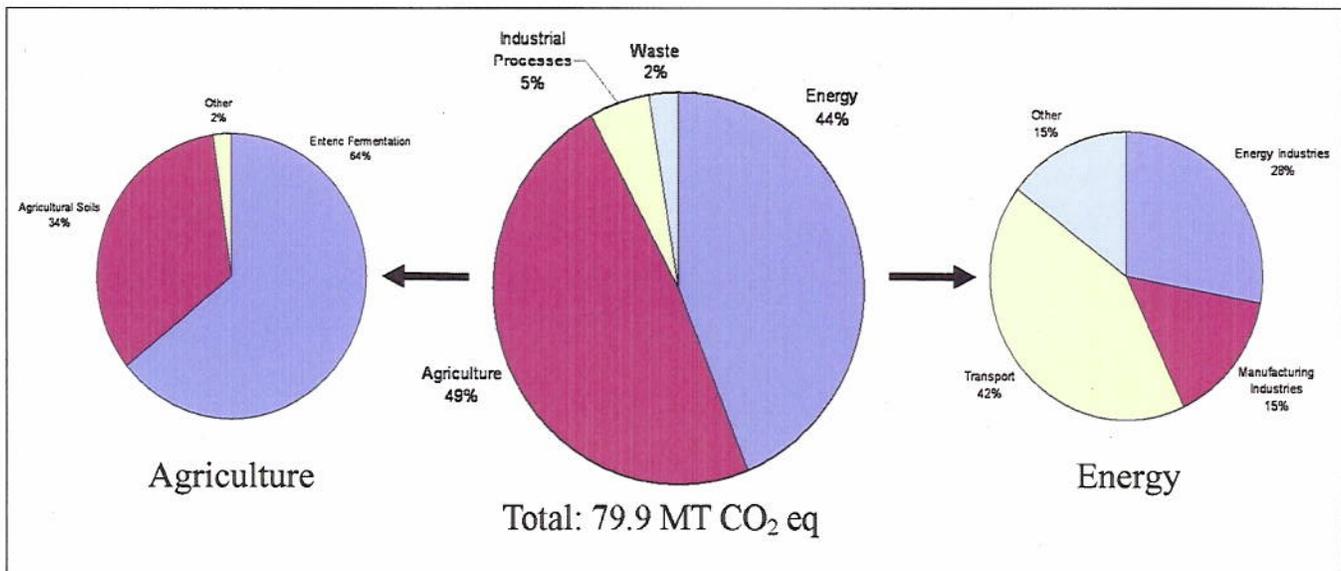


Figure 2. New Zealand's GHG emissions in 2006, by sector (in CO₂eq).

and 6.6% is in planted production forest. New Zealand's timber industry is now based almost entirely on planted production forests.

Between 2008 and 2012 (the first commitment period under the Kyoto Protocol), New Zealand has assumed an obligation under the Kyoto Protocol to cap emissions at 1990 levels. In 2006, emissions are 26% higher than the 1990 level.⁶ Further, under a business as usual emission scenario,

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New Zealand's emissions are projected to increase significantly. This growth in emissions is the product of a broad range of economic activities. Thus, the government decided that a correspondingly broad-based economic measure, based on pricing of carbon-equivalent emissions and covering all types GHGs in all economic sectors, was needed to implement the GHG reduction strategy.³

Emissions Trading Scheme

The government has proposed a bill before the Parliament that would provide for New Zealand to use an emissions trading scheme as its core price-based measure for reducing GHG emissions and enhancing forest carbon sinks. The New Zealand Emissions Trading Scheme (NZ ETS) will operate alongside other policies and measures to reduce domestic emissions and achieve New Zealand's broader sustainability objectives. The government has stated that the objective of the NZ ETS will be "to reduce [GHG] emissions by reducing New Zealand's net emissions below business-as-usual levels and complying with our international obligations, including our Kyoto Protocol obligations, while maintaining economic flexibility, equity, and environmental

integrity at least cost in the long term."⁴

The following core design features of the NZ ETS have been proposed:³

- A New Zealand Unit (NZU) will be the primary domestic unit of trade (e.g., currency). For the first commitment period, NZUs will be fully fungible with Kyoto units.
- The NZ ETS will involve an annual obligation on participants to hold NZUs that match the emissions levels for which they are responsible. A limited number of NZUs will be issued each year, and the scheme will operate within the global cap on emissions set by the Kyoto Protocol.
- The NZ ETS will, over time, include all major sectors (i.e., forestry, transport, stationary energy, industrial processes, agriculture, and waste) and the six GHGs (CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆) specified in the Kyoto Protocol.
- The NZ ETS will allow both sales to, and purchases from, international Kyoto trading markets.
- The NZ ETS is designed to be adaptable to the future evolution of the international climate change policy framework.

