

Electricity spot prices have crept up over the past three months in response to winter cold and below-average hydro storage levels. For the first three weeks of July, the average spot price was 7.2 cents per kWh, up from a monthly average of 6.8c per kWh in June and from 6.9c per kWh in July last year.

The higher prices reflected the impact of national temperatures which were below seasonal norms during June and July, and a drier winter than usual in some hydro catchments, most notably Manapouri and Waitaki. Prices spiked above 11c per kWh when heavy snow fell in parts of Otago and Southland during June.

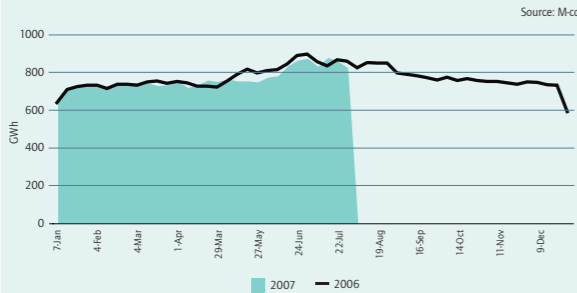
So far this year, national temperatures have been particularly volatile. A sudden cold snap in mid April sent electricity demand over four days to a level 9% higher than the comparable days in 2006. This was followed by May temperatures that were among the warmest on record for this month. From the start of 2007 till late July, cumulative demand was up only 0.7% from the previous corresponding period. Winter did arrive, however, in June and by late July, weekly demand was running at 1% or more above 2006 levels.

By this time also, national hydro storage was only 75% of its seasonal average due to persistently below-average inflows. Indeed, national storage has been below long-term average levels since February – and below 2006 levels since April. (Last year, there was a rapid reversal in the winter power supply outlook when rainfall in late April and May replenished hydro levels which had been well down until that time). This year, inflow and storage levels at Pukaki and Tekapo (the Waitaki lakes) have been below seasonal average since mid February, and below 2006 since April.

The national supply situation this year has been supported by first generation at E3p, the new combined cycle gas turbine plant at Huntly. Commissioning of the 385 MW plant began in February and is due to be fully completed this winter. E3p has been supplying power to the National Grid at intervals during the commissioning process.

Electricity Demand

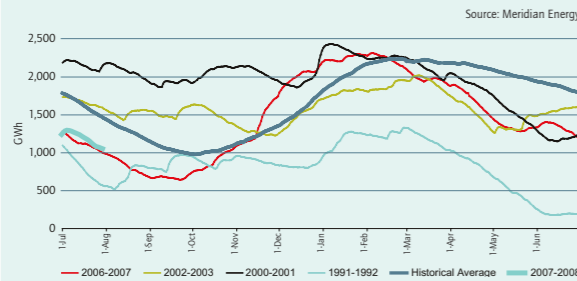
Demand continues to rise at rates near 1% per annum. However, there has been significant volatility in weekly demand figures so far in 2007. During the first 30 weeks of this calendar year, there were 12 in which demand was actually down on the comparable week in 2006. This largely reflected a warmer than usual start to winter (despite some early snowfalls in the South Island during April).



Hydro Conditions

The National hydro inflows and storage levels largely reflect the position at Lakes Pukaki and Tekapo. Storage in the Waitaki lakes has been below seasonal average since mid February 2007, and below 2006 since April.

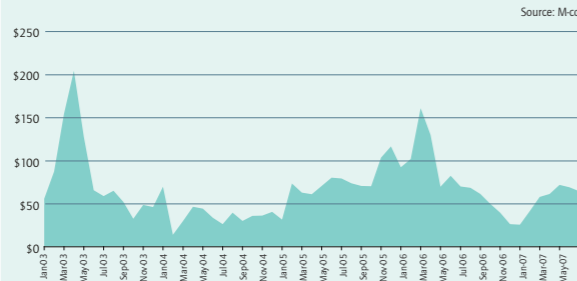
Pukaki + Tekapo Storage [GWh] up to 1 November 2006



Spot Prices

Spot prices this winter have been in much the same territory as winter 2006. The June average of prices at the Haywards reference point was 6.9 cents per kWh, compared with 8c per kWh in the corresponding month of last year. Prices eased back during July to finish the month around 6c (compared with 7c in July 2006). Overall, prices crept up through the first half of this calendar year from particularly low levels last summer (December average at Haywards was just 2c).

