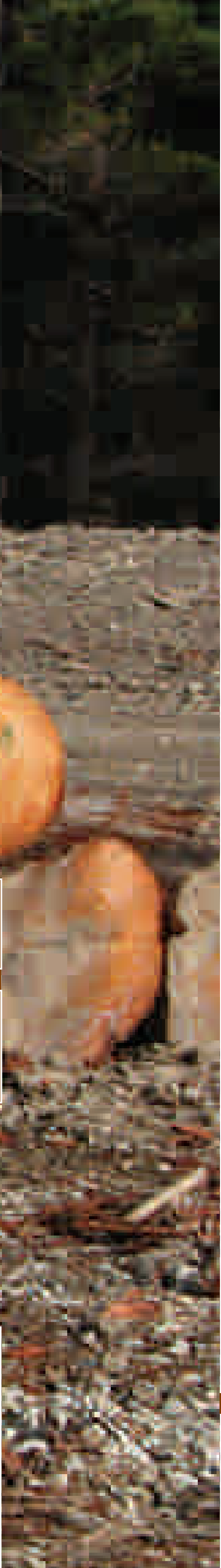
ENERGY EFFICIENT WAYS

to improve the economic bottom line of your
forest harvesting business

Ministry for the Environment
Manatū Mō Te Taiao

Sustainable Management Fund



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EBEX21

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Energy Prices and Emission Factors

Use the information in this table to help calculate your potential savings in the case studies.

Energy Source	Unit Energy	Price+ $	Emission Factor‡
Electricity	kWh	$0.072/kWh	0.000625
Natural Gas	MJ	$0.012/MJ	0.0000524
Diesel	litre	$0.56/litre	0.00271
Petrol	litre	$0.82/litre	0.00232
Sub-bituminous Coal	tonne	$100/tonne	2.064

Emission Factor = tonnes of CO_2 emitted per unit of energy.
+Ministry of Economic Development 'Energy Data File' July 2004, excluding GST.
‡New Zealand Climate Change Office (Projects emission factors), 2004. The electricity emission factor is based on an operating margin electricity factor.

Estimated Potential Savings

Enter the savings you calculate can be made for your operation here.

Initiative	Fuel Saved	Unit
Regular maintenance		litres per tonne
Driver education		litres per tonne
Tyre pressures		litres per tonne

This information kit is one of six aimed primarily at small to medium sized enterprises (SMEs) in New Zealand's primary production sector, namely:

- Dairying;
- Protected crops;
- Forestry;
- Fishing;
- Mining and Quarrying.

Road transport is an integral part of all of these primary production operations. For this reason, road transport has been included as a separate information kit.

ACKNOWLEDGEMENTS

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This information kit was developed on behalf of the Energy Federation of New Zealand Inc. (EFNZ) and the above companies by Deborah Maxwell and Julia Rackley of CRL Energy Ltd. Further information and copies of this information kit can be obtained by contacting:

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INTRODUCTION

This information kit can save you money! Energy is a direct cost to your business and one that you can reduce. This information kit will identify and quantify energy efficient ways to:

- Reduce energy consumption;
- Improve energy efficiency; and
- Improve the bottom line of your business.

> If all the measures outlined in the case studies throughout this document were implemented, a forest manager could save over a quarter in fuel consumption.

HOW TO USE THIS INFORMATION KIT

This kit provides information on energy use and energy efficiency in the forest harvesting sector.

Measures to improve the energy efficiency of your forest harvesting operation are suggested and potential energy savings estimated. You can estimate the potential savings in relation to your own operation by completing the simple calculators throughout this document. To complete these calculators you will need to have with you:

- A calculator;
- Annual energy consumption from your power and fuel bills; and
- The price you pay per unit for your diesel,

WHERE CAN I GET MORE INFORMATION?

This information kit provides case studies on the effects of various measures on energy consumption and energy related costs. The costs of implementing such measures and the associated payback periods are not included.

Links to sources of information for various technologies, products, contractors and consultants can be found at the back of this kit.

