



**Electricity, energy, and the environment:
Environmental performance assessment
1 March–30 June 2004**

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Preface

The electricity sector in New Zealand is dynamic and responsive to change. It is encouraging to see the reduction in the energy intensity of our economy over the past decade (as indicated by electricity consumption compared with GDP). However, the increasing per capita use of electricity over this same period shows that we need to look for much greater improvements in energy efficiency than we have achieved to date.

I intend to work closely with the electricity sector and focus on environmental sustainability, taking both a global and national perspective. The global concerns of climate change and New Zealand's commitment to the Kyoto protocol provide the backdrop to long-term planning in the sector. The government policy statement on electricity governance gives clear direction to the Electricity Commission on both security of supply and environmental sustainability. This first report is a high-level assessment of the processes, organisations, and relationships being established to make progress toward a more sustainable electricity sector. This assessment is the first of many I will make to meet my responsibilities under the Electricity Act 1992.

The Electricity Commission is to be commended for its open and transparent mode of operating. It has consulted widely and engaged with a variety of stakeholders through its advisory groups. I look forward to this continuing and to increasing involvement of the small consumer through representative groups at the grass roots level.

Any new organisation must expend considerable effort on setting up its own operation and dealing with urgent matters. As such the Electricity Commission has focused on the immediate practical issues of its own business and those of the electricity sector. Considerable work has been done on technical efficiency measures and the review of transmission proposals. However, work has yet to be completed on the more strategic Environmental Sustainability Framework.

There is some potential for overlap with the responsibilities and activities of other agencies, particularly EECA. I endorse the development of a memorandum of understanding as an excellent means to address this. I also look forward to the development of the Environmental Sustainability Framework and the consequent coordination of activities and policy development. Some good starts have been made by the Electricity Commission to reshape the development of the electricity sector. However, the necessary shifts in thinking and actions are substantive and will take time. My team and I look forward to contributing to the development of this thinking and to reporting on the progress of the sector.



Dr J Morgan Williams
Parliamentary Commissioner for the Environment

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1 Introduction

1.1 Purpose of this assessment

This assessment fulfils the Parliamentary Commissioner for the Environment's (PCE's) functions under the Electricity Act 1992. Section 172ZP of that Act requires the PCE to examine the extent to which the Electricity Commission (Commission) is meeting the environmental objectives and outcomes in the government policy statement on electricity governance (GPS).¹

The Government has amended the Electricity Act 1992 to set the following principal objectives for the Electricity Commission:

- ensure that electricity is produced and delivered to all classes of consumers in an efficient, fair, reliable, and environmentally sustainable manner
- promote and facilitate the efficient use of electricity.

It also oversees the rules and regulations of New Zealand's electricity market.²

The PCE has developed an assessment framework. This is set out in *Electricity, energy and the environment: Making the connections*³ and *Assessment framework*.⁴ These documents are available from the PCE's website (<http://www.pce.govt.nz/>) or office.

The PCE also decided it was necessary to use his powers under the Environment Act 1986 to examine the wider electricity sector's environmental performance.⁵ This approach was taken because not all the environmental outcomes in the electricity sector can be attributed to the Commission. This is particularly so in this first assessment period (1 March–30 June 2004) when the Commission had only just begun operation.

1.2 Structure of this report

Section 1 describes the electricity sector's regulatory and organisational structure, focusing on the Commission's roles and responsibilities and their relationship to the PCE's assessment.

Section 2 sets the context by reviewing key developments in the sector over this first assessment period.

Sections 3 and 4 assess the environmental performance of the Commission and wider electricity sector respectively.

Section 5 summarises the issues and presents the PCE's recommendations.

The Glossary and acronyms, and the References complete the report.

1.3 Assessment criteria and coverage

Table 1.1 outlines the PCE's environmental priorities for the electricity sector as set out in the assessment framework.⁶ These priorities underpin the PCE's assessments of the Commission and wider electricity sector.

Table 1.1 Parliamentary Commissioner for the Environment’s priorities for the environmental performance assessment

Priority	Environmental considerations and responses
1	Manage growth in electricity demand by: <ul style="list-style-type: none"> • promoting energy efficiency in all segments of the electricity sector • facilitating and promoting active demand-side participation in the wholesale market.
2	Promote the development and role of renewable technologies, particularly new and emerging technologies.
3	Promote the electricity system’s security and efficiency by: <ul style="list-style-type: none"> • ensuring the use of distributed generation is facilitated • facilitating and promoting active demand-side participation in the wholesale market • ensuring energy resources are used efficiently • ensuring renewable resources are managed within their natural rates of replenishment • facilitating and promoting the complementary use of energy sources to overcome supply limitations, particularly for renewable sources of energy.
4	Ensure consistency with government policies on climate change and energy efficiency.
5	Minimise greenhouse gas emissions by: <ul style="list-style-type: none"> • using energy and other resources efficiently • minimising hydro spill • managing transmission losses and constraints efficiently.
6	Avoid, remedy, or mitigate new or existing effects on the environment, including effects on: <ul style="list-style-type: none"> • biodiversity • air • water • land.