Monthly Average Spot Price at Haywards



The New Zealand Wine Company says being carbon neutral is good business – and fast growing export sales volumes certainly give proof to this.

The Marlborough wine producer attained CarboNZero™ certification last August, building on an already-strong reputation for environmental sustainability in its vineyard and winery operations. The New Zealand Wine Company may be the first carbon neutral wine producer in the world and the CarboNZero™ mark will appear on the labels of its award-winning Sanctuary and Grove Mill wines from the 2006 vintage onwards.

European and North American wine distributors are toasting the company's success with substantially increased orders. Indeed, The New Zealand Wine Company is set to substantially increase its annual sales volume to Sainsburys, the UK supermarket chain, and has a new agreement with its US distributor that could also double exports of Marlborough Sauvignon Blanc into that market.

"Wine drinkers in these markets show increasing appreciation of the quality of our wines," says Chief Executive Rob White. "Being carbon neutral gives further endorsement to that quality and also signals very clearly to people that they are consuming an environmentally sustainable product. That is a very powerful position for Grove Mill, Sanctuary, and other labels we will develop in particular markets."

Sainsburys is keen to build on its 10 year-long supply arrangements with The New Zealand Wine Company by adding a Sanctuary Pinot Gris and a house-brand Marlborough Sauvignon Blanc to its range, all under a "taste the difference" marketing line. Mr White says the supermarket chain is in no doubt about the significance of CarboNZero™ in the UK market which accounts for 40% of The New Zealand Wine Company's sales volume (exports are 80% of total production).

Landcare

Landcare Research gave the certification after the company completed a rigorous process of measuring its carbon footprint, managing down carbon emissions associated with its business, and then offsetting those emissions which were unavoidable with carbon credit purchases. The process was applied – and

subject to independent audit – for the year ended 30 June 2006. The New Zealand Wine Company is now committed to ongoing reduction in its carbon footprint through energy efficiency measures, astute management of its daily operations and selection of business partners who share the same focus on environmental sustainability.

The New Zealand Wine Company found that, in fact, around half of its emissions were accrued in the shipping of product to export markets. Next most significant were emissions associated with the company's electricity consumption for irrigation and winery operations, followed by its use of diesel and other fossil fuels for transport. The company's systems analyst, Roger Kerrison, gathered and analysed data in each area of the business – and many other staff members had a contribution to managing down the carbon footprint.

"We couldn't do much about emissions in the global shipping industry but we could devise better ways to package our wine and use less container space. That made a useful contribution," says Mr Kerrison. The company was already making strides on energy efficiency, through full insulation of its winery and warehouse and through heat recovery from refrigeration plant. The insulation has eliminated the need for any additional energy to cool or warm buildings where wine is stored, while the recovered heat is used for warming wine to the precise temperature required in the bottling process.

Efficiencies

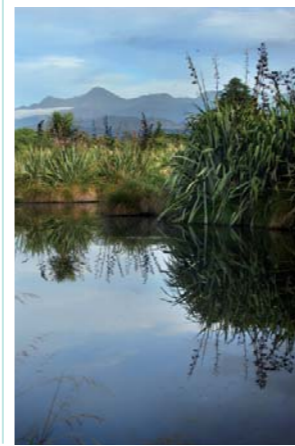
The New Zealand Wine Company has cut its power usage substantially in relative terms. For the 2005-06 year, electricity consumed in growing and processing each tonne of grapes into final form (bottled wine) was down to 128 kWh – a reduction of 28% in comparison with the 2003-04 year. Over the same period, the tonnage of grapes entering the winery was up 76%. Major efficiency gains were achieved while production volume rose sharply.

The company will be further assisted in reducing emissions associated with electricity usage by becoming a Meridian Energy customer. CarboNZero™ certification on its electricity means The New Zealand Wine Company gets the benefit of having no emissions at all in this area of its emissions measurement.

Mr Kerrison says recycling makes a major contribution, including the re-use of waste water from the winery for vineyard irrigation and the application of waste grape skins as an organic fertiliser. With the various measures in place, the company ended 2005-06 with unavoidable emissions totalling 312 tonnes of CO₂ equivalent – a volume that required offsetting with carbon credits. These were purchased through the Landcare Research-organised EBEX21 exchange. The credits came from a native forest regeneration project on former pasture land in the Marlborough Sounds.

