

2.2 Enhancing energy efficiency to address air pollution and atmospheric problems, combat climate change and promote industrial development

The Energy Efficiency and Conservation Act entered into force in NZ in 2000. The Act required a National Energy Efficiency and Conservation Strategy (NEECS) to be developed and periodically reassessed. The Act also empowers the government to regulate minimum energy performance standards and energy labelling requirements for energy using products and services.

In 2001, NZ launched its first NEECS, which is still in effect. The NEECS includes action plans which contain regulatory and non-regulatory measures. Further information about the NEECS is available at <http://www.eeca.govt.nz/strategy/strategy.asp>.

The Energy Efficiency (Energy Using Products) Regulations entered force in 2002. The regulations prescribe minimum energy performance standards and/or energy labelling requirements for a number of classes of electrical products used in the household, commercial and industrial sectors.

Energy efficiency: incentives vis-a'-vis disincentives

End use efficiency in commercial and residential sectors

Assistance for energy-intensive small and medium sized enterprises

Emissions from small and medium-sized enterprises (SMEs) are estimated to account for around 15% of New Zealand's annual CO₂ emissions. The Energy Efficiency and Conservation Authority (EECA) estimates that most firms are capable of achieving energy efficiency gains of 5-7% through relatively simple measures. The government estimates that further improvements of up to 20% can be made using information from energy audits.

Therefore, government assistance for energy-intensive small and medium sized businesses aims to achieve overall efficiency gains of 5% for fossil fuel use and 7% for electricity use, with up to 20% in some firms in target industries. Nine industries have been identified as being energy intensive: wood processing, food processing, basic metals, non-metallic industries, pulp and paper products,

tourism transport, glasshouse crops, fishing and irrigated dairying and arable crops.

In March 2005 the government approved specific policies for energy-intensive businesses to help them reduce greenhouse gas emissions through improved energy efficiency. The assistance will be implemented through four measures. First, financial grants will be available to assist capital investment in technologies to improve energy efficiency. Second, demonstrations of energy efficient technologies to provide support for innovation and technology uptake will be conducted. Third, the government will sponsor training for company directors to influence a conservation culture in corporate governance. And fourth, education for company managers and staff about energy efficiency will be provided.

Energy efficient housing retrofits

The Building Act 2004 requires that the Building Code promote buildings that are designed, constructed and used in ways that promote sustainable development, and that they facilitate the efficient use of energy and energy conservation. It also requires the Building Code to promote the use of renewable sources of energy in buildings.

But while the revised Code will improve the energy performance of new buildings, a major effort is focussed on retrofitting existing buildings – particularly those built before 1978 when insulation became mandatory. To improve the energy performance of these houses, EECA provides financial assistance to service providers under its EnergyWise Home Grants programme to carry out a range of energy efficiency household retrofits – including ceiling and under-floor insulation, draft stopping of doors and windows, hot water cylinder wraps and low flow shower heads for low income families.

There are 1.3 million occupied houses in New Zealand, 0.9 million of which were built before energy efficiency requirements became mandatory in 1977. EECA estimates that around 300,000 of the 900,000 or so New Zealand houses constructed before that time remain without adequate ceiling insulation.

In addition to the NZ objectives to improve national energy efficiency beyond business as usual, and to limit national greenhouse gas emissions, there is significant concern in New Zealand about the health impacts of energy inefficient housing. In 2003, a New Zealand study found that nearly 30% of the average winter evening living room temperatures of New Zealand houses were below the WHO recommended healthy minimum of 16°C. It is known that health consequences of cold and damp housing include excess winter mortality, exacerbation of skin conditions, and respiratory illnesses. For example, UK studies have found that thermally inefficient housing is a major factor in excess winter mortality.

The NEECS has an objective that all pre-1977 New Zealand homes are retrofitted with a suite of cost-effective energy efficiency measures by 2016. EECA uses EnergyWise home grants to target the 100,000 homes with inadequate insulation that are occupied by low-income families. Other pre-1977 houses are not yet actively targeted.

Since 1995 EECA has assisted with the insulation of over 17,000 homes, and is aiming to increase the annual numbers of retrofits in coming years.