Source: PCE, 2004.

With respect to the Commission, this assessment focuses on the delivery of the Government’s objectives for renewable energy, distributed generation, energy efficiency, climate change, and the potential contribution of the demand side in the electricity market as set out in the GPS.⁷ See Table 1.2.

Table 1.2 Environmental objectives of the government policy statement (GPS) on electricity governance, 2004

Key environmental objectives of the GPS on electricity governance

Ensure electricity is produced and delivered in an environmentally sustainable manner.

Promote and facilitate the efficient use of electricity.

Promote and facilitate stronger demand-side participation in electricity markets.

Maintain or enhance incentives for investment in energy efficiency and demand-side management.

Remove barriers to new generation technologies, renewables, and distributed generation.

Use hydro, thermal, and other fuel resources efficiently in the generation of electricity and minimise unnecessary hydro spill.

Contribute to achieving the Government's climate change objectives.

Source: Minister of Energy, 2004a.

The Commission has a range of methods to give effect to the GPS. They can be grouped into five broad categories.

- *Facilitating and promoting* (e.g. organising discussions with other parties and assisting energy efficiency and demand-side initiatives)
- *Monitoring* (e.g. developing measures of progress)
- *Developing and implementing rules* (e.g. identifying whether a rule needs to be developed after market failure to achieve a specific outcome)
- *Modelling* (e.g. identifying information that could come from new models for forecasting future electricity supply and demand, whether created by the Commission or another party)
- *Developing policy* (e.g. providing input into policy solutions after observing market failure and identifying the need for regulatory action).

This report comments on how the Commission has applied each method to the environmental objectives listed in Table 1.2.

1.4 Assessment time-frame

Although the Commission was established in May 2003, it did not become operational until the beginning of 2004. Therefore, this assessment covers the period from 1 March to 30 June 2004. However, this report was written from December 2004 to March 2005, so it also refers to events that happened after the assessment period that will be relevant to future assessments.

Future assessments will be conducted annually and linked to the Commission's reporting time-frame.

The first full-year reporting period will be 1 July 2004 to 30 June 2005.

1.5 Parliamentary Commissioner for the Environment's role

The PCE's assessment of the Commission and wider electricity sector is facilitated by two Acts.⁸

- The Environment Act 1986 empowers the PCE to investigate any matter where the environment has been, or could be, adversely affected (i.e. the wider electricity sector).
- The Electricity Act 1992 (as amended by the Electricity Amendment Act 2001 and Electricity Amendment Act 2004) requires the PCE to report annually to Parliament on the Commission's performance against the environmental objectives of the GPS.

Under the Environment Act 1986 the PCE has five roles:

- *Environmental systems guardian:* The PCE checks the ability of an environmental management regime (including institutional arrangements, legislation, policies, and the generation of necessary knowledge) to ensure the environment's quality is maintained or improved.
- *Information provider, facilitator, and catalyst:* The PCE disseminates information to a variety of groups and individuals to stimulate high-quality debate and action on environmental issues.
- *Environmental management auditor:* The PCE evaluates public authorities' performance to ensure they are meeting their environmental responsibilities.
- *Parliamentary select committee advisor:* The PCE responds to select committee requests for advice and assistance.
- *Environmental advocate:* The PCE encourages preventative measures and remedial actions to protect the environment.

1.6 Assessment objectives and methodology

1.6.1 Objectives

The objectives of this assessment are to:

- meet the PCE's statutory obligations to assess the Commission's environmental performance
- provide information to decision makers in the electricity industry and government to help them improve the electricity sector's environmental performance
- raise awareness of the electricity sector's environmental effects among people working in the electricity industry and in the wider community
- provide information about whether the electricity sector is helping New Zealand to achieve its sustainable development objectives.

The PCE recognises the need to work with all participants in the electricity sector to develop a secure and sustainable sector.

This assessment provides an external view on what the Government and energy sector need to do to create a holistic approach to sustainable energy management.

1.6.2 Methodology

This assessment is based on interviews and discussions with the Commission and other leading regulators and organisations with responsibilities or interests in electricity generation, distribution and use.