Mr White says the business benefits of being CarboNZero™ are potentially substantial, in terms of both brand value and operational cost savings. CarboNZero™ certification is another step along the path reflected in the New Zealand Company vision: "To build successful premium New Zealand wine brands globally through environmentally sustainable business practices".

Over the past 10 years, the Sanctuary, Grove Mill and Frog Haven brands have been developed around this concern with the environment, expressed in large part through investment in wildlife habitat restoration on wetlands adjacent to its principal vineyard at Grovetown, Marlborough. As Mr White points out, this project and all other initiatives that are now reflected in carbon neutrality are also highly compatible with being a public company listed on the NZAX market.



2006

We value your feedback. To get in touch please either call your Account Manager on 0800 496 888, or email us at meridianreport@meridianenergy.co.nz

This newsletter has been printed on chlorine free paper using vegetable oil based inks.

MERIDIAN REPORT

Your energy point of difference



NZ moving in the right energy direction

In the world today there's a fundamental shift occurring in how people think about energy systems and sustainability. Three realities are becoming abundantly clear to leaders in government and business, and to the general populace of many countries, New Zealand definitely included.

First, climate change is a major threat to humankind in the 21st century and all countries have a critical role to play in its mitigation by reducing greenhouse gas emissions (more commonly referred to as carbon emissions). The past year has brought a flow of alarming news – the Stern Review*, the Intergovernmental Panel on Climate Change reports, Al Gore's "An Inconvenient Truth" and other research into the likely consequences of unchecked emissions growth. In the news also have been many indications that government and business leaders are, indeed, beginning to respond in meaningful ways.

Second, renewable energy will be increasingly important in slowing, and ultimately reversing, the course of climate change. Fossil fuel burning for electricity generation is a major cause of carbon emissions – hydro, wind and geothermal power have no, or very low, emissions as do other forms of renewable energy under development. The need to shift away from heavy reliance on fossil fuels has become central to all concepts of sustainability – environmental, economic and social.

Third, energy security is a major issue worldwide. Many countries face uncertainty over the supply and pricing of energy, whether from fossil fuel burning or renewable sources. Climate change aside, reliance on fossil fuels means exposure to increasing cost in volatile

international markets. Each country has challenges in securing its energy needs while avoiding economic shocks and contributing to emissions reduction.

I believe New Zealanders have a strong grasp of these realities. A recent public opinion survey showed, for example, that 77% believe climate change is an urgent or current problem, and 83% favoured investment in alternative fuel technologies (including those to capture and store emissions). Almost two thirds do not believe we currently have long-term energy security. The findings in this survey are consistent with earlier research showing strong public support for wind power and other renewables.

New Zealand is, in fact, very well positioned to meet the global challenges of emissions reduction, renewables growth and energy security. We have excellent options for more wind and geothermal power, and to a lesser extent, hydro. We are making good progress with technologies for greater energy efficiency and emission reductions over time.

The Government is currently developing a New Zealand Energy Strategy that leverages these strong natural advantages, along with our economic and social capabilities, to create a sustainable, low-emissions energy future. The goal is nothing less than to make this

country truly sustainable – and it seems that the business community is largely in step with that goal. A business leaders survey late last year showed 78% support for the view that sustainability would make the country more internationally competitive. Recently, Business New Zealand recommended an emissions trading scheme for implementation beyond 2012 – another sign of business leadership on key energy issues (although in this instance, the proposed timing was too slow).

This Meridian Report puts a focus on the costs of increasing energy supply from renewables, especially wind, compared with fossil fuel alternatives: It looks at the basic economics of carbon emissions, the concept of "carbon neutrality" and the business opportunities arising with the shift to sustainability. There are many critical decisions to be made in shaping New Zealand's energy future. Meridian Energy believes the country is moving in the right direction – and we are pleased to promote understanding and debate on fundamental issues of technology choice and cost.

KEITH TURNER
CHIEF EXECUTIVE

* For more on the Stern Review see article inside ...

Renewables confirmed in costs comparison

Developing more renewable energy is likely to be the cheaper way to meet New Zealand's electricity demand growth given expected future carbon costs and gas prices, according to the Government's Draft New Zealand Energy Strategy.* In weighing options for the country's next 1000MW of generation capacity, the Strategy shows new wind and geothermal projects come out ahead of combined cycle gas turbine (CCGT) plants even when these are fired with moderately-priced indigenous gas supplies.