GLOSSARY OF TERMS

Below is a short glossary of terms that are used throughout the document:

MJ megajoule – A joule is the energy required to heat one cubic centimetre of water by approximately a quarter of a degree Celsius, or the energy needed to lift a kilogram approximately 100 millimetres. A megajoule is 1,000,000 joules. In New Zealand it usually refers to gross energy input.

kWh kilowatt hour – Unit of electrical energy. A kWh is 3,600 joules.

tCO_2 tonnes of carbon dioxide.

WHY REDUCE YOUR ENERGY CONSUMPTION?

ENERGY COSTS ARE GOING UP!

Energy prices have been increasing significantly in the past few years. Rising volatility in oil rich areas of the world has seen the dollar value of a barrel of oil reach record high prices. These prices are being passed on to the consumer who has seen petrol prices reach their highest in 10 years.

Electricity prices have also been rising. Dry years, supply constraints, population increase economic growth and resource management issues have been attributed to this increase.

Maui gas supplies are running out and the higher costs of exploration for new supplies are forcing the price of natural gas up.

Many renewable energy technologies are relatively expensive. Work is continuing to develop them into viable energy options and to provide them with a 'level playing field' compared with other energy sources.

Despite price increases, energy demand is continuing to rise in New Zealand and elsewhere. Energy use in the primary production sector has fluctuated in the past seven years but has generally been increasing. Energy may have also been used more efficiently with a greater volume of production per unit of energy in many sectors. Since 1998 the amount of forest harvested has increased by over 25%. An improvement in energy efficiency may be attributed to improvements in the way the harvesting is now conducted and technological advancements.

PRICES WILL CONTINUE TO INCREASE!

The increasing demand for electricity and the pressure for ongoing supply will mean that energy prices will continue to increase.

One of the Government's climate change policy initiatives is the emissions charge, which will be introduced on fossil fuels and industrial process emissions from 2007 to create a financial incentive to reduce emissions. The charge will approximate the international emissions price, but will be capped at NZ$25 per tonne of carbon dioxide (CO_2) equivalent.

The emissions charge will be applied at (or close to) the point of production and is expected to be reflected in a higher cost of energy to the consumer. It is uncertain how much of this charge will be passed on but it is inevitable that the fossil fuel end user will bear the brunt of the additional cost.

The emissions charge could result in a significant increase in the costs of running a business. It will impact most significantly on energy intensive sectors such as manufacturing and primary production.

The impact of the emissions charge on businesses has been calculated at three price levels. Table 1 represents the increase in energy bills if the charge were set at $10 per tonne, $15 per tonne or the maximum of $25 per tonne.

The results show that reducing energy consumption will become an increasingly important part of any business strategy.

Table 1. Increase in energy bills for the industrial sector as a result of the proposed emissions charge

	$10/$tCO_2$*	$15/$tCO_2$	$25/$tCO_2$
Electricity	0.63c/kWh	0.94c/kWh	1.56c/kWh
Natural Gas	$0.52/GJ	$0.79/GJ	$1.31/GJ
Diesel	2.7c/litre	4.1c/litre	6.8c/litre
Petrol	2.3c/litre	3.5c/litre	5.8c/litre
Sub-bituminous Coal	$20.64/tonne	$30.96/tonne	$51.60/tonne

Source: New Zealand Climate Change Office for the year to March 2003.
*tCO_2 = tonnes of carbon dioxide. GJ = gigajoule (or 1,000 MJ).
Note: assumes 100% of the price rise is passed through to the consumer and excludes GST for businesses.

IT CAN SAVE YOU MONEY!

Reducing your energy consumption and using the energy you receive more efficiently will save you money!

Lower energy costs associated with reduced consumption will improve the economic bottom line of your business and help you to run a more efficient operation.

THERE ARE A NUMBER OF OTHER BENEFITS AS WELL

Aside from the benefits of an improved bottom line there are a number of other advantages. Reducing energy consumption and improving energy efficiency may also result in:

- Better risk management planning and strategies;
- Marketing opportunities through an improved image of your organisation;
- Improved record keeping in regard to compliance measures;
- A useful tool for marketing your organisation and separating it from its competition;
- Improved air quality; and
- Helping to reduce New Zealand's greenhouse gas emissions and meet Kyoto Protocol obligations.

