4.4 Energy (non-transport)

Summary

This section:

- summarises current climate change policy settings applying to the energy (non-transport) sector, including both price-based and non-price-based measures
- assesses the rationale for existing non-price-based measures in the energy sector
- undertakes an assessment of each non-price-based measure, including the climate change benefits, any co-benefits, and the cost of the measure.

It concludes:

- there is currently a well-developed package of non-price-based measures in the energy sector, including an appropriate mix of policies
- there is a clear rationale for all existing non-price-based measures in complementing a price-based measure
- based on current cost-effectiveness and gross impact, the Energy Efficiency of Products programme presents the greatest potential for additional energy-efficiency improvements (and therefore emissions reductions)
- the Emprove programme demonstrates positive impacts in terms of emissions reductions, indicating there may be further value (from a climate change perspective) in expanding this programme. Consideration should also be given to a coherent and overarching public awareness campaign on energy efficiency
- it would be appropriate to wait until EECA's review of the NEECS is completed before any decisions are made on adjusting the existing package of non-price-based measures, given the NEECS review will undertake a more comprehensive assessment of energy efficiency and renewable energy policies.

In 2004, non-transport energy emissions (primarily arising from combustion of coal and gas and discharge of geothermal fluid) accounted for 23% of total New Zealand emissions, a large majority of which are carbon dioxide. A further breakdown follows:

Table 18 - Breakdown of Non-transport Energy Emissions

Energy (non-transport) Sub-sector	Emissions in 2004 (Mt CO_2e)	% of total New Zealand emissions [109]
Thermal electricity generation	6.07	8
Other transformation (emissions from fuel combustion in energy-producing industries including petroleum refining, synthetic petrol production, and oil and gas extraction and processing)	1.12	1
Industry (emissions from fuel combustion in industry, including industrial electricity generation)	5.09	7
Other sectors (emissions from fuel combustion in commercial and institutional buildings, households, agriculture, forestry and fishing)	3.48	5
Fugitive (such as gas venting and geothermal field discharges)	1.58	2
Total	**17.34**	**23**

Source: MED, New Zealand Greenhouse Gas Emissions 1990 - 2004

4.4.1 Current policy settings (including NEECS where relevant)

Current policies targeted at or significantly impacting on greenhouse gas emissions in the energy sector are listed below. The full details of these policies have been outlined in Sections 3.2.4 and 3.2.5.

Price-based measures include:

- the carbon tax
- NGAs
- the PRE programme.

Non-price-based measures include:

- the energy-intensive businesses policy
- a suite of programmes implemented by EECA that aim to improve energy efficiency and the development of renewable energy
- recognition of the benefits of energy efficiency and renewable energy in the RMA
- research and development expenditure of approximately $1.8 million per annum (Ministry for the Environment, 2004e) dedicated to mitigating greenhouse gas emissions in the energy sector
- electricity regulations to require retailers to offer low-fixed-charge tariff options to domestic consumers
- pending regulations on providing access to electricity distribution lines for distributed generation (which will contribute to emissions reductions if generation is based on renewable energy)

[109] Based on 2003 total.

- Electricity Commission energy-efficiency pilots.

Note that the Electricity Commission pilot programmes are temporary (their lifespan ranges from three months to 18 months) and are subject to their own review process and potential modification or discontinuation. They will therefore not be assessed further below in the context of a sustainable climate change policy package.

4.4.2 Options – price-based measures

The Review has identified three broad options for a price-based climate change measure: proceeding with the current carbon tax/NGA regime, adopting a low-level carbon tax with few exemptions, or postponing adoption of a price-based measure until other countries adopt similar measures. Given the likely exclusion of agriculture from the coverage of any price-based measure (as a result of lack of coverage internationally), the primary focus of a price-based measure will be energy-sector emissions. Energy-sector impacts of these options are therefore generally canvassed under the individual assessments of these options in Section 4.2. Note that the PRE programme is subject to a separate analysis in Section 4.2.5 and the transport component of energy emissions is discussed separately in Section 4.5.

4.4.3 Options – non-price-based measures

Although price-based measures are generally considered to be more effective than a "command and control" or regulatory approach in achieving emissions reductions at lowest cost, non-price-based measures as discussed in Section 4.3 may be necessary (also at Ministry for the Environment, 1999) to:

- market imperfections in the emissions sectors that are covered by a price-based measure
- change in people's tastes and preferences. An inherent attribute of using the market to create incentives for behaviour change is that individuals apply their own sense of values to their decisions. In some cases, it will be preferable to encourage individuals to alter their preferences beyond what price would imply on its own (eg, the Government invests in warning the public about the dangers of smoking and alcohol, despite the heavy externality taxes already applied)
- distributional and equity issues
- emissions sectors not covered by a price-based measure.

Common market imperfections in the energy sector that may lead to the adoption of a non-price-based measure include:

- lack of information (information is too costly or difficult for individuals to acquire)
- barriers to access to capital
- split incentives: ie, the person making decisions is not the one to face the consequences or benefits of that decision
- some information is underprovided because of its public-good characteristics; eg, underinvestment by the private sector in research and development, given the inability to exclusively capture the benefits.

The following table assesses where non-price-based energy measures (including existing measures) may be necessary to complement or enhance the effect of a price-based measure. It looks at where market imperfections might arise, where distributional and equity issues might arise, and where changing people's tastes and preferences might add further benefit. While there may be other reasons to pursue the non-price-based measures identified (including productivity benefits, local environmental benefits and health benefits), the table basically derives the "climate change rationale" for why these measures might be adopted.

Table 19 - Potential Non-Price-Based Energy Measures to Complement a Price-Based Measure

	Desired impact of a price-based measure	Is there a market imperfection?	Are there distributional or equity issues?	Would changing tastes and preferences provide further benefit?
Energy Supply (electricity generation, transmission and distribution)	Generators displace fossil fuel generation with renewable generation or more carbon-intensive fossil fuel generation (coal) with less carbon-intensive (gas)	Establishing new renewable generation may encounter resource management obstacles. This issue is targeted by recognising benefits of renewable energy and energy efficiency in the RMA. Some small firms may not have access to information on the benefits of renewable generation, including the option of distributed generation. This issue is targeted through EECA's promotion of renewable energy to potential and existing generators and through its encouragement of the uptake of small-scale renewable energy technology. There may be transaction costs for small generators negotiating connection of distributed generation to transmission lines. To address this issue, regulations to provide for the connection of distributed generation to distribution lines on reasonable terms and conditions are being developed.	Windfall gains will accrue to renewable generators although no efficiency implications arise as a result.	No. Commercial incentives are the primary driver for these firms, although some companies may simply choose to maintain a limited portfolio of generation options that they are expert in; eg, developing a wind or geothermal portfolio requires the development of new specialist expertise.
	Generators adopt more emissions – efficient technologies	No. Firms are well informed, well resourced and well motivated to respond.		
	Generators invest in research and development to develop more emissions-efficient technologies	It is difficult for a firm to exclusively capture the benefits of research and development and use them to gain a competitive advantage (research and development has the traits of a "public good"). This reduces the incentive for firms to invest. This "market failure" is addressed through public funding for climate change mitigation research, which is assesses in 4.4.4.		