The draft Strategy document presents a comprehensive view of future electricity costs, based on analysis of six different types of new generation project. Wind costs emerge as being below or level with CCGT costs until well into the future – most definitely so if new gas-fired generation was to be fueled with imported liquefied natural gas (LNG). The latter is recognised as the country's most expensive option, just ahead of new coal-fired generation.

The document notes that in addition to being economic, renewables projects need to gain consents and this can push up their costs. "In practice, there could be some trade-off between additional renewables and (electricity) prices, especially if sufficient lower-cost renewable options are unable to be consented or if high levels of intermittent

renewables, such as wind, impose additional costs on the system (see below)."

The document notes also that gas and coal-fired generation still may not in the near future bear the social costs of their carbon emissions – and there is an argument of reflecting in renewables projects some value for the emissions which would otherwise occur from additional gas or coal generation. "The government believes that pursuing renewable generation is not only environmentally preferable but is also more likely to keep New Zealand's electricity prices lower in the foreseeable future than if we rely on more fossil fuel-based generation that will need to bear the cost of its greenhouse gas emissions or the cost of carbon capture and storage."



Other current Government initiatives include a nationwide analysis of renewables potential. Potential projects with total generation capacity of 6,500MW have been identified in eight regions – of the total, 3,600MW from wind generation. No local environmental effects of these various potential projects have been taken into account but in the Government's view, only a third of the total would need to be developed in order to meet New Zealand's electricity demand growth over the next 10 years.

* The Strategy report "Powering our future: Towards a sustainable, low-emissions energy system" was issued in December 2006, http://www.med.govt.nz/templates/ContentTopicSummary____19431.aspx. The document is expected to be finalised in September 2007

Wind power – no problems for New Zealand

New Zealand can substantially increase its reliance on wind power without adding great complexity and cost to the national electricity supply system. Even if 20% of all supply came from wind – a realistic figure in 10 years' time given the outlook for new wind farms – that would not create major system problems.

This is the key conclusion in a high-level analysis of the technical and economic implications of integrating an increasing amount of wind power into the system over the next 10 years.* The analysis looked at additional system costs on four different scenarios, with wind "penetration" in 2016 at 2% (the same level as in 2006), 10%, 15% and 20%. (Penetration is energy from wind as a percentage of total supply on the national system).

Reliance on wind generation raises particular issues for the operation of electricity systems in any country. The natural variability of wind

power is greater than hydro or thermal generation, and this means some additional reserve generating capacity is required to cover the prospect of rapid decline in supply from wind farms.

The report identifies two key advantages in this country – the dominance of hydro generation and relatively high average speeds of wind. Hydro plants provide substantial operating flexibility to help manage the variability of wind power in the short term. The high wind speeds also help with management of variability. These two factors mean New Zealand has a lower need for additional generation capacity relative to any given level of wind power than do other countries which have thermal-based electricity systems.

The analysis shows varying levels of additional capacity are required in relation to changes in wind penetration and to different operating assumptions. Overall, New Zealand's need for

additional "instantaneous reserves" – capacity built into the system for managing the risk that supply will suddenly be lost from a large generator – is very small. On the other hand, the need for additional "frequency keeping reserves" – capacity from one major generator in each of the North and South Islands at any given time – is significant. At 20% wind penetration, the analysed additional reserve would be around 360MW, or 12% of total new generation under this scenario, over the next 10 years.

The analysis also shows that increased wind penetration does not drive a need for new transmission, although it might exacerbate existing constraints on some parts of the national grid.

* "The Wind Integration Study – Phase 1" was prepared by consultants at the UK Centre for Distributed Generation and Sustainable Electricity Supply. It was commissioned by Meridian Energy and had input from energy industry participants, the Electricity Commission and New Zealand Government officials

A world of business opportunities

The increasing focus on climate change and emissions reduction are creating new business opportunities worldwide, not least in New Zealand.

In broad terms, the opportunities arise from: changing consumer preferences; emerging awareness that many current activities are unsustainable; growing demand for technologies associated with lower (or no) carbon emissions; and the actions of governments and others to mitigate and adapt to the effects of climate change.

"Green consumerism" is much talked about in the developed world, especially Europe where there is a trend to labelling food and other products with climate change-related information. Products are likely to be increasingly valued for their environmental attributes, including low or no carbon emissions.

The trend encompasses the concept of "food miles", which involves measuring energy consumption (and hence emissions) in the transportation of particular products to markets. Some New Zealand exporters to the UK have been concerned at a possible food miles-based tax on their products, although in recent months, there have been official re-assurances against introducing such a tax.