The PCE consulted people from:

- the Commission
- the Ministry of Economic Development (MED)
- the Climate Change Office (CCO) at the Ministry for the Environment (MFE)
- the Energy Efficiency and Conservation Authority (EECA)
- Statistics New Zealand.

The PCE posed specific questions in letters to the Commission, MED, the CCO, and EECA. The issues covered in the letters and the responses are incorporated in this report.

1.7 Scope of this assessment

During this assessment period the Commission had not implemented any detailed programmes to achieve the environmental objectives in the GPS, but was developing an environmental sustainability framework. How the framework will fit with the Commission's operational structure is unknown, although actions the Commission has said it will take in the next assessment period indicate its likely focus and intentions.

The approach in this first assessment was largely at a high level and focused on structural issues of form, process, organisations, and relationships. It provided a view about the prioritisation and development of key issues relating to energy policy.

Therefore, this report focuses on aspects of the Commission's organisational structure and outputs produced by its advisory groups that are relevant to the PCE's environmental priorities. The next assessment will have greater coverage.

This assessment also takes a preliminary look at the Commission's overlapping responsibilities with other key agencies, particularly EECA and the CCO. It explains what future assessments will focus on and highlights the types of information the PCE needs to effectively assess the sector's environmental performance.

2 Developments in New Zealand's electricity sector

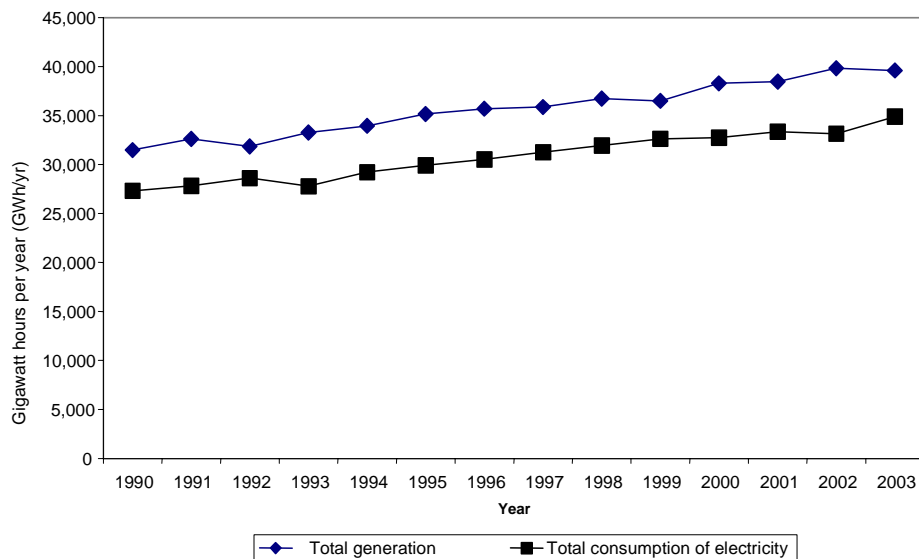
2.1 Electricity sector trends

This section presents key trends in the electricity sector. More information is available in MED's energy data files (e.g. MED, 2004a).

Figure 2.1 shows that both electricity generation and consumption increased by about 28 percent from 1990 to 2003.

The proportion of electricity loss (i.e. the proportion of generated electricity lost as heat before it could be consumed) remained constant at about 14 percent.

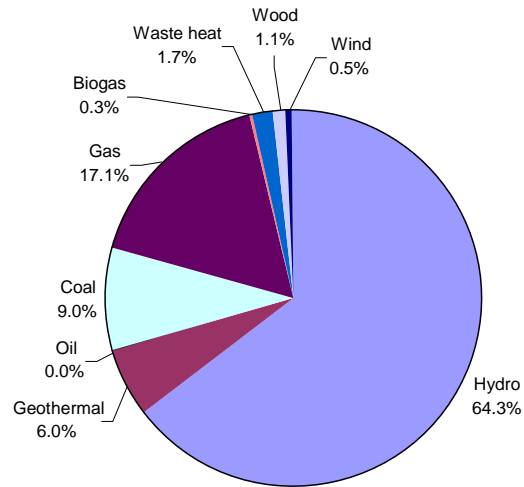
Figure 2.1 Trends in electricity generation and consumption, 1990–2003



Source: MED, 2004a.

Figure 2.2 shows the sources of energy used to generate electricity from January to March 2004. During this period there were no water shortages, so Figure 2.2 clearly demonstrates that hydro generation still dominates electricity generation in New Zealand.

