

Concentrations of greenhouse gases (GHGs) in the atmosphere have increased to unprecedented levels and continue to rise. Consequences of this increase in GHG's are uncertain, but it is likely that there will be less predictable, more frequent and more severe weather events. Despite the debate about the causal relationship between GHG's and climate change there are global initiatives such as the Kyoto Protocol to reduce GHG's.

Greenhouse gases, climate change and the Kyoto Protocol will affect the business environment in many ways. The bio-based industries as users of energy and, with weather-dependent production systems, are particularly exposed to these global changes.

This newsletter looks at some of the risks and opportunities for your business.

Greenhouse gases in NZ

NZ currently produces 80 M tonnes carbon dioxide equivalent emissions each year. This is a measure based upon volume of the gas in million tonnes and its global warming potential (GWP)¹. NZ emissions represent a very small fraction of the global emissions, but are rising. NZ has increased total greenhouse gas emissions by 22% since 1990, with notable increases in:

- Methane (CH₄) from dairy (65% increase),
- Carbon dioxide (CO₂) emissions from transport (61% increase), and
- Emissions from electricity generation (58%)

NZ has an unusual emission profile with a high contribution of agriculture, which presents some unique challenges.

NZ implementation of Kyoto

NZ has ratified the Kyoto Protocol, an inter-governmental agreement that recognises the effect of GHGs on climate change and commits governments to reductions in their levels. New Zealand has made a commitment to initially return GHG emissions to 1990 levels, and move towards a permanent downward path for total gross emissions by 2012. To this end a package of policies has been implemented.

The government policy package aims to reduce 'business as usual' GHG emissions but will still leave NZ with emissions in excess of the Kyoto Protocol target by 62 million tonnes carbon dioxide equivalent.

Policy Package

1. Price based measures

¹ For example the GWP for carbon dioxide is 1, and for methane and nitrous oxide it is 21 and 310 respectively.

The key component of the price-based measures is an **emissions charge** on emissions of GHG's. This will be set at the world price for carbon but capped at NZ\$25 per tonne of carbon dioxide equivalent. It is not to be introduced before 2007 and would apply across all sectors of NZ with varying impacts.

Some of these impacts are shown in Table 1. At \$10/t residential customers might anticipate paying up to 5% more for transport fuels, electricity and gas. If the world price rises to the cap of \$25 rises would be nearer 10%. Industry could expect to see higher rises, from 5-10% at \$10/t and up to 25% at \$25/t. Coal would be hardest hit across the board, with rises over 40%.

Table 1: Estimated price increases resulting from emissions charge

	NZ\$10/t CO2 equivalent		NZ\$25/t CO2 equivalent	
	Residential	Industrial	Residential	Industrial
Petrol	3c/l (3%)	NA	6c/l (6%)	NA
Diesel	3c/l (5%)	NA	7c/l (12%)	NA
Electricity	4%	6%	9%	16%
Gas	3%	9%	8%	24%
Coal	8%	17%	19%	44%

Source: Climate Change: The Government's Preferred Policy Package. A Discussion Document, April 2002. Note that energy prices have changed since this document was released.

2. Non price-based measures

The competitiveness of some energy-intensive companies is considered to be 'at risk' should they be subjected to the carbon charge so some alternative options are proposed.

The **Negotiated Greenhouse Agreements** mechanism enables some companies to be exempted from some or all of the charge in exchange for adopting a pathway to world's best practice in emissions management. It recognizes that global GHG emissions will not be reduced if industries relocate to other countries where there are higher emissions per unit of production.

There have also been sector-specific negotiations. Emissions of ruminant methane for example have been exempted from the emissions charge. A proposed agriculture research levy was withdrawn when government and industry agreed an **agricultural research** programme on methane and nitrous oxide would be implemented. A package has also been proposed with the **forest sector** that contains policies and programmes relating to transport, bioenergy, forest management and health, labour, skills, and market access. The wider scope recognizes the economic and environmental value of the entire industry to New Zealand.

The **Projects** mechanism encourages the reduction of greenhouse gas emissions and hence reduces exposure to the carbon charge. Abatement options include increasing the use of renewable energy, improving energy efficiency, and fuel switching. Projects are rewarded with a promise from the Government of emission units that have a value and can be traded internationally.

The Projects mechanism may be particularly suitable for bio-based industries. There may be renewable energy options that can be integrated with other parts of the business.

Projects approved so far include wind farms, cogeneration, bioenergy, landfill gas, small hydro, geothermal, existing hydro enhancements and industrial heat plants. Together they could achieve up to 365 MW of additional electricity generation capacity, equivalent to about 2 years of growth in electricity demand.

New Zealand's Balance Sheet

New Zealand's balance sheet for GHG's is shown in Table 2. This shows New Zealand having a surplus of credits i.e. we will both reduce our output and absorb more CO₂ than we generate. The latter is based on forests sequestering 95 Mt CO₂, leaving a surplus of 33 Mt CO₂.

This surplus should not be taken as a cause for complacency. The forecast surplus has been shrinking by, for example the current combination of increasing dairy conversions and deforestation, and decreasing afforestation rates. Of longer term significance is that forest sinks are not a long-term option unless the biomass is used for fossil fuel substitution.

Table 2: Estimated Kyoto Balance Sheet over the period (2008-2012)

	Impact	M tonnes CO ₂ equivalent
Predicted	NZ total projected emissions 2008 - 2012	399 ²
Less	NZ assigned amount under Kyoto (adjusted for Emission units allocated to Projects)	298
Subtotal	Assigned amount balance	-101
Add	Total Impact of Policies and Projects to reduce emissions	39
Subtotal	Excess emissions over assigned amount	-62
Add	Total sink credits 2008 to 2012 from forests	95
	Sink credits	33

Impacts on your business

Climate change, its weather-related impacts and responses to it will affect our entire business environment. You may identify possible impacts and response options by asking yourself questions such as:

- How can weather affect your operations? Are you vulnerable to flooding, drought, temperature extremes or storms? Can you minimise risks by engineering works, moving location (perhaps undercover), and securing reliable supplies of essential resources?
- How critical is energy to your operations? How would a carbon charge affect your profitability or viability? Can you afford to have disruptions to your power or fuel supply?
- What energy services do you require and what fuels do you use to meet them? Can you reduce energy intensity or meet demands more efficiently? Do you have an accessible market for energy products and services?
- Can you claim carbon credits or are you liable for debits?

The Projects mechanism mentioned above may present an opportunity to manage some of these impacts. Some options may include:

- Solar panels that can provide hot water or electricity, as part of or on top of roofs and other shelters.
- Hydro-power that may be generated as part of a water supply or irrigation scheme.

² Of this amount 201 Mt relates to agriculture

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- Biomass that can be used directly to provide heat and power or converted to a variety of intermediate solid, liquid or gaseous biofuels depending on the nature of the resource. Bioenergy is the most widely used renewable source of energy in the world today, often using a waste stream as the feedstock.

Some of these options may involve existing or readily available technology while for other businesses a significant innovative advance may be needed to meet a more carbon efficient future.

If you have any queries or comments please feel free to contact us.