Indeed, a major UK Government report in 2005 highlighted the need to measure carbon emissions in all areas of production and supply, not just focus on international freight movements.# Of all food-related transport emissions in the UK, domestic road transport is now recognized as far more significant than air and sea importation. Overall, an increasing focus on energy usage in food production and

supply can favour efficient and sustainable New Zealand producers, despite their distance from markets (see "Toast to carbon neutrality", over page).

Eco labeling

New Zealand consumer markets appear to be moving in the same, green direction. Of business decision makers surveyed in late 2006, 88% believed "eco labeling" would become increasingly important (54% said they were more likely to buy products so labelled even if they cost a little more). A recent public opinion survey confirmed high levels of concern about climate change although only 16% of people said they were well informed on the subject.*

Business opportunities can emerge with all manner of new information on energy efficiency and sustainability. During 2006, for instance, New Zealand Merino producers funded a comparative study on the production of fine wool and nylon: Producing one kilogram of the synthetic fibre required five times as much energy as processing the same weight of wool. The study encompassed wool collection from the farm, scouring and top making, and transport to a mill in China (transport was just 3% of total energy consumed).^

With more knowledge, businesses can adopt more efficient practices that substantially reduce their costs. The New Zealand Business Council for Sustainable Development reports that many companies have already secured multi-million dollar benefits from reducing energy consumption, requiring suppliers to provide more sustainable products, and adopting such practices as online ordering and recycling.

Carbon neutral – the term is everywhere. Indeed, the New Oxford American Dictionary declared it Word of the Year for 2006 – an accolade given to the term best reflecting global events or concerns that have dominated a particular year.

According to the dictionary "being carbon neutral involves calculating your total climate-changing carbon emissions, reducing them where possible and then balancing your remaining emissions, often by purchasing a carbon offset; paying to plant new trees or investing in 'green' technologies such as solar or wind power."

This way of defining carbon neutrality has wide international acceptance. In essence,

Investment

Globally, there is a growing expectation that governments and businesses will invest heavily in coming decades to stabilise greenhouse gases in the atmosphere, in line with targets proposed in the Stern Review (UK, October 2006). New Zealand public opinion appears to support such developments. The recent surveys showed 83% support for more investment in alternative fuel technologies, including those that capture and store emissions.* Support is also strong for government incentives (eg. 85% favoured incentives for low emission, fuel-efficient vehicles). Growth in public and private sector initiatives here and internationally will create new markets for existing and new businesses in technology development and implementation.

Biofuels are a current New Zealand example. Oil companies operating here are being required to increase their sales of biofuels (3.4% of total fuel sales by 2012). This will promote the growth of a domestic biofuels industry producing biodiesel from vegetable oils, tallow and other sources, and bio-ethanol from fermented sugars and starches.

Department for the Environment, Food and Rural Affairs report July 2005, www.defra.gov.uk

* Surveys undertaken by ShapeNZ for New Zealand Business Council for Sustainable Development, 2006 and 2007, www.nzbscd.org.nz

^ "Merino Wool: Total energy use and carbon dioxide emissions", report for Merino Inc, August 2006, www.merinoinc.co.nz

CarbonZero™ brand. Certification is earned through: measurement of the carbon footprint using calculators developed by Landcare for application to energy consumption and other emissions created directly by the entity; independent auditing of the footprint; management and reduction of those emissions; and mitigation through the purchase of offsetting credits for unavoidable emissions.

To date, there are 10 participants in the CarbonZero™ programme, including Meridian Energy. Meridian's energy supply to retail customers and its renewable electricity generation have been certified CarbonZero™ until June 2008.

For more information see www.carbonzero.co.nz

Carbon will become a cost on all of us

Carbon emissions have increasing economic cost – and sooner or later, that cost will fall on all of us. In fact, sooner is better than later because it should spur us into action that will prevent the cost becoming horrendous over the long term.

Such is the dire warning laid out in the Stern Review, the most comprehensive economic analysis yet undertaken on the impacts of emissions-driven climate change.* The "us" referred to above are the producers, distributors and consumers of goods and services everywhere – and obviously this includes New Zealand. In the Stern Review's outlook for the world, the cost of emissions reduction can be borne today in the form of taxes, restrictions and/or traded quotas that are all designed to reverse current trends – or the cost can be borne by future generations who are left to suffer the economic impacts of catastrophic climate change.