Figure 3 sets out the government's proposed pathway for introducing various sectors into the NZ ETS.³ Draft regulations have been proposed for the forestry⁷ and liquid fossil fuel sectors.⁸ It is significant that forestry is the first sector to enter the scheme as New Zealand is the first country to include both forestry liabilities and credits in their emissions trading program. This action is aimed at reducing emissions from deforestation in New Zealand and encouraging afforestation. The forestry sector is unique in that landowners can bring forward their deforestation activities in time; furthermore, the Kyoto Protocol recognizes net carbon removals from post-1989 afforestation that accrue starting on January 1, 2008. For these reasons, the forestry sector

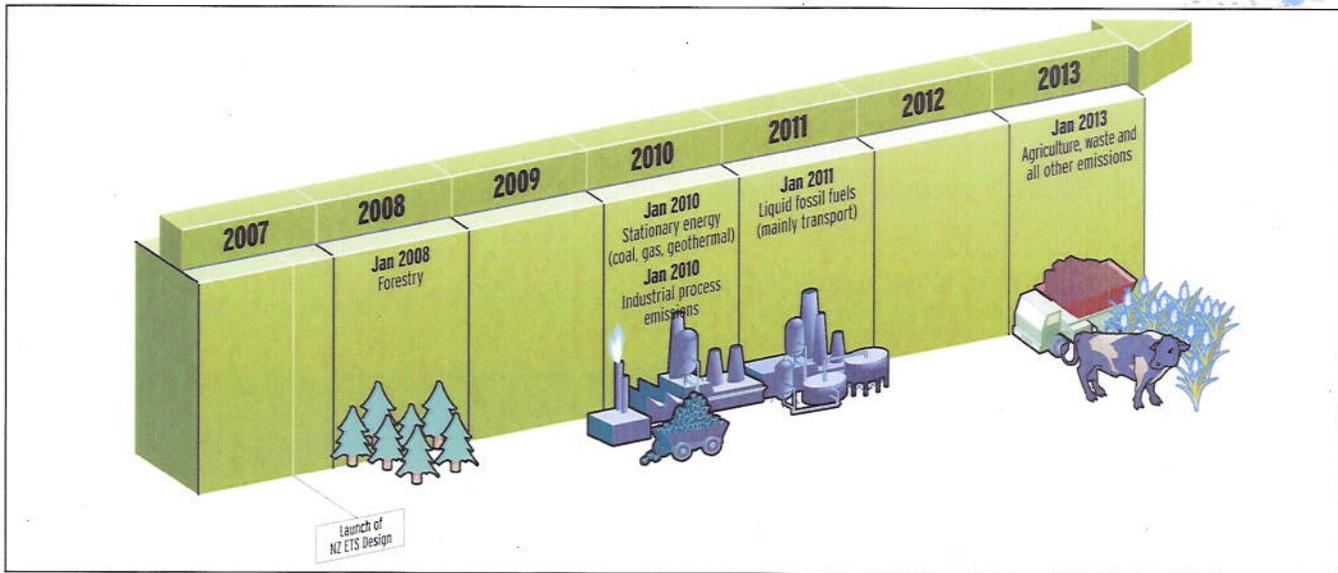


Figure 3. Timeline for the entry of sectors into the NZ ETS.

will be the first sector to enter the proposed scheme. Upon entry into the scheme, all sectors will assume the obligation to surrender NZUs on an annual basis to match emissions, as well as comply with monitoring and reporting provisions. Participants from the post-1990 forestry sector will also be able to earn credits as their trees grow.

Procedures for monitoring, reporting, and verifying emissions are still evolving. However, emission calculation procedures for the forestry and transport sectors will be prescribed in the final regulations and rely on the general emissions equation:^{7,8}

$$\text{Emissions} = (\text{Activity Indicator}) \times (\text{Emission Factor}) \quad (1)$$

In the case of forestry, the *activity indicator* is hectares of “deforested” land; in the case of liquid fossil fuels, the *activity indicator* is liters of the applicable fuels. Emission factors are provided for different tree species by geographic region to account for temperature and rainfall effects, as well as for 10 fuel types. The emission factors are composites across all relevant GHGs for the source category based on the equivalent CO₂ Global Warming Potentials, as specified by the Intergovernmental Panel on Climate Change.⁹ For example, the liquid fossil fuel emission factors are composites of CO₂, CH₄, and N₂O emissions factors in CO₂eq units. It is anticipated that these factors will be relatively stable and that a consistent methodology for estimating emissions will provide an unbiased estimate of emissions for all participants. A procedure for approving unique emission factors is anticipated, and emission factors are to be reviewed periodically. Consistent with the basis of emissions trading under the Kyoto Protocol, the level of confidence in emission estimates and emission factors is assumed to be sufficient across source categories (even though uncertainty varies) to support emissions trading across source categories. The compliance regime follows a self-assessment

model, which requires participants to submit annual emission returns and retain information records. The government will have the ability to audit the compliance of emission returns, and to impose penalties for noncompliance.