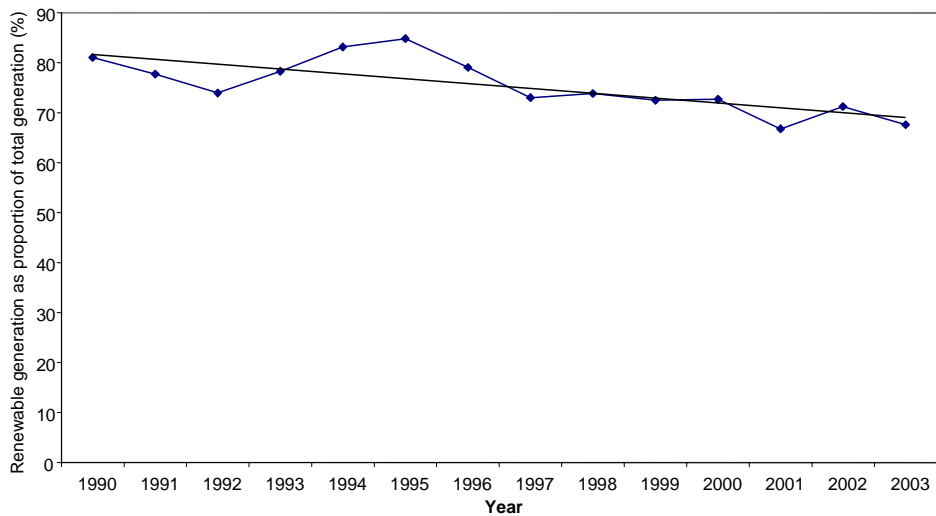
Figure 2.2 Sources of electricity generation, January–March 2004



Source: MED, 2004a.

However, Figure 2.3 shows that the proportion of electricity derived from hydro generation fell from 1990 to 2003. A probable reason for this decline was the significant investment in gas-fired thermal generation during this period. This type of generation is best suited as base load generation, displacing hydro power stations.

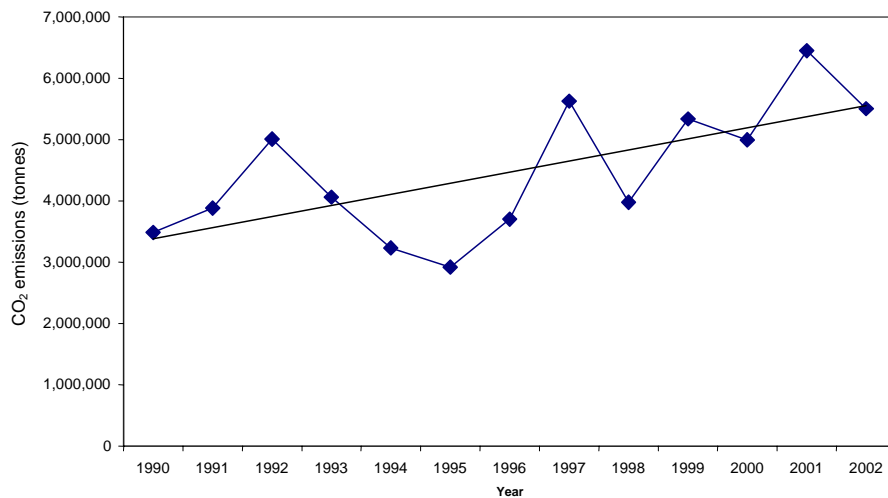
Figure 2.3 Renewable generation as proportion of total generation, 1990–2003



Source: MED, 2004a.

As the proportion of renewable generation has declined, the proportion of fossil fuel based generation has increased. Figure 2.4 shows the increased use of fossil fuels led to higher emissions of carbon dioxide (CO₂). Trends in CO₂ emissions also demonstrate the impact of the dry years of 1992, 1997, and 2001 when more thermal generation had to be used to meet demand.