Energy demand-industrial	Firms move to less emissions – intensive fuel types.	No. Firms are well informed, well resourced and well motivated to respond.	No. Costs fall appropriately on those undertaking emissions-inducing activities.	No. Commercial incentives are the primary driver for these firms.
	Firms reduce the emissions intensity of their industrial processes	Firms may lack information on how to reduce energy use and therefore not respond appropriately to the price-based measure. There may also be financial constraints on firms investigating energy efficiency, particularly if energy is not considered part of the core business. The **Emprove** programme aims to address these barriers for high-energy use firms by providing grants for energy audits.		
	Firms invest in research and development to develop new business processes or capital that will improve emissions intensity	As above, the public-good nature of research and development is addresses through **public funding for climate change mitigation research,** assessed in 4.4.4.		

Energy demand commercial and SMEs	Firms conserve energy or improve efficiency	There may be information barriers to change. As energy use may not be a core cost for these firms, they may lack information on how to reduce energy use and therefore not respond appropriately to the price-based measure. Existing non-price measures targeting this failure include the **4 Million Careful Owners** and **Emprove** programmes. EECA's provision of financial assistance for energy audits under **Emprove** also provides targeted information on reducing energy use. Education for company mangers and staff as part of the **energy-intensive businesses** policy also aims to address this issue. Split incentives may exist, where the party investing in capital may not receive the full resulting benefits; eg. landlord/tenant, builder/occupier, retrofitter/new owner. This issue is partially addressed through changes to the **Building Code** to facilitate the efficient use of energy and the use of renewable energy in buildings. It is also partially addressed by **minimum energy-performance standards**, where require certain types of appliances and equipment to reach a minimum level of energy efficiency. Price signals sent by the price-based measure may be distorted by strategic behaviour. For example, electricity generators or retailers may choose to recoup the impact of the price-based measure through one sector more than another. Aside from applying strict regulations, it is difficult to address this issue through a non-prices measure.	No Costs fall appropriately on those undertaking emissions-inducing activities.	Information and education about the risks of climate change and the importance of conserving energy may encourage these firms to make decisions about their energy consumption that benefit New Zealand overall. This potential benefit is targeted through the **Emprove** and **4 Million Careful Owners** programmes, and training for company directors to influence an energy conservation culture under the **EIB** policy.

Energy demand commercial and SMEs cont.	Firms conserve energy or improve efficiency cont.	Price signals sent by the price-based measure may be distorted by pricing methodologies. For example, firms on fixed-or mostly fixed-price contracts will not receive immediate signals from the measure. The structure of the electricity market means electricity end users will not receive price signals differentiating renewable and non-renewable electricity. This effect is difficult to avoid without significantly altering market structures. There may be bounded rationality; ie, energy is a low proportion of total expenditure or is perceived as a necessity and hence does not command discretionary attention. This issue is partially addressed through the **EIB** policy, which will involve training for company directors to influence and energy-conservation culture, and through training and information under the **Emprove** programme.		
	Firms move to less emissions – intensive fuel types	The risks associated with new technologies may delay the uptake of these technologies beyond what would be optimal from New Zealand. Demonstration projects under the **energy-intensive businesses** policy aim to address this through providing support for innovation and technology uptake, as does the provision of loans and information through the **Emprove** programme for energy efficiency or small-scale renewable energy investment.		
Energy demand – residential	Households conserve energy or improve energy efficiency	There may be information barriers to change. For example, households may lack information on how to reduce their energy use and therefore not respond appropriately to the price-based measure. Existing non-price measures targeting this failure include the **4 Million Careful Owners** and **Emprove** programmes, and the implementation of **energy-performance labelling** on some products. Split incentives may exist, where the party investing in capital may not receive the full resulting benefits; eg, landlord/tenant, builder/occupier, retrofitter/new owner. This issue is partially addressed through changes to the	Distributional impacts of price-based measures on households are ambiguous: low-income households spend a greater proportion of their income on carbon-intensive commodities such as petrol and electricity, but several commodity types on which higher-income households spend proportionally more will also undergo substantial price	Information and education about the risks of climate change (essentially making people more “climate aware” or “climate friendly”? may help consumers make decisions about their consumption that benefit New Zealand overall. Information provided under the **4 Million Careful owners** programme aims to address this issue

		Building Code to facilitate the efficient use of energy and the use of renewable energy in buildings. It is also partially addressed by **minimum energy-performance standards**, which require certain types of appliances and equipment to reach a minimum level of energy efficiency. Price signals sent by the price-based measure may be distorted by pricing methodologies. For example, households on fixed-or mostly fixed price contracts will not receive immediate signals from the measure. This issue is partially addressed through regulations requiring electricity retailers to offer a **low-fixed charge tariff** to small electricity users, enabling them to receive more financial benefit from controlling their electricity use. The structure of the electricity market means electricity end users will not receive price signals differentiating renewable and non-renewable electricity. This effect is difficult to avoid without significantly altering market structures.	increases. Kerr concludes a carbon tax on petrol may have the greatest impact on middle-income households. Substantial equity issues are not predicted to arise as the overall impact of a price-based measure on energy prices is expected to be low initially and a large subset of the low-income group most vulnerable to increases in prices will be partially compensated: benefits and superannuation are CPI adjusted and Family Support will be indexed to increases in the CPI from 2008.	
Energy demand – residential Cont.	Households conserve energy or improve energy efficiency. Cont	There may be bounded rationality: ie, energy is a low proportion of total expenditure or is perceived as a necessity and hence does not command discretionary attention. This is partially addressed through information provided through the **4 Million Careful Owners** programme, and through the **residential housing** programme Financial barriers to change may exist. For example, low-income households may not have access to funds to purchase capital to improve their energy efficiency. This issue is partially addressed through the awarding of **grants for the installation of insulation in low-income homes**.		

The table identifies that there is a rational role for all existing non-price-based energy measures, under a situation where a price-based measure is adopted.

Non price-based measures where there is a broad, low-level carbon tax

One of the price-based measures put forward in the review is that of a low-level (maybe $5 per tonne of CO_2e) carbon tax with few exemptions, which may be ramped up over a period that is compatible with New Zealand's economic objectives. In this situation, the low-level price-based measure would still be a central climate change measure in the energy sector.