The desired impact of the NZ ETS will be to change investment and consumption behaviors by integrating a

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price for emissions into decision-making by producers and consumers. The result should be a progressive shift in the economy and lifestyle toward consuming, using, and investing in goods and services with lower GHG emissions.³

Conclusions

By engaging all sectors in the economy in its Emissions Trading Scheme, New Zealand is embarking on an innovative approach to emissions trading to achieve its global climate and sustainability objectives. The scheme will support the government's existing sustainability and climate change initiatives by making it more expensive to behave in ways that increase emissions while making it relatively cheaper to behave in ways that reduce emissions.² It will be interesting and informative to follow the evolution and impact of the New Zealand Emission Trading Scheme and its role in achieving these objectives. Of particular interest will be:

- the cost and benefits to the New Zealand economy along with public, business, and political acceptance of the strategy;
- the reduction in New Zealand's emissions versus the purchase of credits on the international market;
- the linking of the scheme to the international carbon market and potentially on a bilateral basis with other domestic emissions trading schemes;
- the effect in trading across GHGs and source categories;
- the level of participation of the forestry and agriculture sectors in the emissions trading program;
- the stability of emission factors and the impact of the uncertainty of emission factors on trading;

- the role of verification and compliance procedures; and
- the future development of the scheme as the international policy framework continues to evolve.

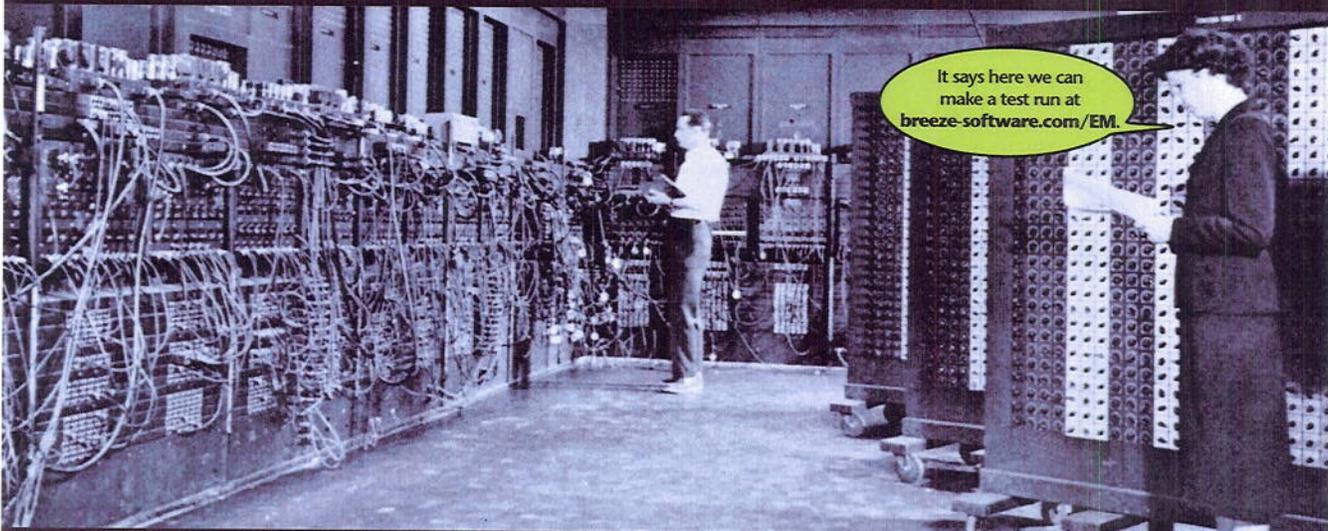
The experience in New Zealand should be of great benefit to other countries as they address the issues of climate change and sustainability. It will potentially place New Zealand at the forefront to take advantage of the global carbon market.

Disclaimer: EPA supported the research described here, and it has been subjected to agency review and approved for publication. **em**

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