Appliance Standards and Labelling

New Zealand uses minimum energy performance standards (MEPS) and labelling to improve the efficiency of appliances. MEPS are set and implemented in conjunction with Australia. By 2008 the two countries will have 14 product classes covered by MEPS or labelling requirements, and a further 19 product classes will be investigated for future measures. New Zealand, along with the US and Australia, has recently moved to the most advanced energy efficiency standard for refrigeration in the world.

EnergyWise Home Grants Programme

- Time frame 1995 - 2016 (21 years)
- Status - ongoing
- Objective - to target (for insulation retrofits) the 100,000 pre-1977 homes with inadequate insulation that are occupied by low-income families.
- Lead agency - Energy Efficiency and Conservation Authority (EECA)
- Significant funding for the EnergyWise home grants programme has been contributed by the NZ Ministry of Health and the NZ Ministry of Social Development. Third party funders including the Housing New Zealand Corporation (HNZC) contribute in partnership with EECA.

HNZC is New Zealand's largest landlord, and is improving the thermal efficiency of around 40,000 pre-1977 state rental properties through its Energy Efficiency Retrofit Programme. The 10-15 year programme retrofits approximately 2,500 houses each year with energy efficiency features, at a cost of approximately \$4m. HNZC delivers further energy efficiency benefits through its Healthy Housing, Modernisation and Community Renewal Programmes.

- Results achieved - The Wellington School of Medicine's "Housing, Insulation and Health Study"² has compared occupants from a control group of un-insulated houses against those in houses that had been insulated. The study found:
 - a significant improvement in the self-reported health of adults and children living in insulated houses, compared to those in un-insulated houses;

² It should be noted that this study concentrated on households containing members with respiratory conditions and therefore the sample was not representative.

- adults and children in the insulated houses reported less visits to their GP (this decrease being statistically significant in adults);
- adults and children in the insulated houses reported less hospital admissions for respiratory conditions;
- insulated houses had a small but significant drop in energy use and costs, and were drier and warmer (people in insulated houses reported that their houses were significantly warmer); and
- adults in insulated houses were significantly less likely to take sick leave from work, and children were less likely to take time off school.
- Relationship of the programme to internationally agreed goals and targets
The EnergyWise home grants programme is aimed at helping to meet a NEECS objective to retrofit energy efficiency measures (insulation) to all pre-1977 homes by 2016. The NEECS was developed to help NZ to meet its obligation under the Kyoto Protocol to return NZ's average greenhouse gas emissions in 2008-2012 to the 1990 level.

Energy efficiency in transportation: public transport, vehicle efficiency standards and market-based mechanisms

Vehicle Emissions

Vehicle particulate emissions standards were introduced in 2003 under the 2003 Vehicle Exhaust Emissions Rule. It puts in place a vehicle emissions standards regime for motor vehicles entering the fleet that were manufactured after 1990, and aims to ensure that all such motor vehicles have been manufactured to the applicable exhaust emissions standards specified in the rule. The rule was fully implemented on 1 January 2006, and more stringent requirements will be phased in by 2008 as fuel specifications in NZ also grow more stringent. The more stringent rules will result in the progressive exclusion from NZ of vehicles manufactured after 1990 that are not manufactured to emissions standards.

Additional measures to tackle vehicle pollution include:

- Revised fuel specifications, including the progressive reduction of the maximum sulphur content in diesel fuels to 50 parts per million by 2006.
- Amending the 1976 traffic regulations to make it an offence to emit excessive smoke for more than ten seconds.
- Further changes to fuel specification standards.

The Government has not yet imposed any fuel economy standards, but it has begun to collect fuel economy information about vehicles imported from Japan. This data will help provide information for a website the Government is developing to provide fuel economy information to New Zealanders making new and used car purchases. The Government is also committed to providing point-of-sale information on the fuel economy of both new and used cars based on the information in the database.

The National Energy Efficiency and Conservation Strategy transport action plan (http://www.eeca.govt.nz/pdfs/action_plan_transport.pdf) has an objective to improve vehicle fuel efficiency in NZ. The Land Transport Management Act 2003 and the NZ Transport Strategy also aim to help achieve a sustainable land transport system.