However, a low-level tax would be unlikely to initially result in significant emissions reductions. Undertaking an enhanced range of measures in the energy sector could be considered. As a result, a lower threshold may be adopted when assessing the cost-benefit ratio of complementary measures to include in a climate change package.

Non-price-based measures where there is no price-based measure

Price-based instruments are considered to be particularly important as part of New Zealand's policy response to climate change, as they can cover a broad range of emitters and overcome information barriers that make it difficult to construct a "command and control" approach. However, for a number of reasons (including that competitiveness issues arise if other countries are not moving to a similar measure) the Government may wish to postpone the adoption of a price-based instrument in New Zealand. In this situation, it may be appropriate for the Government to adopt a greater range of non-price measures, including in the energy sector, so that New Zealand's climate change policy package is internationally credible.

Little analysis has been undertaken in New Zealand on preferred non-price-based measures in the absence of a price-based measure. Following electricity generation dry years in 2001 and 2003, the Government commissioned a report (Charles Rivers Associates, 2003) examining the effectiveness of various financial incentives in promoting the uptake of energy-efficiency measures among firms. The report looked at direct cash grants, subsidies for equipment purchases, loans and tax concessions.

Overall, direct cash grants appeared to be the preferred intervention. Among their advantages was that they could be used for any qualifying technology or investment, meaning decisions would be based on the benefits delivered as opposed to the specific technology option pursued. Direct cash grants had the most significant impact on investment payback periods. However, it was acknowledged that the direct cost of grants to Government is considerably higher than measures such as loans, as there is no payback.

Financial assistance for equipment purchases were thought to be inferior to grants, as in some cases, vendors may capture some of the assistance through not wholly deducting the value of subsidies from their prices. Moreover, this type of assistance will necessarily steer investments towards particular technologies. Loans and tax concessions were shown to have a minimal effect on payback periods and loans had

the additional disadvantage of reducing the firm's ability to borrow to fund its core activities (given they will appear as a debt on the firm's balance sheet).

This analysis, however, excluded other non-price-based measures such as regulation and generally was constrained by lack of information on the energy-efficiency opportunities available, existing penetration and take-up rates for energy-efficiency investments, and likely take-up rates of different incentive mechanisms.

The remainder of this section makes some assessment of the climate change benefits of existing programmes. EECA is currently undertaking a review of the NEECS, which provides the strategic context for EECA's package of energy efficiency and renewable energy measures. The Energy Efficiency and Conservation Act 2000 requires the NEECS to be reviewed five years after it comes into force and requires the Minister of Energy to determine whether or not the NEECS needs to be replaced by a new strategy. This first stage will involve a stocktake of current NEECS programmes, an assessment of best practice, and an assessment of programme "gaps". Should the Minister decide that a new strategy is to be developed, a more in-depth assessment of options for additional and expanded programmes will be undertaken. It is therefore recommended that any decisions to adjust the existing package of measures should follow completion of the NEECS review. However, this section provides an initial assessment from an emissions reduction perspective of the value of existing programmes.

4.4.4 Assessment – non-price-based measures

In the context of climate change policies, non-price-based measures should proceed:

- if they promote both economic welfare and emissions reductions: ie, a "win-win" or "no-regrets" measure. A number of non-price energy-efficiency measures are likely to fall into this category, given the potential cost savings associated with energy efficiency; or

- where the measure involves some economic cost but produces emissions reductions that deliver benefits unambiguously sufficient to offset those economic costs. Co-benefits are also an important consideration in assessing overall net benefits.

This section will examine the non-price-based measures identified in Table 19 above. It will attempt to determine where expected economic-welfare gains, in addition to emissions-reduction benefits, make the intervention a no-regrets measure. In situations where an economic cost is expected, the section will attempt to determine whether the climate change benefits outweigh that cost. Where there are clear co-benefits, these will be noted and incorporated in the assessment.

References to energy-efficiency savings and avoided emissions indicate the additional impact per annum from the programme[110], as estimated by EECA for the 2005/06 year. Energy and emissions savings from these programmes are "locked in" and therefore accumulate over time.

[110] Except the potential emissions savings quoted for the EIB programme, which represents a linear level of savings.

Measuring the benefits, both climate change and otherwise, of non-price energy-sector measures tends to be difficult, given a lack of evaluation and monitoring data and, in particular, difficulty in assessing where benefits are directly attributable to the specific programme.

Energy-intensive businesses (EECA)

Type of policy: information provision and financial incentives

The energy-intensive businesses policy aims to assist small and medium energy-intensive firms (ie, those that do not negotiate NGA agreements) to reduce greenhouse gas emissions and mitigate the possible adverse effects of a carbon tax through improved energy efficiency. The interventions included in the EIB programme were identified in a survey of small and medium enterprises (SMEs) undertaken by PricewaterhouseCoopers to identify potential adverse effects of a carbon tax on competitiveness. International examples of energy-efficiency programmes for SMEs were also reviewed to inform the design of EIB policy.

The grants scheme was assessed as being the most appropriate financial incentive (compared to subsidies, loans and tax concessions) due to low administration costs, flexibility and effectiveness in reducing payback time.

Demonstration projects in targeted firms are considered an effective means of support for innovation and technology uptake to promote energy efficiency in these industries. EECA and The Ministry for the Environment intend to work with industry associations to identify suitable sites to demonstrate technologies that have cost-effective energy savings but low uptake.

Training and education programmes will be targeted at top management, as this is considered to have the greatest influence on behaviour change. It has been identified that energy-efficiency and conservation values are less strongly held in New Zealand-owned companies than in offshore-owned companies operating in New Zealand.

Targeting these measures at areas where the most cost-effective gains are thought to exist will help maximise the benefits derived from available funding.

Climate change benefits

As this policy is only beginning to be implemented, an ex-post assessment of its impact on energy efficiency and therefore emissions reductions is not possible.

The Ministry for the Environment states that the potential for emissions reductions by SMEs is small but not insignificant. It is estimated that SMEs were responsible for around 5Mt of carbon dioxide emissions in 2002. It is thought that there may be proportionately greater potential for energy-efficiency improvements in SMEs than in other, larger firms. Based on results achieved to date through its own programmes, EECA estimates most SMEs are capable of achieving energy-efficiency gains of between 5% and 7%. If all SMEs achieved a reduction of 5% in their energy use as a result of this policy, emissions reductions of 0.25Mt of CO_2 per year would be achieved. However, given that the policy will focus on specific sectors, a

considerably lower level of emissions reductions (probably under 0.1Mt of CO_2 per year) would be more realistic. EECA has noted that there is a risk that current funding associated with this programme is insufficient to provide credible support to all affected sectors.