Figure 2.4 Carbon dioxide (CO₂) emissions from electricity generation, 1990–2002



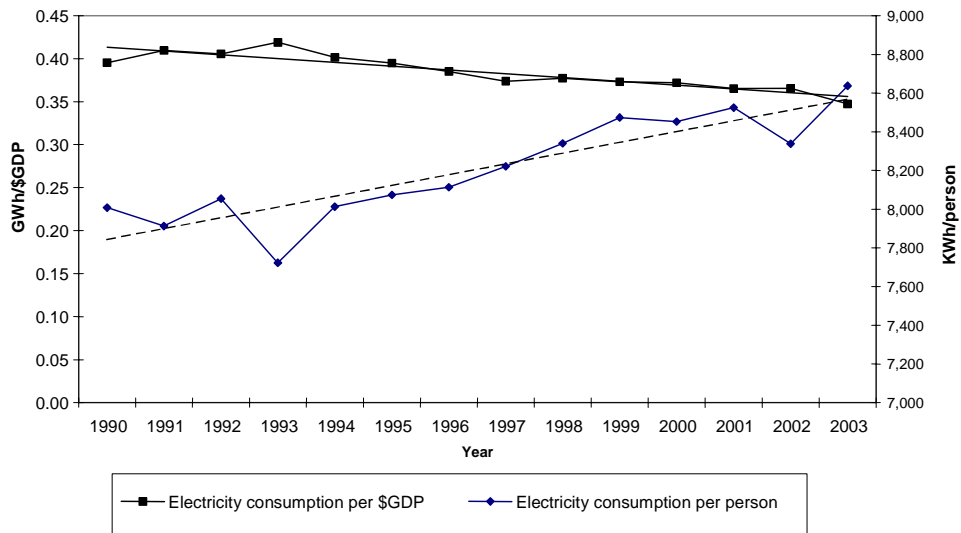
Source: MED, 2004a.

Figure 2.5 shows two trends: a decrease in electricity consumption per dollar of gross domestic product and an increase in electricity consumption per person.

Electricity consumption per dollar of gross domestic product may have decreased for two reasons: the economy moved from more energy-intensive activities to less energy-intensive activities (e.g. tourism) and the economy's productive sectors became more energy efficient.

However, at the same time, electricity consumption has increased faster than the growth in population.

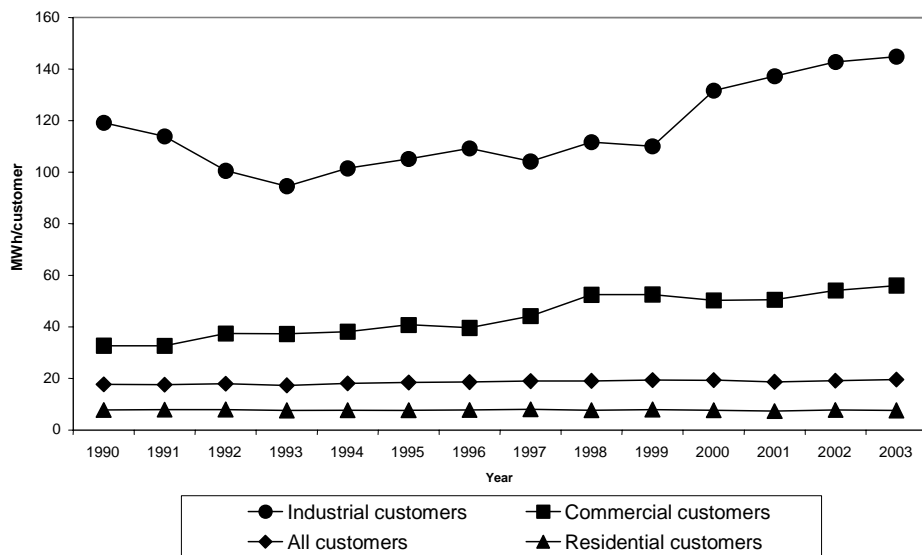
Figure 2.5 Electricity consumption per capita and per dollar of gross domestic product (\$GDP), 1990–2003



Source: MED, 2004a; Statistics New Zealand, 2005.

Figure 2.6 shows that, in both the industrial and commercial sectors, electricity consumption per customer connection increased over 1990–2003, possibly due to an increase in the size of businesses. Further work is needed to understand the implications of these trends.