The NZ Ministry of Transport leads work in NZ on energy efficiency standards for vehicles. The first stage of the work programme aims to provide accurate information on the fuel consumption of vehicles in NZ. From 28 February 2005 the fuel consumption of every new vehicle, and vehicles first registered in Japan since 2000, will be part of the vehicle's record. A public website is planned to be available by the end of 2005 to assist informed purchasing decisions, and the information will be used in developing further policy. Further work proposed includes voluntary display of information at point of sale, and investigating setting voluntary minimum energy efficiency standards.

The Ministry of Transport is also investigating measures to improve vehicle exhaust emissions, which will assist in improving fuel efficiency through better maintenance and technology improvements.

A comprehensive review of fuel specifications undertaken in 2001-2002 (http://www.med.govt.nz/ers/oil_pet/fuelquality/index.html) led to the introduction of the Petroleum Products Specifications Regulations 2002 (http://www.med.govt.nz/ers/oil_pet/fuelquality/regs/index.html). The regulations provide for a number of improvements in fuel quality that have been introduced in a series of stages between 2002 and 2006, notably substantial reductions in sulphur levels in diesel and benzene levels in petrol. Requirements for 'zero sulphur' petrol and diesel have been indicated but the timing of such requirements has yet to be finalised.

Facilitating the development, deployment and dissemination of energy efficient technologies: policy frameworks and capacity-building

The NZ government has assisted with training and capacity building activities including:

- ♦ businesses, including EECA account managers to provide on site support with energy management for large energy users
- ♦ local government, in programmes for EnergyWise Councils and/or International Council for Local Environmental Initiatives
- ♦ renewable energy industries, working with industry associations. For example, EECA has assisted the solar water heating industry with development of standards and a code of practice, and accreditation and training programmes for solar water heating installers

- ♦ helping build capacity in the insulation retrofit industry, including training of insulation installers
- ♦ helping schools and businesses to establish travel plans

In addition, training and education programmes on energy efficiency are planned for energy intensive businesses from July 2006, with a pilot demonstration project launched in 2005. A government programme on bio-energy includes work on information, knowledge sharing and research and started in 2005.

EECA has also produced a number of publications with information on both energy efficiency and renewable energy. None of the publications are proactively distributed but are available for the public or organizations when requested. The publications are made available for the public to download from the EECA website (<http://www.eeca.govt.nz>).

Energy Star ®

The international mark denoting products with outstanding energy efficiency has been introduced into NZ. Consumers can save on their households and business power bills by choosing Energy Star ® products. 40% of household's energy is used on appliances including fridges, lighting and home electronics. The Energy Star ® label will only be awarded to products that achieve significant energy savings and is expected to cover the top 25% of the market. Energy Star ® will be phased into NZ market with new products added each year. The first phase that ends in June 2006 will cover home electronics, domestic refrigeration appliances and office equipment.

The government has allocated \$3.1 million over the next four years to introduce, promote and administer the Energy Star ® in NZ. Energy Star ® has already been established elsewhere, including the US, Australia, Canada and Europe.

2.3 Meeting growing needs for energy services through increased use of renewable energy, greater reliance on advanced energy technologies, including advanced and fossil fuel technologies

Renewable energy made up 28% of the total consumer energy (502 PJ) used in NZ in the year ended March 2004. The National Energy Efficiency and Conservation Strategy (NEECS) sets a target to increase annual NZ consumer energy from renewable sources by 30 petajoules above the 2000 level by 2012. This includes a target for renewable transport fuels of 2 petajoules per year by 2012. The NZ government's climate change policy also promotes renewable energy. Relevant policies and programmes include:

- the Projects to Reduce Emissions (PRE) programme, administered by the Ministry for the Environment's Climate Change division. This programme

has supported a number of renewable energy projects in NZ beyond 'business as usual' by awards of emission units (see Theme 3 below for more detailed discussion);

- the renewable energy programme administered by Energy Efficiency Conservation authority (EECA) under the NEECS and;
- Legislation including the Resource Management Act 1991 and the Resource Management (Energy and Climate Change) Amendment Act 2004.