Co-benefits

Material improvements in energy efficiency achieved under the policy will have a number of co-benefits, including helping businesses to adjust to the carbon tax through reducing their costs, improving New Zealand's security of electricity supply (through reducing both peak load and overall load), and delaying the need for investment in new generation, thereby reducing local environmental impacts.

Costs

Government funding of $1.482 million (GST exclusive[111]) has been agreed. As EIB policy will focus on providing information to SMEs on the benefits and ways to improve energy efficiency to inform the firms' decisions, costs imposed on firms will be very low.

Conclusion

This policy has been designed to achieve cost-effective energy-efficiency gains with the limited funding available. An ex-ante assessment of the climate change benefits and co-benefits is not possible, as the policy is only beginning to be implemented. Based on EECA's estimates, there appears to be good potential to reduce emissions among SMEs. There would also be a number of co-benefits associated with any energy-efficiency improvements achieved.

Based on the low cost of this policy and these potential benefits, this policy is considered likely to result in a net economic welfare gain and emissions-reduction benefits for New Zealand, and is therefore a no-regrets measure. It would be appropriate for this policy to continue to operate at its current level (allowing for the introduction of the training and education components in 2006/07) until ex-post evidence on its effectiveness is available.

Emprove (EECA)

Type of policy: information provision and financial incentives

The Emprove programme aims to promote business uptake of energy-efficiency measures. It offers grants for energy audits and provides information to raise awareness of the opportunities to improve profitability through good energy management. Loans are also offered to government departments, local authorities and Crown entities to implement energy savings.

Emprove focuses primarily on the top 30 energy-use companies (which consume 71% of business energy use), with a secondary emphasis on the 80 next-largest energy users. In implementing the programme, EECA targets the areas that will

[111] Note that in this section dollar values are GST exclusive unless otherwise noted.

bring the greatest benefits to businesses and also help to reduce greenhouse gas emissions.

The programme attempts to take a "multiple barrier" approach. It provides focused education and information provision through energy audits, and offers grants to overcome financial barriers. In other countries, a similar approach has helped to develop an active and competitive market for energy service companies. Energy audits are considered to provide a high benefit-to-cost return.

Climate change benefits

EECA have estimated that Emprove will provide 0.2 PJ of annual energy-efficiency improvements and 0.02Mt of avoided carbon dioxide emissions per annum. EECA notes this estimate is reasonably robust, given sound experience with the underlying programme.

Co-benefits

Improvements in energy efficiency resulting from this programme will help to reduce business energy costs (thereby improving economic competitiveness), improve the security of supply of New Zealand's electricity system, and may delay the need for investment in new generation (thereby reducing associated local environmental impacts).

Costs

Total costs of the Emprove programme to EECA are $2.056 million in 2005/06. The programme is therefore estimated to achieve 1 PJ of energy-efficiency savings at a cost of $10.3 million (EECA, 2005). Some energy-savings opportunities identified through audits will be achieved only through investment in new energy-efficient capital or processes. In these cases, firms will face some up-front investment costs. However, up-front costs are likely to be offset through accumulated energy savings. Firms will draw on their own investment criteria in making these investment decisions.

Conclusion

The Emprove programme appropriately focuses on the businesses where there are the highest potential energy savings. It also employs a multi-barrier approach to address both information and financial constraints. The programme has demonstrated a relatively strong history of energy savings, resulting in greenhouse gas emissions reductions and a number of co-benefits.

The programme costs approximately $2 million per annum to implement. Based on a 0.2 PJ per annum energy-efficiency improvement, the programme may be expected to save approximately $5 million per annum in business energy costs.[112] This

[112] Based on an average industrial price of electricity of $25.3 million/PJ (GST incl.), derived from the July 2005 Energy Data File. Note, however, that savings in industrial energy costs will have some impact on the profitability of electricity retailers.

indicates the programme is likely to achieve a net gain in economic welfare and is therefore a no regrets policy.

A strong benefit-to-cost ratio indicates Emprove might achieve additional cost-effective energy savings if additional resources were available. However, given the programme already focuses on those companies with the highest energy use, expanding the focus of the programme could bring diminishing returns for each additional dollar spent. Overall, with currently available data, the value of expanding the Emprove programme is unclear. Should an overall expansion of complementary energy measures by undertaken, it would be worthwhile exploring the potential benefit of expanding Emprove in more detail.

Building regulations (EECA)

Type of policy: regulations

Building regulations are considered the simplest and most effective way to ensure minimum levels of energy efficiency in new commercial and residential buildings. This programme seeks to influence the review of the New Zealand Building Code to ensure energy-efficiency measures are included in the development of new housing stock. It also involves undertaking some supporting research to increase understanding of energy use in buildings. It is generally considered that incorporating energy efficiency at the design stage delivers good value for money. This measure is used in many countries to address energy use in buildings and provide other benefits.

Climate change benefits

Household energy use in New Zealand is low compared with other developed countries. It is expected that EECA's efforts to improve energy efficiency in this area will result in a slower increase in energy use rather than a significant decrease.

EECA has predicted that a 0.01 PJ per annum improvement in energy efficiency may be possible from this programme, resulting in 1,400 tonnes of avoided carbon dioxide emissions. Actual energy (and emissions) savings may be very difficult to measure.

Co-benefits

Given that anticipated energy savings are very small, associated co-benefits will be small also. In principle, designing energy-efficient buildings will reduce energy costs for the occupant (which, in the case of business, will improve economic competitiveness) and may improve the warmth of these buildings, thereby increasing comfort and reducing negative effects on health. Nationally, improved energy efficiency will improve the security of supply of New Zealand's electricity system, and may delay the need for investment in new generation (thereby reducing associated local environmental impacts).

Costs

The total cost of the building regulations work programme for EECA is $0.3 million per annum. The programme is therefore estimated to achieve 1 PJ of energy-

efficiency savings at a cost of $30 million (EECA, 2005). Increased private building costs may result from using energy-efficient materials and design, although these may be offset by accumulated energy savings.

Conclusion

Incorporating energy efficiency at the design stage of building construction is considered to give good value for money in the long term. However, measuring realised gains from this programme will be very difficult.

The programme costs $0.3 million per annum to implement. Based on a 0.01 PJ per annum energy-efficiency improvement, the programme may be expected to save approximately $0.37 million per annum in residential and business energy costs[113]. This estimate indicates there may be a marginal economic-welfare gain as a result of this programme. Taking into account associated climate change and co-benefits, plus the long-term locked-in nature of efficiency gains achieved through design and construction practices, it is considered this programme is justified on an overall cost-benefit basis, if not a no-regrets policy.

Given the one-off nature of the Building Code review, it seems unlikely there would be value in expanding this programme on a sustainable basis.