Global warming and the resulting changes to the world's climate are a growing problem. If left to run its course, climate change will have significant impacts on our economy, environment and society. By ratifying the Kyoto Protocol New Zealand is taking action to reduce greenhouse gas emissions. Further information about the actions being taken and climate change in general, can be found in the Annex of this document.

NEW ZEALAND'S FORESTRY SECTOR

New Zealand's economy is largely based on primary production made up of the agriculture, forestry, fishing, mining and quarrying sub-sectors. Products from the primary production sector accounted for more than 60% of New Zealand's export income in the year 2003 and used over half of New Zealand's available land. Forestry and farming alone employed approximately 8.5% of the total workforce aged over 15 years.

New Zealand's forest resource covers 8.1 million hectares, or 29% of New Zealand's total land area. Indigenous forests make up the majority of this while planted production forest accounts for 1.8 million hectares.

In the year to March 2003 the total volume harvested was estimated to be 23 million cubic metres. Of this, over 35% or 8.5 million cubic metres was for export as logs. This earned New Zealand over $3.6 million, contributing approximately 4% to GDP and 13% to New Zealand's overall export earnings. The largest export markets for log harvests are Australia, the United States of America, Japan and other Asian markets.

Reforested and afforested plantings were estimated at 22,100 hectares in 2002, of which approximately two-thirds were afforested (new forest plantings into former pasture or marginal land). Between 1990 and 2002, 640,000 hectares of new forest were estimated to have been planted.

Trends suggest that the new forest owners are (or in future will be) private investors or syndicate investors and the forest sizes will be relatively small.

However, 1.3 million hectares of the entire plantation forest resource are still currently owned by growers with more than 1,000 hectares of forest.

FORESTRY ENERGY USE

The primary production sector is accountable for 5% of energy consumed in New Zealand. Although this is a fairly small proportion, parts of the sector are highly energy intensive. Since 1998 energy use in the primary production sector has fluctuated but has generally been increasing. This is partly a result of increased product output and a greater emphasis on infrastructure.

Fuel is the main energy source consumed in forestry. This energy use is greatest at the end of a rotation cycle when harvesting occurs.

Most of the in-forest energy demand is from diesel use by log haulers and loaders. The amount of fuel used is dependent on a wide array of factors including the length of the rotation, the size of plantation, whether it is a new plantation, and site topography. A small amount of energy input is petrol used for chainsaws.

HOW CAN YOU REDUCE YOUR ENERGY CONSUMPTION?

Fuel consumption in harvesting depends on the piece size, terrain, primary haul distance, and type and size of machinery used.

On the following page is a calculator which will help you estimate how much fuel you are using during harvesting. To assist with your calculations, a worked example is provided based on the assumptions below.

WORKED EXAMPLE ASSUMPTIONS

Throughout this information kit case studies are used to provide an indication of the potential savings that can be made through the implementation of particular energy efficient measures.

The forest harvesting operation in this worked example covers several hundred hectares on gentle slopes. During harvesting three main pieces of equipment are used including a skidder and two excavators. Each piece of equipment uses 200 litres of diesel per day to harvest 300 cubic metres (around 300 tonnes), totalling 600 litres per day. Over a year, this operation would be harvesting for 230 days, equating to 138,000 litres of diesel.

The savings calculated in the case studies are based on the figures in Table 2. Energy prices can vary from month to month but the Ministry of Economic Development figures are likely to be typical for some small to medium energy users. The emissions charge has not been included in the prices because it will not be applied until 2007.

Table 2. Energy prices and emission factors

Energy source	Unit Energy	Price $[†]	Emission Factor[‡]
Electricity	kWh	$0.072/kWh	0.000625
Natural Gas	MJ	$0.012/MJ	0.0000524
Diesel	litre	$0.56/litre	0.00271
Petrol	litre	$0.82/litre	0.00232
Sub-bituminous Coal	tonne	$100/tonne	2.064

Emission Factor = tonnes of CO_2 emitted per unit of energy.

† Ministry of Economic Development 'Energy Data File' July 2004, excluding GST.

‡ New Zealand Climate Change Office (Projects emission factors), 2004. The electricity emission factor is based on an operating margin electricity factor.

How much diesel fuel does your forest harvesting operation consume and how much CO_2 does it emit?