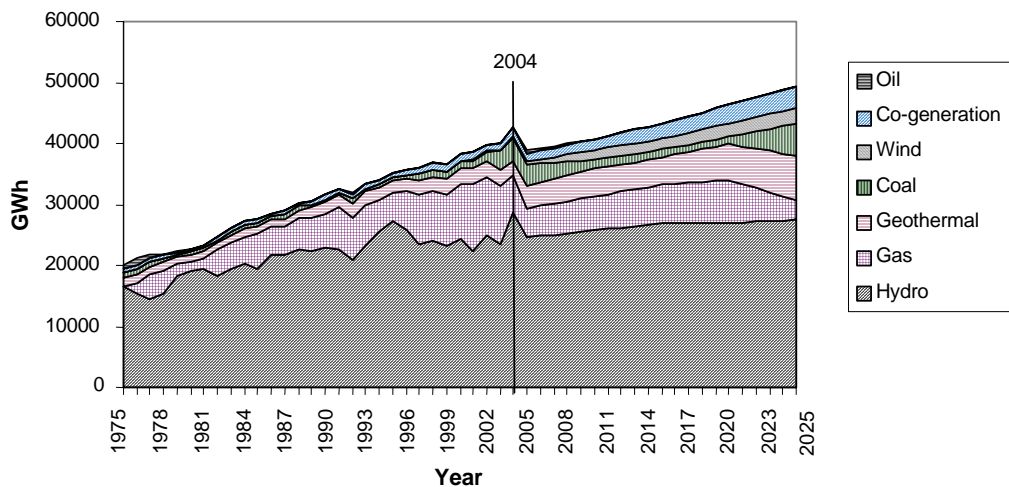
Figure 2.6 Average electricity consumption per customer connection, 1990–2003



Source: MED, 2004a.

Figure 2.7 is based on the reference or baseline scenario for electricity generation in *New Zealand energy outlook to 2025*.⁹ This scenario is based on the assumption that current trends will continue, but subject to probable resource constraints, specifically for hydro and natural gas. This scenario sees demand growth largely being met with increased geothermal, wind, co-generation (gas and woody biomass) and, after 2020, coal generation.

Figure 2.7 Electricity generation, 1975–2025



Source: MED, 2003b, adapted by authors.

2.2 Electricity and energy policy issues

In September 2003 the Government released a draft GPS. This set the objectives and outcomes it wanted to pursue in relation to the governance of the electricity industry and against which the Commission would report and be examined (under s 172ZK of the Electricity Act 1992).

The GPS was issued because the electricity sector has a critical role in achieving the Government's objective of a sustainable and efficient energy future (as set out in *Sustainable development for New Zealand: Programme of action*¹⁰).

During this assessment period the Government received submissions on the draft GPS and in September 2004 published a final version subject to the passage of the Electricity and Gas Industries Bill 2003 (which became the Electricity Amendment Bill 2004 on 13 October 2004).

2.2.1 Sustainable development programme of action for energy

In January 2003 the Government released a discussion document outlining a programme of action for sustainable development.¹¹ Its main purpose was to set directions and outline the Government's initial actions. One of the five areas of focus it identified was energy.

The energy component had an overarching goal “to ensure the delivery of energy services to all classes of consumer in an efficient, fair, reliable and sustainable manner”.^{12 13}

It sought to achieve three outcomes:

- *Energy use in New Zealand becomes progressively more efficient and less wasteful*
- *Our renewable sources of energy are developed and maximised*
- *New Zealand consumers have a secure supply of electricity.*¹⁴

Actions to achieve these outcomes were set out in, for example, *Energy policy framework*,¹⁵ *National energy efficiency and conservation strategy*,¹⁶ the climate change work programme,¹⁷ *Government policy statement on gas governance*,¹⁸ and *Government policy statement on electricity governance*.¹⁹

The Government sees security of the electricity supply as an essential infrastructural input to achieving sustainable economic growth in New Zealand.²⁰ The efficient and cost-effective provision of electricity over the long term is also seen as a vital component of the Government’s Growth and Innovation Framework.²¹

2.2.2 Sustainable energy document

In October 2004 the Government released *Sustainable energy*.²² This discussion document provides an overview of government thinking on a sustainable energy future for New Zealand.

Sustainable energy discusses the key challenges and opportunities New Zealand faces in making this transition to a sustainable future, considers what needs to be done to achieve sustainability, and suggests new policy approaches.

Sustainable energy was the focal point for 6 months of consultation, after which a more formal sustainable energy policy may be developed.

2.2.3 Electricity and Gas Industries Bill 2003

The Electricity and Gas Industries Bill became two amendment Acts: the Electricity Amendment Act 2004 (which amended the Electricity Act 1992) and the Gas Amendment Act 2004 (which amended the Gas Act 1992). It put in place a framework for the governance of the electricity and gas sectors to achieve the Government’s stated energy policy goals.

The Electricity Amendment Act established the Commission and updated terms in the Electricity Act 1992 to take account of this. It provided for the Commission to try to ensure that New Zealand’s electricity supply is secure, New Zealand has adequate reserve energy for dry years, and electricity is used efficiently.

The Gas Amendment Act also provided for the establishment of an approved industry body to regulate the gas industry. If industry self-regulation is not successful, an Energy Commission may be established with the Electricity Commission’s responsibilities widened to include the gas sector.