The review predicts that not acting now to curb emissions will lead to losses in global GDP growth of at least 5% per annum over the long term. On the other hand, Stern does see substantial opportunity to avoid those losses through various cost and price mechanisms for encouraging emissions reduction and for promoting the shift to "low carbon" technologies, goods and services. The review says the cost of acting now to mitigate climate change can be limited to around 1% of global GDP per annum.

Externalities

Economic analysis of emissions reduction is grounded in the general theory of externalities. The latter can be defined as third party, or spill-over, affects from the production or consumption of goods and services for which all appropriate compensation might not be paid. Negative externalities involve marginal social cost over and above the cost to private producers or consumers. Air pollution from manufacturing plants or vehicles (or cigarette smokers) are often recognised as forms of negative externality.

Market failure is said to occur where such externalities are not adequately reflected in costs to producers or consumers whose behaviour then persists at levels above the social optimum. Private producers and consumers tend not, of their own volition, to take account of marginal social costs, leaving governments to recover them through taxes, other charges and

restrictions. Climate change is a huge externality – and indeed, Stern describes it "as the greatest market failure the world has ever seen".

The general theory of negative externalities offers three standard responses to climate change: restrictions on the volume of emissions; the creation of property rights among emitters and those affected by emissions, with all parties then able to engage in bargaining or trading; and the taxation of emitters such that they face the full social cost of their emissions.

The world has various "cap-and-trade" schemes today, combining the first two of these responses. The schemes (not notably in the European Union) limit the total volume of allowable emissions in a particular jurisdiction, and economic entities are then left to decide among themselves how best to use emission allocations and to apportion the cost of making an overall reduction.

Efficiency

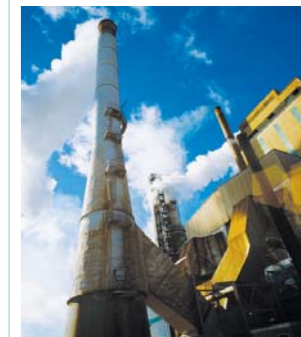
The major concern for Stern and others is ensuring carbon emission reduction occurs with economic efficiency. Everyone wants to see emissions growth stopped and reversed at least cost. However, emission cessation costs are highly uncertain and heavily reliant on new technology development. The scale and timing of climate change impacts are also highly uncertain. This negative externality arises from emissions worldwide but the impacts will vary vastly from one location to the next. The impacts actually come from the build up of greenhouse gases in the atmosphere, not the flow of emissions themselves. A given volume of emissions will have varying impact over time.

In the Stern analysis, growth in the marginal social cost of emissions – and therefore the "price of carbon" to producers, distributors and consumers – is likely to accelerate over the long term as greenhouse gases build up and have increasing impact on the globe. In the short term, the rate of change could be relatively constant. On the other hand, the margin cost of measures to reduce emissions could be relatively high at the outset and then moderate over the long term.

The push for efficient, market-based mechanisms to stop and reverse the growth in emissions is likely to involve a mix of volume constraints, tradeable allocations and taxes in different economies – and different approaches in the short and long

terms. The foundation for all of this, says Stern, must be a long-term international stabilisation target for greenhouse gases in the atmosphere. Once such target is agreed, more carbon emission trading schemes are expected to be formed and increasingly linked across the world.

* The Stern Review was lead by former World Bank Chief Economist, Nicholas Stern and published in the UK last October – available on www.hm-treasury.gov.uk



Key Facts

- Carbon dioxide (CO₂) from fossil fuel burning is the major one of six greenhouse gases (GHGs) – the others are nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. "Carbon emissions" is short hand for all GHG emissions (measured as tonnes of CO₂ equivalent, or "t CO₂e").
- NZ's carbon emissions have risen on average 2.2% a year since 1990, to a total of 75.3 million t CO₂e in 2005.
- Emissions from agriculture (methane from animals and nitrous oxide from soil) made up over 49% of NZ's total emissions in 2005. Energy was a further 43%, principally in the transport sector (electricity generation was 10% of the total).
- NZ is 15th in the OECD ranking of emissions per capita – 8.09 t CO₂e, which is 50% of the Australian per capita figure.
- Under the Koyoto Protocol, NZ has committed to reducing its emissions back to their 1990 level by 2012 – this equates to a 23% reduction from today's level.