	Worked Example	Your Example	
No. machines/vehicles used =	3		vehicles
Tonnes harvested per day =	300		tonnes per day
Litres used per day =	600		litres per day
Litres per tonne = litres per day ÷ tonnes per day = (600 ÷ 300)	2.0		litres per tonne
No. harvest days per annum =	230		days per annum
Annual litres = litres per day x no. harvest days = (600 x 230)	138,000		litres per annum
Tonnes of CO_2 = litres per tonne x emission factor = (2.0 x 0.00271)	0.0054		tCO_2 per tonne
$ per tonne = litres per tonne x $/litre = (2.0 x 0.56)	1.12		$ per tonne
Tonnes of CO_2 = litres per annum x emission factor = (138,000 x 0.00271)	374		tCO_2 per annum
$ per annum = litres per annum x $/litre = (138,000 x 0.56)	77,280		$ per annum

EQUIPMENT AND MACHINERY

Careful management of on-site equipment, machinery and vehicles will help you reduce energy consumption. This can be achieved through:

- Regularly servicing and cleaning machinery and equipment;
- Reducing vehicle use where possible;
- Ensuring machinery is regularly maintained, wheel slip is optimised and tyre pressures are kept at the correct level, which can reduce fuel consumption by 15%. Tyres should be kept at recommended inflation pressures to minimise rolling resistance and/or maximise traction;
- Increasing driver education and awareness. This can lead to fuel savings of 15%;
- Ensuring engines are not left to idle unnecessarily. Consider installing controls to automatically shut down if left idling for a period of time. A typical 420 horsepower heavy truck engine consumes fuel at the rate of around 2 litres an hour when the truck is stationary and the engine is idling. A vehicle that idles, on average, for 1 hour per day or 5 hours per week could reduce fuel consumption by 5 litres per week, if idling times were halved. Over a year the savings equate to over 120 litres of diesel and $66 per vehicle;
- Keeping accurate fuel consumption records in order to monitor performance more accurately;
- Improving the matching of equipment, machinery and vehicles to tasks by:
  - ensuring the appropriate machine (engine size for the task) is used, where possible. For example, during harvesting consider forest size, topography and operation requirements; and
  - correctly sizing engines, motors or pumps for the task/operation;
- Replacing energy inefficient machines, vehicles and equipment with more fuel efficient technologies;
- Keeping the unloaded weight (tare) to a minimum. This allows more loads to be carried without exceeding the regulated gross vehicle weight, thus generating more revenue per trip and allowing more product to be transported per litre of fuel consumed;
- Positioning the skid site (or landing) so as to minimise the hauling distances of log haulers, skidders and crawlers;
- Grading surfaces on larger sites, where there are a number of roads, to maximise fuel economy which will increase tyre life;
- Installing and using central tyre inflation systems so that vehicles are able to change tyre pressures on the move to suit changing ground conditions; and
- Using skidders rather than crawler tractors and cable haulers on flatter terrain.

Case Study – Regular Maintenance

Fuel savings of 15% can be achieved through regular maintenance, optimum wheel slip and correct tyre pressures.

Fuel Saving Calculation	Worked Example	Your Example	
No. vehicles used =	3		vehicles
Litres used per tonne =	2.0		litres per tonne
Litres per tonne saved = litres per tonne x % saved = (2.0 x 15%)	0.30		litres per tonne
Cost reduction = litres per tonne saved x $/litre = (0.3 x 0.56)	0.17		$ per tonne

Case Study – Driver Education

The driver of a vehicle or machine can have a significant impact on fuel consumption and fuel efficiency of a vehicle or machine. Increasing driver education and awareness can lead to 15% fuel savings.

Fuel Saving Calculation	Worked Example	Your Example	
No. vehicles used =	3		vehicles
Litres used per tonne =	2.0		litres per tonne
Litres per tonne saved = litres per tonne x % saved = (2.0 x 15%)	0.30		litres per tonne
Cost reduction = litres per tonne saved x $/litre = (0.3 x 0.56)	0.17		$ per tonne

Case Study – Tyre Pressures

Under-inflated or over-inflated tyres affect not only fuel consumption but also the maintenance costs of tyres on forestry vehicles. Maintaining tyre pressures at the optimum level and ensuring that optimum wheel slip is achieved can help improve fuel efficiency.