Residential housing (EECA)

Type of policy: information provision and financial incentives

This programme provides information and targeted financial incentives to reduce energy use in the home. It includes the EnergyWise Home Grants programme, which provides financial assistance for installing insulation in pre-1977 homes (when the Building Code introduced mandatory requirements on insulation in new homes) occupied by low-income families. Rental properties are included, which will assist in cases where investment is hindered by split incentives (ie, between landlords and tenants). The programme also includes the Home Energy Rating Scheme, which aims to raise awareness of, and improve, residential building energy efficiency by providing reliable information to encourage home owners to improve the energy performance of their homes. The Home Energy Rating Scheme targets middle-to-high income owners of pre-1977 homes.

The programme focuses on the lower and higher ends of the income distribution spectrum, as these are the households for whom energy efficiency is a low priority. For low-income households, this is due to more general difficulties accessing capital, while for high-income households, it is because they are (and can afford to be) less concerned with their energy expenditure.

Climate change benefits

[113] Based on a national average price of electricity of $37.0 million/PJ (GST incl.), derived from the July 2005 Energy Data File. Note, however, that savings in residential and business energy costs will have some impact on the profitability of electricity retailers.

As space heating often represents a significant proportion of domestic energy use, insulation can help to achieve substantial reductions in energy use among the target households. EECA have established a target for this programme of an additional 0.07 PJ of energy savings per annum, resulting in 9,800 tonnes of avoided carbon dioxide emissions.

Co-benefits

The installation of insulation in low-income homes has significant co-benefits, including reducing the energy costs faced by these households and improving the average warmth of their homes (thereby increasing comfort and reducing negative health impacts). Studies have shown that the health benefits of warmer homes are considerable and result in fewer doctor visits and less absenteeism. These co-benefits are the primary driver of the EnergyWise Home Grants policy. EECA estimates the value of health benefits arising from this programme to be nearly twice the value of the energy savings. Insulation may also assist in reducing emissions of PM10 particulates into the air, and provide employment opportunities for low-skilled workers.

General improvements to energy efficiency resulting from the EnergyWise Home Grants programme and the Home Energy Rating Scheme programme can also improve the security of supply of New Zealand's electricity system, and may delay the need for investment in new generation (thereby reducing associated local environmental impacts).

Costs

Total costs of the residential housing work programme for EECA are $0.832 million per annum. The programme is therefore estimated to achieve 1 PJ of energy efficiency savings at a cost of $11.9 million (EECA, 2005).

Conclusion

The programme costs $0.832 million per annum to implement. Based on a 0.07 PJ per annum energy-efficiency improvement (ie, EECA's targeted savings for the programme), the programme may be expected to save approximately $3.2 million per annum in residential energy costs.[114] This would indicate the programme, if it meets its targeted savings, is likely to achieve a net gain in economic welfare and would therefore be a no-regrets policy.

However, the primary driver for this programme is the associated health benefits of warmer homes, which EECA estimates have nearly twice the value of the energy savings. An earlier focus for grants funding under the programme was improving the efficiency of lighting and water-heating systems, thought to be the most cost-effective means of improving energy efficiency in homes. However, the measures that result in the highest health and social benefits and have the most permanence are ceiling and underfloor insulation. The focus of the programme has now shifted to whole-

[114] Based on an average residential price of electricity of $46.4 million/PJ (GST incl.), derived from the July 2005 Energy Data File. Note, however, that savings in residential energy costs will have some impact on the profitability of electricity retailers.

house installations, to ensure these latter benefits are accrued. This has reduced the cost-effectiveness of the programme in terms of energy-efficiency goals.

Given the significance of these health and social co-benefits, they should remain the primary driver for this programme. No adjustment is proposed for this programme on the basis of climate change goals.[115]

Renewable energy to the grid (EECA)

Type of policy: information provision

This programme aims to ensure that electricity generation is sourced from renewable energy wherever that is economically and environmentally efficient. It provides information to existing and potential electricity generators on renewable energy developments and associated issues, and aims to influence local authorities to create a favourable regulatory framework for resource management decisions on renewable energy proposals.

Climate change benefits

In the year to 30 June 2006, it is anticipated that, nationally, New Zealand will have generated an additional 1.4 PJ of renewable energy to the grid. It is not possible to determine the level of renewable energy development that is directly attributable to this programme, given its facilitation and information-provision nature.

Co-benefits

Facilitating the development of renewable energy in place of fossil fuel generation reduces the release into the air of local pollutants such as sulphur and mercury, which can have adverse effects on health.

Costs

Total costs to EECA of the renewable energy to the grid programme are $0.56 million per annum.

Conclusion

Given the inability to directly attribute renewable energy development to this programme, it is very difficult to estimate the programme's cost-effectiveness. Addressing information barriers for generators investing in renewable energy and for local authorities evaluating the benefits of renewable energy will be an important part of facilitating greater renewable energy development. Further evidence should be gathered on the effectiveness of this programme before a decision is made on adjusting it.

[115] It may be desirable to expand the programme on the basis of the co-benefits noted.

Market development renewable energy (EECA)

Type of policy: information provision and financial incentives

This programme aims to increase the contribution to New Zealand's energy supply of renewable energy derived from small-scale (generally less than 1 MW) technologies such as solar water heating, heat pump water heating, mini and microhydro, small-scale wind and photovoltaics. One of the key mechanisms in this programme is the provision of grants to purchase and install solar water heating systems in residential dwellings. Other activities include promoting the benefits of solar water heating and other renewables, and supporting the development of renewable energy industries.

Climate change benefits

In the year to 30 June 2006, it is anticipated that nationally New Zealand will have generated an additional 0.03 PJ of renewable energy from small-scale renewables. It is not possible to determine exactly the level of additional energy attributable to this programme, although it is thought to be high as a result of the financial incentives provided for solar water heating. The solar water heating industry has grown at more than 40% per annum for the last three years.

Co-benefits

Households installing solar water heating are estimated to save around $350 per year on energy costs. The development of distributed, off-grid generation also contributes to New Zealand's security of supply by diversifying the supply mix and avoids distribution and transmission line losses (thereby improving overall efficiency of the electricity system).

In general, the development of renewable energy in place of fossil fuel generation can bring benefits, including reducing local pollutants. EECA anticipates that distributed renewable generation will play an increasingly important role in New Zealand's energy supply in the future. However, in the short term, it is considered unlikely that the contribution of small-scale renewable generation will have a large impact on the overall mix of new generation.

Costs

Total costs to EECA of the renewable energy to the grid programme are $0.6 million per annum. Homeowners who choose to install solar water heating will still face some investment costs over and above EECA grants, although these will be offset by approximately $350 per year generated by energy savings. Homeowners will use their own investment criteria in making decisions about solar water heating, although the market development renewable energy programme reduces the initial investment barrier.