Wind Power

Wind makes up the largest and fastest growing share of NZ's emerging portfolio of renewables. Currently, wind farms make up 168 MW, or less than 2% of existing capacity. Wind farms for which planning information has been made public could add over 700MW, which would increase wind capacity by more than five times the current amount.

Renewable energy for poverty eradication and productive activities

NZAID is in the process of finalising its Environment Policy that focuses on those environmental development issues that most relate to poverty elimination. The draft policy identifies access to environmentally sound and locally appropriate technologies, including for energy, as being particularly important in enhancing the capacity of poor people to manage their environment. As it is not yet finally approved, the policy has yet to influence NZAID investments and interventions.

NZAID has, however, been involved in energy supply assistance to particular Pacific small island developing states in an ad hoc way through bilateral programmes, notably the provision of **reticulated electricity to Tokelau, and to the Niua Group in Tonga.**

NZAID is also a core funder of the South Pacific Applied Geoscience Commission, (SOPAC), which has the regional mandate for energy in the Pacific. NZAID funding to SOPAC is at a programme level and thus includes, without specification, its energy programme. SOPAC have recently led the revision of the Pacific Energy Policy. This Policy forms the basis of the Pacific Island Energy Strategic Action Plan (PIESAP).

When the NZAID Environment Policy is approved, the Agency's Pacific Environment Programme will be reviewed. This review will establish a clearer focus on assistance to poverty-related activities and programmes including NZAID's commitments to Pacific Umbrella WSSD 'Type 2' partnership initiatives, one of which is the principal funding mechanism for the PIESAP.

Renewable Energy Project – Tonga

NZAID is funding a renewable energy project to advance social and economic development by providing solar electrification to households on the remote Niuafo'ou Island. NZAID will contribute \$950,000 to this project from 2004 to 2007.

Facilitating the development, deployment and dissemination of renewable energy technologies in both developed and developing countries: policy frameworks and capacity building

Because New Zealand's small size and limited resources means it is advantageous for us to work in conjunction with others when conducting R&D for new technologies, New Zealand is a particularly active participant in international organisations for the research, development and implementation of renewable energy technologies.

For example, New Zealand is an active participant in the APEC Expert Group on New and Renewable Energy Technologies (ENGRET), which is responsible for the APEC 21st Century Renewable Energy Development Initiative (REDI). The REDI itself consists of nine 'Collaborative Efforts' or projects, three of which are led by New Zealanders. These are the *Distributed Energy Resources* project, the *Alternative Transport Fuels* project and the *Web-Based Renewable Energy Information Dissemination* project. A work stream stemming from the last of those projects is the *Renewable Energy Collaborative Projects Indicator (APEC-CPI)*. APEC-CPI was funded from the APEC Trade and Investment Liberalisation Fund the work was conducted by a New Zealand contractor (Evolution Technologies). The APEC-CPI is a secure database where participants can develop ideas, advertise skills, store research, look up an industry specific library, see the latest industry news, finance ideas, and develop ideas into projects and work on them in one environment that gives access to a range of resources.

New Zealand is also an active participant in the International Energy Agency (IEA) 'Working Party on Renewable Energy Technologies' (REWP) and is an active member of all five of the 'Implementing Agreements' carried out under this working party's auspices. These are the *Bioenergy*, *Geothermal*, *Solar Heating and Cooling*, *Wind Turbine Systems*, and *Hydrogen Implementing Agreements*.

Other examples of New Zealand's participation in international organisations for the research, development and implementation of renewable energy technologies include the *International Partnership for the Hydrogen Economy* (IPHE), the *Johannesburg Renewable Energy Coalition* (JREC), and the *Renewable Energy and Energy Efficiency Partnership* (REEEP).