Studies have found that the correction of tyres that are under-inflated (by 20%) can result in a 2% fuel saving.

Fuel Saving Calculation	Worked Example	Your Example	
No. vehicles used =	3		vehicles
Litres used per tonne =	2.0		litres per tonne
Litres per tonne saved = litres per tonne x % saved = (2.0 x 2%)	0.04		litres per tonne
Cost reduction = litres per tonne saved x $/litre = (0.04 x 0.56)	0.02		$ per tonne

TOTAL SAVINGS

The methodology below provides an indication of the order of savings that can be made by the measures specified. It should be noted that this method over-inflates the potential total savings since each measure has been calculated from the initial energy use.

That is, if the initial energy consumption were 10,000 litres per annum and a measure were implemented that saved 10%, the annual energy consumption would be reduced to 9,000 litres (10,000 litres minus 10%). If a second measure were implemented the savings made would be subtracted from the new energy consumption amount. That is:

First measure (10% saving) = 10,000 litres – 10% = 9,000 litres per annum

Second measure (10% saving) = 9,000 litres – 10% = 8,100 litres per annum

Therefore implementation of two separate measures, each of which produces 10% energy savings, will lead to a 19% energy reduction.

Potential savings for the case study forest harvest operation

	Worked Example	Your Example	
Regular maintenance	0.30		litres per tonne
Driver education	0.30		litres per tonne
Tyre pressures	0.04		litres per tonne
TOTAL saved for this harvest operation	**0.64**		**litres per tonne**
Tonnes of CO_2 = litres per tonne x emission factor = (0.64 x 0.00271)	0.0017		tCO_2 per tonne
$ per tonne = litres per tonne x $/litre = (0.64 x 0.56)	0.36		$ per tonne

Potential savings per annum

Tonnes produced per annum =	69,000		tonnes per annum
Litres per tonne saved =	0.64		litres per tonne saved
Litres saved per annum= 0.64 x 69,000 =	44,160		litres saved per annum
Tonnes of CO_2 = litres per annum x emission factor = (44,160 x 0.00271)	120		tCO_2 per annum
$ per annum = litres per annum x $/litre = (44,160 x 0.56)	24,730		$ per annum

Percentage savings of total annual fuel consumption

Litres per tonne =	2		litres per tonne
Litres saved per tonne =	0.64		litres per tonne
% of total = litres saved ÷ total litres x 100 = (0.64 ÷ 2.0 x 100)	32		%

SIMPLE PAYBACK CALCULATION

It has not been possible to provide examples of payback periods for all the energy efficiency measures in this information kit. However, a calculator has been included on the following page that will help quantify the potential payback for energy efficiency measures in relation to your own business.

The payback period is the most commonly used measure to assess the cost effectiveness of energy efficiency. The payback period is the amount of time it takes for an energy efficiency measure's energy cost savings to cover its purchase, installation and operating costs.

It is calculated by the simple equation:

Payback period =
initial investment ÷ net annual savings

The **initial investment** is the initial cost of purchasing the new energy efficient equipment. It may be the difference between the cost of the energy efficient equipment and the cost of the inefficient equipment that would have otherwise been installed. If existing equipment can be sold, the residual value should be subtracted from the initial cost as well.

Net annual savings is the energy cost savings resulting from the measure (determined either from the calculators in this document or the cost difference between the existing energy consumption and the new energy consumption) minus the annual costs related to the implementation of the measure (for example, operating costs which may include additional maintenance and servicing requirements or periodic replacement of parts such as filters or belts).

If an energy efficiency measure will not result in enough energy cost savings to pay for its purchase, installation and operating cost within the life of the measure, it is unlikely to be installed.

If an emissions charge were applied at the $25 per tonne CO_2 level (to estimate the future cost of energy), this would make energy prices and therefore cost savings higher. Consequently, payback periods would be shorter to some degree.

Simple Payback Calculation

Payback period is a measure of the number of years (or months or days) required for the benefits of a measure to equal the required initial capital investment.

Payback period = initial investment ÷ net annual savings

Net annual savings = annual savings resulting from the measure – annual costs related to the implementation of the measure.