However, the focus of the Electricity Act 1992 is on *electricity*; not *energy* in a more general sense. As the Act's explanatory note states, its policy goals are essentially that "electricity is generated, conveyed and supplied to all classes of consumers in an efficient, fair, reliable and environmentally sustainable manner".

2.2.4 Climate change policy initiatives

A key component of the Government's climate change policy is the Projects to Reduce Emissions programme, managed by the CCO.

The programme aims to enable New Zealand to meet its targets under the Kyoto Protocol to the United Nations Framework Convention on Climate Change.²³ The programme supports projects that aim to reduce greenhouse gas emissions over the protocol's first commitment period, 2008–12 beyond the reductions that would have occurred without the project, by awarding the project initiator emission units (or 'carbon credits').

Emission units are tradable internationally and can be added to the financial value of a project that will reduce greenhouse gas emissions. They are available for projects that are additional to business as usual and can help bring forward projects that would not otherwise be financially viable at present.

It is expected that project tender rounds will be held annually, with two rounds held so far.

The programme, together with the emissions charge planned from 2007, and Negotiated Greenhouse Agreements for firms whose competitiveness might be at risk from the charge, are expected to play key roles in reducing emissions. However, this depends on each firm's commitment and ability to install abatement technology.

2.2.5 National Energy Efficiency and Conservation Strategy

The National Energy Efficiency and Conservation Strategy (NEECS) was prepared as a requirement of the Energy Efficiency and Conservation Act 2000 and was released in September 2001.²⁴ The NEECS is a whole-of-government strategy, which EECA leads and coordinates. Other government sector organisations also lead NEECS projects or participate as project partners.

The NEECS has two high-level targets:

- a 20 percent improvement in energy efficiency by 2012²⁵
- an increase in New Zealand's supply of renewable energy by a further 30 PJ by 2012.²⁶

These targets are pursued by five action plans, focusing on:

- central and local government
- energy supply
- industry

- buildings and appliances
- transport.

The NEECS also has six goals, emphasising the economic, environmental, and social outcomes it aims to achieve:

- improve economic productivity
- promote industry development
- improve economic resilience
- reduce CO₂ emissions
- reduce local environmental effects
- improve health and welfare.

2.2.6 Building Act 2004

In 2003 the Building Act 1991 was reviewed, leading to the Building Act 2004.

The 2004 Act aims to improve the control of, and encourage better practices in, building design and construction, so buildings are designed and built correctly from the beginning. The aim is to assure building owners and users, particularly homeowners, that their buildings meet the standards in the Building Code.²⁷

Another key aspect is the introduction into the Building Code of a sustainability requirement for new homes.

2.2.7 Resource Management Act 1991

During 2003 and 2004 the Government reviewed the Resource Management Act 1991. This led to proposed changes being announced in September 2004 and a Resource Management and Electricity Legislation Amendment Bill 2004 referred to select committee for report back by mid-June 2005.

The Bill includes several changes that could affect the energy sector. One of the most striking features is the greater role for central government to support local decision-making. Key initiatives include greater central direction and consistency (through national policy statements and standards) and greater support for local government. When considering large or complex projects, such as important infrastructural initiatives, regional and district councils will be able to seek additional resources from the Government or ask the Minister for the Environment to ‘call in’ the project, in which case an independent board would be established to consider it.

2.3 Supply-side (generation) developments

Around this assessment period several developments occurred in the electricity generation market. These have a bearing on the actions of the Government and industry participants.

2.3.1 Fossil fuel generation

Before this assessment period several dry-year electricity supply shortages had occurred. This resulted in the following four developments.

Whirinaki power station

In May 2004 the Government commissioned a 150 MW diesel-fuelled power station at Whirinaki. The station was constructed at the site of the old Contact Energy Whirinaki plant.

Contact Energy operates the station under contract to the Government.

The station is intended to provide reserve energy to help ensure New Zealand's electricity needs can be met, even in very dry years, without electricity savings campaigns.

The station was built on the assumption that market arrangements did not provide sufficient incentives for companies to hold energy in reserve.

Huntly e3p plant

In August 2004 the Government announced it had entered into an agreement with Genesis Energy to share a limited and specified amount of risk for Genesis Energy's long-term gas supplies for the Huntly Energy Efficiency Enhancement Project (e3p) plant. The plant already had the necessary resource consents, so construction started in February 2005. Commissioning is scheduled for late 2006.

The Huntly e3p plant is a combined cycle electricity generation plant that Genesis Energy will install at its Huntly site. It will produce electricity using a gas turbine engine, with additional electricity generated from what would otherwise be waste heat from the exhaust.