Advanced energy technologies, including advanced clean technologies for fossil fuels

The government funds energy research in NZ principally via the Foundation for Research, Science and Technology (<http://www.frst.govt.nz/>). Current government funded energy research includes;

- ♦ *renewable energy*: wave energy conversion, bioenergy, solar photovoltaic energy, geothermal energy and small scale renewable electricity generation;
- ♦ *energy efficiency*: improved industrial controls, industrial heat pumps, residential household energy use, and travel behaviour;
- ♦ *advanced energy technologies*: hydrogen (production from coal and renewable energy, storage and use in fuel cells), carbon dioxide geological sequestration.

Privately funded research in NZ has included the development of a micro scale cogeneration unit by Whispertech and a novel wind turbine generator by Windflow Technology.

2.4 Investing in Energy and industrial development activities

Enabling environment, including national energy and industry policies and regulatory framework, for increased investments in energy and industry

New Zealand has been through a recent process of considering the investment environment in relation to investment in exploration of our continental shelf. Maui gas previously available in large quantities and at cheap prices has played a very significant role in the New Zealand economy over the past thirty years. The Maui gas/condensate is nearly depleted and so are the low gas prices that have stifled exploration for the replacement of these gas resources. To increase investment in the exploration of New Zealand's petroleum basins to replace these depleting hydrocarbon assets, in particular gas resources for on-going electricity generation, the government has introduced a number of initiatives to make exploration for hydrocarbons more attractive. These have included:

- ♦ Improving the fiscal regime - reducing royalties to encourage exploration and development - these changes were made in the new Minerals Programme for Petroleum that came into effect on 1 January 2005.

- ♦ Relaxing the taxation regime on seismic vessels and offshore drilling rigs in order to make data acquisition and exploratory drilling and development more attractive for explorers.
- ♦ Providing additional funding for improving access to "open file geotechnical" data.
- ♦ Providing additional funding for the acquisition of new geophysical seismic data - off shore East Coast, North Island.
- ♦ Providing additional funding for the promotion of the hydrocarbon potential of New Zealand to offshore petroleum investors - in particular the block offers – (Northland, Outer Taranaki Basin Block offers).

2.5 Progress on New Zealand Commitments

WSSD commitments

Johannesburg Renewable Energy Coalition (JREC)

At WSSD Heads of State agreed that there was a sense of urgency, to substantially increase the global share of renewable energy sources with the objective of increasing its contribution to total energy supply. To ensure there was adequate follow-up NZ joined 18 other countries³ to make a joint political declaration titled "*The way forward on renewable energy*". As of June 2004 88 countries had joined the Coalition. The EC has hosted the JREC Secretariat since 2003.

NZ has not taken an active role in JREC beyond WSSD.

Renewable Energy and Energy Efficiency Partnership (REEEP)

REEEP was established at WSSD in 2002 as a public-private partnership to accelerate market growth and the uptake of renewable energy and energy efficiency technologies.

NZ became a member at REEEP's official launch in the UK in 2003. In January 2006 Australia established a REEEP secretariat for the South-East Asia and Pacific Region hosted by the Australian Business Council for Sustainable Energy. The current government partners in this region include New Zealand, Australia, Indonesia, the Philippines and Singapore.

To date NZ has not played an active role in REEEP. NZ has a small renewable energy and energy efficiency industry that has not engaged with REEEP. With

³ Bulgaria, Cyprus, Czech Republic, Estonia, The European Union, Hungary, Iceland, Lithuania, Malta, New Zealand, Norway, Poland, Romania, Slovakia, Slovenia, The Alliance of Small Island Developing States, Switzerland and Turkey.

The recent establishment of the regional secretariat in Australia has prompted a further consideration of NZ's engagement with REEEP.

Type II⁴ Partnerships

The Type II partnership initiatives were established at the World Summit on Sustainable Development in Johannesburg in 2002 in response to the need for better collaboration between national, regional and international stakeholders in the implementation of development activities. The Type-II's⁵ are legally non-binding voluntary commitments that involve a multiple actors including NGO's, business and civil society groups and focus on collaboration to achieve WSSD and MSI agreed outcomes. Type II partnerships provide an alternative to long drawn out negotiations. There are currently 319 Type II partnerships registered with CSD.