For the Worked Example

Using the case study of improving driver education, a simple payback period can be calculated of 0.8 years or 10 months. This measure may reduce fuel consumption by 15% or 20,700 litres and $11,600 (diesel price of $0.56/litre). However, for three equipment operators to undertake an annual driving course, it could cost the company $7,000 when taking into account the loss of personnel while on the course. Once the initial training is complete, the ongoing operational costs would be in annual review/update courses for the crew, which may cost $3,000 for the three workers.

The payback period for such a measure would therefore be:

Payback period = initial investment ÷ net annual savings

Initial investment = the cost of the initial driver training course and lost personnel cost = $7,000.

Net annual savings = annual savings $11,600 – annual costs of $3,000 = $12,400.

Payback period =	$7,000 ÷ $ 8,600	=	0.8 years or 10 months

What does this mean for your forest harvesting business?

Initial investments =			
Net annual savings =			
Payback period =	÷	=	

FURTHER INFORMATION

Further information on this sector can be found at:

- Bio-energy Association of New Zealand – Ph: (04) 385 3398 (www.bioenergy.org.nz)
- Forestry Insights – (www.insights.co.nz)
- Ministry of Agriculture and Forestry – Ph: (04) 474 4100 (www.maf.govt.nz)

FOR INFORMATION ON:

MANAGING AND REPORTING ON GREENHOUSE GAS EMISSIONS

- Energy/Biodiversity Exchange Project (EBEX21) – Landcare Research New Zealand Limited (www.ebex21.co.nz)
- Emprove (if a company has a large energy bill) – Energy Efficiency and Conservation Authority (EECA) (www.emprove.org.nz)
- Triple Bottom Line Reporting Guide – Sustainable Business Network (www.sustainable.org.nz)
- NZBCSD Emissions Accounting & Reporting Guide – New Zealand Business Council for Sustainable Development (www.nzbcsd.org.nz)

THE BUSINESS OPPORTUNITIES ASSOCIATED WITH CLIMATE CHANGE

- The NZBCSD report on the business opportunities associated with climate change is useful – New Zealand Business Council for Sustainable Development (www.nzbcsd.org.nz)

REDUCING TRANSPORT RELATED GREENHOUSE GAS EMISSIONS

- Econodrive – Energy Efficiency and Conservation Authority (EECA) (www.eeca.org.nz)
- Greenfleet – Sustainable Business Network (www.sustainable.org.nz)

SIMPLE, PRACTICAL TIPS ON HOW TO REDUCE GREENHOUSE GAS EMISSIONS

- ‘Four Million Careful Owners’ – New Zealand Climate Change Office (www.4million.org.nz)
- Climate Friendly Kiwi Guide – BRANZ Limited (www.branz.co.nz)

MEASURING GREENHOUSE GAS EMISSIONS

- E-bench – Energy and Technical Services Ltd (www.energyts.com)
- EnergyPro – (www.energyPro.co.nz)
- NZBCSD Emissions Accounting & Reporting Guide – New Zealand Business Council for Sustainable Development (www.nzbcsd.org.nz)

ENERGY EFFICIENCY TIPS

- NZBCSD guide to energy efficiency – New Zealand Business Council for Sustainable Development (www.nzbcsd.org.nz)
- Meridian Energy: Energy Efficiency Tips for SMEs – Meridian Energy (www.meridianenergy.co.nz)

CONTRACTORS, PRODUCTS AND SUPPLIERS

- ‘Find An Expert’ – Energy Efficiency and Conservation Authority (www.eeca.govt.nz)

ANNEX – ENERGY AND CLIMATE CHANGE

CLIMATE CHANGE

The global climate changes naturally over time and has undergone significant changes over millions of years. There is a blanket of gases around the Earth, which the sun's warmth can pass through easily. Usually when energy from the sun enters the Earth's atmosphere, about one third of this energy is reflected back into space. Of the rest, the atmosphere absorbs some, but most of it is absorbed by the surface of the Earth.