Conclusion

Again, it is difficult to directly attribute the development of small-scale renewables to this programme, although recent growth rates in the solar water heating industry indicate it is having a noticeable impact. Given the relative contribution of small-scale renewables to New Zealand's overall energy supply, it is not anticipated this policy will have a significant impact on the energy system or greenhouse gas emissions. EECA also acknowledges that the initial upfront investment in this programme is high relative to the short-term energy gains (EECA, 2005). This would indicate that there is no clear value in expanding this programme relative to other programmes.

Energy efficiency of products (EECA)

Type of policy: regulations and information provision

This programme achieves energy savings by increasing the stock of energy-efficient products in New Zealand through influencing the purchase process. The programme comprises two workstreams: Minimum Energy Performance Standards (MEPS) and mandatory labelling; and the "Energy Star" products endorsement scheme.

MEPS is regulatory and requires selected products to abide by a minimum standard of energy efficiency in order to be sold. Incorporating energy efficiency at the design stage is thought to deliver improved value for money. Products covered are air conditioners, domestic refrigerators, electric water heaters, refrigerated display cabinets and distribution transformers, fluorescent lamps and ballasts for such lamps, and three-phase motors. Fridges, freezers, and domestic air conditioners (single phase) must also display an Energy Rating Label.

The "Energy Star" products endorsement scheme is a voluntary labelling scheme that encourages consumers to purchase home appliances, office products and domestic refrigerators with high energy-efficiency ratings.

Under Trans-Tasman Mutual Recognition Arrangements with Australia, New Zealand and Australia are required to mutually recognise regulatory standards adopted. As a result, standards under the MEPS are agreed in conjunction with Australia. This creates a degree of inflexibility and means that the setting of standards under MEPS will not always be able to maximise the benefit to New Zealand in terms of pursuing policy objectives.

Climate change benefits

MEPS and mandatory labelling is estimated to contribute 0.73 PJ of energy savings per annum. The "Energy Star" products endorsement scheme is estimated to realise 0.02 PJ of energy savings per annum. The overall Energy Efficiency of Products programme is therefore estimated to achieve 0.75 PJ of energy-efficiency improvements per annum, resulting in 0.13Mt of avoided carbon dioxide emissions per annum. EECA considers these estimates to have a high degree of certainty, given a strong programme history and the direct relationship between regulations and energy use.

Co-benefits

Improvements in energy efficiency resulting from this programme will help to reduce domestic and business energy costs (thereby making households better off and firms more competitive) and improve the security of supply of New Zealand's electricity system, and may delay the need for investment in new generation (thereby reducing associated local environmental impacts).

Costs

Total costs of the Energy Efficiency of Products programme to EECA are $1.815 million in 2005/06. The programme is therefore estimated to achieve 1 PJ of energy efficiency savings at a cost of $2.4 million (EECA, 2005). Manufacturers may experience some additional costs in reaching the standards of energy efficiency set by MEPS regulations.

Conclusion

The Energy Efficiency of Products programme is assessed to achieve the greatest improvement in energy efficiency of EECA's programmes. As well as influencing purchasing behaviour, labelling schemes may encourage manufacturers to develop more efficient products.

The programme costs $1.815 million per annum to implement. Based on a 0.75 PJ per annum energy-efficiency improvement, the programme may be expected to save over $25 million per annum in business energy costs.[116] This indicates the programme is very likely to achieve net economic-welfare gains, making it a no-regrets policy. This strong cost-effectiveness is consistent with the consideration that incorporating energy efficiency at the design stage delivers improved value for money.

The high benefit-to-cost ratio indicates that further gains might be achieved by expanding this programme, most likely by increasing the number of products to which standards or labels are applied, but potentially also by raising the minimum standards associated with currently regulated products. Light bulbs may be considered an obvious example of an additional product to include, although further assessment would be needed to confirm this would be appropriate. However, gains are likely to

[116] Based on a national average price of electricity of $37.0 million/PJ (GST incl.), derived from the July 2005 Energy Data File. Note, however, that savings in business energy costs will have some impact on the profitability of electricity retailers.

be diminishing if the opportunities for highest energy savings have already been exploited and may also be limited by existing technical potentials. New Zealand's Trans-Tasman Mutual Recognition arrangements with Australia may also result in some inflexibility in expanding this programme.

Nevertheless, should an overall expansion of complementary energy measures by undertaken, it would be worthwhile exploring the potential benefit of expanding the Energy Efficiency of Products programme in more detail.

RMA and government submissions

Type of policy: regulations

Initially, the RMA did not explicitly provide for improved energy efficiency or give particular weighting to the value of renewable energy, despite the fact that these matters bring national benefits. In contrast, matters such as landscape and amenity values were listed as matters of national importance or matters to be given particular regard, creating the potential for imbalance. Consultation at the time indicated there was potential for resource management decisions and council plans to better address national energy objectives, including the NEECS and the Government's climate change policy package.

As a result, the RMA was amended in 2003 to require particular regard to be given to the national benefits derived from the use and development of renewable energy and the efficiency of the end use of energy. Since the amendment was introduced, MED has made numerous submissions to local authorities considering renewable energy developments, noting the amendment and drawing attention to the benefits of these proposals.

Climate change benefits

Greater use of renewable energy and improved energy efficiency are key ways of reducing New Zealand's emissions of greenhouse gases. The RMA (and its implementation through regional and district plans and decisions on resource consents) can have a significant effect on the level and timing of renewable energy projects and investment in upgrading the national electricity grid (which can improve the overall efficiency of the electricity system). The amendments to the RMA will ensure that the national benefits of energy efficiency and renewable energy projects are given appropriate weight in decision-making compared with local environmental and amenity effects.

Since this amendment was passed in 2003, a number of significant renewable energy projects have successfully proceeded through the resource consent process, including Awhitu wind farm (19 MW), Te Rere Hau wind farm (52 MW), White Hill wind farm (70 MW), Tararua wind farm (120 MW) and Hawke's Bay wind farm (225 MW). MED has made submissions to consent hearings for a number of these projects and in doing so, has drawn attention to the benefits of renewable energy and energy efficiency and the related RMA amendment. While it is not possible to directly attribute the successful consenting of these projects to the amendment or

these submissions, anecdotal evidence suggests they provide additional support for the projects proceeding.

Co-benefits

Facilitating the development of renewable energy in place of fossil fuel generation reduces the release into the air of local pollutants such as sulphur and mercury, which can have adverse effects on health. Improved electricity efficiency may also offset the need for additional generation entirely, thereby avoiding associated local environmental impacts. Renewable energy and energy efficiency also improve New Zealand's security of electricity supply.