The Pacific developed 14 "Umbrella" partnerships that cover a wide range of sectors and issues. These partnerships are being developed and facilitated by Pacific regional agencies on behalf of their member countries. They should provide a single credible strategy for key sectors around which donor support can be aligned, as well as a mechanism for coordinating activities so that lessons can be shared and gaps identified.

New Zealand indicated at Johannesburg that we would pursue an interest in six of the Pacific umbrella partnerships (water and sanitation; waste management; vulnerability; adaptation; energy; and mainstreaming conservation and traditional knowledge) as well as four global and/or pilot partnerships (HIV/AIDS; invasive species; education for sustainable development; and a governance for community-based sustainable development pilot in Fiji).

New Zealand's engagement with the various Type II partnerships will be reviewed as part of NZAID's programme strategy process in 2006. It is likely that NZAID will continue to support the type II partnerships but focus on deeper engagement with a smaller number of partnerships.

Type II Partnership - Pacific Island energy for sustainable development
NZAID is not directly engaged in the partnership at present. We understand the EU are providing substantial support to this Type II.

⁴ Type I partnerships are those that are referred to in agreements that are negotiated by states and include political agreements such as conventions and declarations.

⁵ CSD guidelines for Type II partnerships provide that they are: voluntary initiatives by governments and stakeholders; contribute to the implementation of Agenda 21 and the JPOI; are not a substitute for supplement the commitments by governments; add value to existing implementation processes; are in accord with the economic, social and environmental dimensions of sustainable development; are based on predictable and sustained resources; are sectorally and geographically balanced; are transparent and accountable allowing an exchange of information with government and other stakeholders; are publicly announced and consistent with national laws and sustainable development strategies.

Commitments made at the International Conference on Renewable Energy in Bonn 2004, Bonn, Germany

APEC-CPI – the Global New and Renewable Energy Technologies Forum and

Marketplace

Status – became operation on 15 May 2004

Objective – To bring together private and public sector players, from the APEC economies and globally, through a web-based collaborative trade platform and to accelerate development and uptake of new and renewable energy technologies.

Target area/place – Asia Pacific and global

Leading Actors – New Zealand (Ministry of Economic Development) and Asia-Pacific Economic Cooperation (APEC) (Experts Group on New and Renewable Energy Technologies)

Summary – APC-CPI (Collaborative Projects Integrator) is a secure database where participants can develop ideas, advertise skills, store research, look up an industry specific library, see the latest industry news, fiancé ideas, and develop ideas into projects and work on them in one environment that gives access to a range of resources.

Arrangements for financing – This is a public/private partnership with APEC and Evolution Technologies providing initial seed funding. Ongoing financing will be provided through subscription and opportunities for government and corporate sponsorship.

Expected results – Improved global technology transfer leading to increased uptake of renewable energy technologies.

Projects to Reduce Emissions (PRE)

Through the 'Projects to Reduce Emissions' (PRE) programme, the Government provided incentives to initiatives that would reduce greenhouse gas emissions prior to and during the Kyoto Protocol's first commitment period. In order to qualify, projects had to be uneconomic without the incentive. For example, some wind energy projects did not qualify for these incentives as wind energy is often already economic in New Zealand. The programme took advantage of the Kyoto Protocol's joint implementation mechanism, encouraging the development of projects by providing a share of New Zealand's Kyoto emissions units, which can be traded on international markets. The benefit to New Zealand in terms of emissions reductions comes from the difference between the amount of credits the government provided to the project and the reductions the project actually delivers.

PRE projects were selected through annual tender rounds (a third round is currently on hold pending a review). After a selected project has delivered

verified emissions reductions it receives emissions reduction units in the form of assigned amount units (AAU) from the government. AAUs are tradable emissions units under the Kyoto Protocol's emissions trading mechanism that can be used during the first commitment period. The provision of these is not intended as an immediate financial incentive, but instead provide longer term incentives as companies can sell the credits on Kyoto emissions credit markets in 2008 and beyond.

During the two tender rounds so far completed, 41 projects have received contracts for the provision of a share of 10.6 million Kyoto emissions units. In total 11.9MtCO₂ in reductions are expected from the projects, resulting in a net benefit to the country of 1.3 MtCO₂ over the first commitment period.