GLOBAL WARMING

Certain gases in the atmosphere (commonly referred to as greenhouse gases) block the heat being reflected back to space and radiate it back to the Earth's surface, having an insulation effect. Water vapour is the main natural greenhouse gas. Other gases include carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

While water vapour is the most significant natural greenhouse gas it cannot be controlled by humans. Human activity has, however, influenced the atmospheric concentrations of the other greenhouse gases listed above. Since the beginning of the industrial revolution (about 1700 A.D.), the levels of other greenhouse gases in the atmosphere have significantly increased. This increase is largely associated with human activities such as the combustion of fossil fuels and vegetation changes. As a result, more radiation is being trapped in the Earth's atmosphere, causing it to warm (global warming).

Climate change is a global environmental problem, predominantly caused by human activities. The likely effects of climate change include rising average temperatures, rising sea levels, more frequent extreme weather events and a change in rainfall patterns. There is strong scientific consensus that, by the end of this century, these changes will occur on a scale that will cause serious harm to ecosystems, industries, infrastructure, human health, biosecurity and economies world wide.

This global warming has begun to affect the world's climate. The effects on weather patterns and larger scale climatic trends are expected to become steadily more pronounced over time.

There will be both positive and negative consequences of climate change. But globally, more people are likely to be harmed by the effects of climate change than will benefit. If greenhouse gas emissions are not reduced significantly over the coming decades, the impacts of climate change will more than likely get steadily worse and the costs could be severe.

KYOTO PROTOCOL

In response to this risk, the Kyoto Protocol was initiated to try to reduce global greenhouse gas emissions, with each member country being set reduction targets. Under the Kyoto Protocol, New Zealand will have to limit net average greenhouse gas emissions to 1990 levels during the period 2008 to 2012 (the first commitment period).

Almost 62 million tonnes of CO_2 equivalent were emitted in 1990, meaning that New Zealand must take responsibility for any emissions in excess of its 307 million tonnes allocation over the first commitment period. New Zealand is steadily increasing its greenhouse gas emissions. Current estimates suggest total emissions for 2002 were 22% higher than in 1990 (excluding net removals from forest sinks).

CLIMATE CHANGE POLICY

In order for New Zealand to meet its Kyoto Protocol target the Government has introduced a climate change policy. This policy includes the use of an emissions charge, incentives for greenhouse gas emission reduction projects, agriculture sector funded research, negotiated greenhouse agreements (NGAs) with mainly larger industries, the encouragement of forest sinks and the possible use of emissions trading.

For this policy to be a success the Government requires the assistance and cooperation of a wide variety of sectors of the economy.

Further information in relation to this policy can be found at the New Zealand Climate Change Office website – www.climatechange.govt.nz.

ENERGY AND CLIMATE CHANGE

Agriculture and energy are two of the largest emitting sectors in New Zealand. Since 1990 emissions from the energy sector have increased by 35%, largely due to increased CO_2 from road transport and thermal electricity generation using natural gas and coal.

Therefore, a good way to reduce greenhouse gas emissions is through reducing the demand for energy and improving energy efficiency.

ENERGY FEDERATION OF NEW ZEALAND INCORPORATED (EFNZ)

This information kit was produced on behalf of the Energy Federation of New Zealand Incorporated (EFNZ) with support from the Sustainable Management Fund and a consortium of companies. The EFNZ is a non-profit, membership based, professional and independent energy industry association which promotes the sustainable development and use of energy resources in New Zealand and globally. It was established in 1997 by the merger of the Energy Foundation of New Zealand and the New Zealand branch of the World Energy Council. The EFNZ runs an active programme of seminars, conferences, submissions and research projects, both independently and in collaboration with other energy sector organisations.

As a member of the World Energy Council, the EFNZ:

- Liaises with similar international organisations;
- Participates in international research projects on energy issues;
- Promotes New Zealand representation at World Energy Council meetings;
- Supplies information on the activities of the World Energy Council; and
- Participates in World Energy Council study committees.

A range of services is provided to members of the EFNZ including:

- Newsletters;
- Faxed or emailed circulation of new items;
- Seminars, conferences and workshops;
- Energy studies;
- Distribution of World Energy Council and other energy related international material;
- Collective research commissions;
- Participation in international studies and working groups;
- Representation of energy industry views; and
- Member access to the global energy information system at www.worldenergy.org.

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