Costs

The RMA amendments change the weighting given to a particular matter. Additional administrative costs imposed on local authorities as a result of the amendments are considered low, given it does not require authorities to change their district or regional plans. Similarly, additional costs to consent applicants are thought to be very small. Applicants for resource consents are, where relevant, required to provide information on how their project contributes to or affects renewable energy. However, many applicants have traditionally provided this information anyway.

MED incurs some administration costs when making submissions, although these are minimal, given that the process has largely been standardised.

Conclusion

It is thought that the RMA and its implementation can have a significant impact on the timing and level of investment in renewable energy. Recognising the national benefits of renewable energy development in resource management decision-making is therefore important. Anecdotal evidence suggests the amendments to the RMA to recognise these matters and accompanying submissions from the Government have provided additional support to the development of renewable energy projects, thereby bringing significant climate change and co-benefits. Given that the costs of compliance are minimal, it is considered the amendment to the RMA to recognise the benefits of renewable energy and the efficiency of the end use of energy and the accompanying process of government submissions on individual proposals are no-regrets policies.

Implementation of the RMA amendment to date indicates that it provides a sufficient obligation on local authorities for these benefits to be properly considered. A stronger obligation may risk overriding the protection of other matters such as landscape and amenity values in circumstances where it would be more appropriate for these values to be protected. Moreover, consideration is currently being given to a National Policy Statement on electricity generation, which would provide further guidance to local authorities on making decisions on these developments. It is therefore considered that no amendments are required to the RMA amendment on the basis of climate change objectives.

Submissions on behalf of the Government are currently being made on most significant renewable energy projects. It is considered no amendment is required to the current submissions process on the basis of climate change objectives.

Low-fixed-charge tariffs

Type of policy: regulations

In 2000, the Government committed to a policy of all domestic electricity consumers having a low-fixed-charge tariff option for their electricity supply. A low-fixed-charge tariff allows low-use consumers to reduce their electricity costs and be rewarded for energy conservation. It can also help those on low incomes to save money on power. This policy is described in Section 3.2.5.

Climate change benefits

Low fixed charges, by giving greater emphasis to the variable charge for energy consumed, provide an increased incentive for domestic consumers to invest in energy efficiency and also alternative energy sources such as solar generation. Both these responses help to reduce greenhouse gas emissions. However, it is not possible to provide a quantitative estimate of avoided emissions resulting from this policy.

Co-benefits

High fixed electricity charges have significant negative impacts on consumers with low incomes. A low-fixed-charge tariff provides consumers of small quantities of electricity (who are often on lower incomes) the option of lower fixed charges and higher variable charges, giving these consumers greater control over their bills. As such, a low-fixed-charge tariff can assist those on low incomes to save money on power.

Improved electricity efficiency will improve the security of supply of New Zealand's electricity system and may also offset the need for additional generation entirely, thereby avoiding associated local environmental impacts.

Costs

From an electricity supplier's commercial perspective, low-use consumers tend to be less profitable to supply. A low-fixed-charge tariff that rewards low electricity use may therefore result in a small loss of profitability for retailers.

The Electricity Commission will have some small ongoing costs associated with monitoring the regulations, but these are met within existing baselines.

Conclusion

Providing appropriate price incentives to domestic electricity consumers to conserve energy is an important element of a well-functioning electricity market. The requirement to offer a low-fixed-charge tariff option will help transmit the price signal generated by a price-based measure to domestic electricity consumers to encourage appropriate behaviour change.

It is clear that these regulations will provide some financial benefit to low-use domestic electricity consumers. However, this may largely come at the expense of electricity retailers. There is therefore no unambiguous economic-welfare gain as a result of this policy. However, co-benefits associated with the policy, including alleviating financial pressure on low-income households (and the corresponding social benefits) and providing incentives for energy efficiency mean that total benefits are clearly greater than total costs. No further adjustment is proposed to this policy on the basis of climate change objectives.

Regulation of line access for distributed generation

Type of policy: regulations

Distributed generation is expected to play an increasingly important role in meeting electricity demand as the cost of smaller-scale and new renewable technologies continues to decline. However, there has been minimal investment in distributed generation in the last few years. One reason appears to be difficulties for potential investors in obtaining clear information about the process and requirements for the connection of distributed generation. Electricity distribution companies (which operate the lines to which distributed generation needs to connect) appear to have weak incentives to effectively facilitate distributed generation. Industry self-governance arrangements have made insufficient progress in addressing this issue.

The Government therefore intends to draft, consult on and introduce regulations to provide for:

- a formal enquiry process to obtain information on connection possibilities or constraints for particular locations
- application forms to be available and application decision timeframes
- access to compulsory dispute resolution when agreement on connection cannot be reached or an application is declined
- rules for network charges for various sizes of distributed generation.

Climate change benefits

Distributed generation is often, although not exclusively, based on renewable sources of energy such as solar and wind. Facilitation of distributed generation will therefore provide further options for renewable electricity to be developed. The development of renewable energy reduces the overall emissions intensity of the energy sector.

Most distributed generation is between 10 kW and 5 MW in size, although domestic generation may be below this range and some schemes, including industrial cogeneration schemes, may be above this range. While distributed generation is anticipated to play an increasingly important role in New Zealand's electricity supply, it is not possible to accurately predict what level of generation it might provide, and what proportion of this generation might be renewable. Climate change benefits are therefore difficult to determine.

Co-benefits

Distributed generation can improve security of supply by creating diversity of fuel types, locations and technologies, and, where appropriately sited, helps reduce the need for transmission and distribution upgrades. It can also reduce electricity line losses from transmission by locating generation closer to the source of demand, thereby improving the efficiency of the electricity system. Distributed generation may delay the need for larger-scale electricity investment, which may be considered to have proportionately greater local environmental impacts.

Costs

Minimal costs will accrue to the Crown from developing and implementing regulations on line access for distributed generation. It is anticipated that transaction costs for potential distributed generation investors will be reduced. Transmission lines companies are likely to experience a small increase in compliance costs associated with the regulations. Consultation on the drafting of regulations may help to reduce these compliance costs.

Conclusion

It is anticipated that distributed renewable generation will play an increasingly important role in meeting electricity demand. In this regard, facilitating a potentially significant source of renewable generation will contribute to reducing the emissions intensity of New Zealand's energy sector. However, it is not possible to accurately determine the climate change benefits that will arise from regulation of line access for distributed generation.

Distributed generation also has a number of co-benefits for New Zealand's electricity system, including improving security of supply. Costs associated with the regulations are expected to be low. On this basis, regulation of line access for distributed generation is considered a no-regrets policy. No changes are proposed to this policy on the basis of climate change outcomes.

4.4.5 Overall conclusions

Existing programmes to reduce emissions are generally more developed in the energy sector than in other sectors. Strong co-benefits (including economic, social, health and environmental benefits) have resulted in the Government acknowledging and committing to energy efficiency and renewable energy, establishing EECA in 2000 to specifically focus on pursuing potential benefits.

EECA now has a well-established, although evolving, package of measures. Other regulatory measures also contribute to climate change outcomes in the energy sector, including recognition in the RMA of the benefits of renewable energy and energy efficiency, low-fixed-charge electricity tariffs and the (pending) regulation of line access for distributed generation.

Table 19 examined the need for complementary measures to enhance the operation of a price-based measure in the energy sector. A clear rationale was identified for all existing complementary measures in these circumstances.

It is also considered that there is an appropriate mix of policies in the energy sector, including programmes focusing on business (high-energy-use businesses and businesses in general), residential, energy-supply and cross-sectoral matters. Should further emphasis be placed on reducing emissions in the energy sector, consideration should be given to including a high-profile, coherent and overarching public awareness campaign on energy efficiency. Such a campaign is recommended in the literature as an integral component of any nationwide energy-efficiency intervention package.

EECA currently runs various information programmes, including aspects of the energy-intensive businesses, Emprove, residential housing, and Energy Efficiency of Products programmes. However, these tend to be targeted on specific audiences. The 4 Million Careful Owners campaign presents information on climate change generally, including energy efficiency, but it is not clear that it has generated broad public awareness on ways to reduce energy use.

Consideration should also be given to private initiatives in this area. For instance, Meridian Energy provides information on ways to save electricity free of charge on its website and in newsletters to customers. It will be important that any publicly funded campaign does not duplicate or crowd out these initiatives.

Climate change benefits and programme costs are summarised in the table below, for programmes where data is available. Programmes fostering renewable energy development (including regulatory measures) are not included in this assessment. While these programmes may result in emissions reductions, it is very difficult to attribute the development of renewable energy specifically to government support programmes.

Table 20 - Programme Cost and Estimated Climate Change Benefits 2005/06

Programme	**Total annual programme cost ($)**	**Total estimated annual CO_2 reductions (tonnes)**	**Programme cost per tonne of CO_2 reduced ($)**
Emprove	2,056,000	20,000	102.80
Building regulations	300,000	1,400	214.29
Residential housing	832,000	9,800	84.90
Energy efficiency of products	1,815,000	130,000	13.96

Source: Derived from the Energy Efficiency and Conservation Authority Business Plan 2005/06

Note that only direct programme costs (ie, departmental budget allocations) are incorporated in "total annual programme cost" and "programme cost per tonne of CO_2 reduced". Increased energy efficiency may have other cost implications, including for the profitability of electricity retailers. Likewise, the overall benefits of these programmes are more diverse than just carbon dioxide reductions. Energy-efficiency improvements also lead to cost savings for businesses and households and generate multiple co-benefits.

The full impact of building regulation changes is anticipated to grow considerably post-2005/06, as Building Code changes are yet to be fully implemented.[117]

There may be potential to further reduce emissions at reasonable cost through expanding some of these measures. Clearly, the Energy Efficiency of Products programme appears to currently provide the greatest overall energy savings, and at the greatest value for money. Further emission reduction benefits might be achieved through expanding this programme, although technical constraints and Trans-Tasman Mutual Recognition arrangement will need to be considered.

The Emprove and residential housing programmes have achieved much lower total emissions savings, at a higher cost per tonne of carbon dioxide. Overall, however, these costs may be offset by co-benefits. Assessment of the Emprove programme indicates there is a high chance it delivers a net gain in economic welfare (as a result of the energy-cost savings it generates for businesses) and is therefore a no-regrets policy. Assessment of the residential housing programme indicates it is likely to deliver a net gain in economic welfare. However, the key driver of this programme is considered to be the health (and comfort) benefits of warmer homes. This objective should therefore dictate the resources invested in this programme.

The impact of the building regulations programme is currently small, although this is to be expected, given that the Building Code changes have not yet been implemented. EECA anticipates a step increase in the impact of this programme in the future.

EECA is currently reviewing the NEECS, which provides an overarching context for energy efficiency and renewable energy programmes. The Energy Efficiency and Conservation Act 2000 requires the Minister of Energy to determine whether or not the NEECS needs to be replaced by a new strategy. This first stage will involve a stocktake of current NEECS programmes, an assessment of best practice, and an assessment of programme "gaps" Should the Minister decide that a new strategy is to be developed, a more in-depth assessment of options for additional and expanded programmes will be undertaken.

The appropriate nature and breadth of future/additional regulatory and supporting interventions to encourage energy efficiency and renewables will be dependent on decisions taken regarding the future shape of any market-based measure (i.e. carbon tax or emissions trading). Broadly speaking, the more closely a domestic carbon tax approximates the international carbon price, the less rationale there is for additional

[117] Cumulative emissions savings between 2005/06 and 2011/12 for the building regulations programme are estimated at 217,000 tonnes of CO_2, an average of 31,000 tonnes per year over this seven-year period, compared to estimated savings of 1,400 tonnes in 2005/06.

supporting measures (however the need to address barriers to energy efficiency will remain). Whilst there may be a basis for transitional support to help firms adjust to a carbon price, this is offset to the extent that a tax is gradually phased in (the phasing in is, in effect, providing transitional support).

Given EECA's expertise in the area and the fact that the NEECS review timeframes will allow a much more comprehensive analysis to be undertaken, it is appropriate that decisions about energy-efficiency and renewable-energy programme be made after the NEECD review is completed. The existing package of complementary measures are considered to provide adequate climate change policy coverage in the energy sector in the meantime

4.5 Transport sector

Summary
This section:

- sets out a policy framework for considering CO_2 emission reductions for transport, noting both technical and behavioural changes
- summarises current government policies applying to the transport sector under headings of: pricing of transport activities and fuels, networks and infrastructure, energy sources, and vehicle technologies/efficiency
- assesses options for further policy with CO_2 benefits, building on the foundation of a cross-economy economic instrument.

It concludes:

- policies to date have not had a strong impact on CO_2 emissions, but a number of programmes have only recently started
- a number of desirable policies for air quality, health, congestion, urban form and oil security also provide CO_2 reductions, so there are co-benefits from pursuing integrated policies and programmes
- future technology development in transport will largely occur overseas, but there are some under-utilised opportunities to improve the CO_2 performance of the vehicle fleet
- there are no obvious "big win" CO_2 emissions-reduction opportunities at present; rather, the opportunities will generally be through small, incremental gains
- in order to get a substantial reduction in transport emissions, aggressive policies would be required that would impact on the access and mobility needs of sections of society.