Under the agreement, the Government will compensate Genesis Energy if it is unable to secure the gas it needs to run the plant.

The Government's view was that it was desirable for the Huntly e3p plant to proceed and that alternative projects would not provide the same certainty and capacity. The Government's support was on the basis that the e3p plant gives domestic and commercial electricity users greater certainty and substantially boosts the margin between supply and demand.

Gas and liquefied natural gas

The decrease in the availability of gas from the Maui gas field has encouraged petroleum exploration companies to increase exploration activities throughout New Zealand. The Government has encouraged this activity through changes to the petroleum royalty and tax regimes.

Contact Energy and Genesis Energy studied the feasibility of importing liquefied natural gas for electricity generation. The aim is to secure future gas supplies for constructed and proposed gas-fired power stations.

Coal

Solid Energy investigated building coal-fired power stations at several South Island sites. Investigations were also under way into constructing a coal-fired power station at Marsden Point. These proposals will be covered in the next assessment.

2.3.2 Renewable energy developments

Around this assessment period significant activities in renewable energy areas occurred.

Project Aqua

In March 2004 Meridian Energy announced it would not continue with Project Aqua, the hydro-electricity development project on the Lower Waitaki River. The six power stations would have generated 540 MW of electricity (up to 90 MW each).

The factors contributing to this decision included:

- significant uncertainties about the nature of the water rights, which local landowners vigorously contested as they wanted the water for irrigation
- the question of whether Meridian would continue to have current levels of access to water in the upper catchment
- concerns about potential negative effects of the project on in-stream values
- unforeseen technical problems
- under-estimated costs
- the projected high cost, long time-frame, and high level of uncertainty associated with obtaining resource consents.

Wind generation

During 2004 a number of wind farm proposals were investigated, given consent, or built (e.g. in Southland (White Hills, 70 MW), Wairarapa (Hau Nui extension, 5 MW), and Manawatu (Te Apiti, 90 MW)). An application for the Awhitu wind farm (19 MW) near Waiuku was declined, but has been appealed to the Environment Court. Other projects are under investigation in the East Coast (Genesis Energy, Eastland Network), Wainui (Windfarm Developments), and Cape Campbell (Trustpower).

Hydro generation

Trustpower investigated hydro-electricity opportunities in the Wairau Valley. It also sought a modification of the Water Conservation Order in the Buller catchment to permit a hydro-electricity project on the Gowan River.

Geothermal generation

Resource consents for expanding the Ngawha geothermal power station were declined, but are under appeal. Consents for a binary generation plant at Wairakei were granted, but are also under appeal.

Solar generation

Solar water heating systems continued to be installed at an increasing rate, with an 88 percent increase in January 2005 from the previous year.²⁸

2.4 Transmission and distribution issues

In early 2004 constraints to electricity transmission were identified in the top of the South Island. The electricity supply and distribution industry (including the Commission) took collective action and identified demand-response measures (which were not needed).

Unforeseen maintenance on the Cook Strait cable in June and July 2004 resulted in the Whirinaki power station being used to provide reserve generation.

During this assessment period Transpower announced plans for major grid upgrades and, in particular, the construction of an additional line into Auckland from the south Waikato district.

2.5 Retail issues

2.5.1 Regulations for low fixed charge tariff options

The Government introduced the Electricity (Low Fixed Charge Tariff Option for Domestic Consumers) Regulations 2004 (effective from 1 October 2004), requiring retailers to offer low fixed charge tariff options of no more than 30 cents per day to domestic consumers who met certain criteria (i.e. use less than 8,000 KWh/yr).²⁹

These regulations will be considered in the next assessment.

2.5.2 Increases in retail prices

The continuing increases in retail electricity prices are concerning, but will be considered in the next assessment.

2.5.3 Managing domestic supply using ripple control

Using ripple control to manage domestic supply (by smoothing morning and evening peak demand periods) has been difficult because of the different ownership of meters and relays. This means technology is used variably and ineffectively throughout New Zealand. The PCE proposes to discuss this with MED as part of the next assessment.

2.6 Electricity and energy efficiency issues

The Commission's electricity efficiency programme is discussed in Section 3.1.2.

The PCE has not been able to assess the effectiveness of EECA's programmes to promote end-use efficiency. This work will be part of the next assessment.

3 Assessment of the Electricity Commission's environmental performance

The Commission has been in operation for only a short time, so this report is a limited assessment of its activities with respect to environmental sustainability and its performance relative to its responsibilities outlined in the GPS.³⁰ However, the PCE has identified emerging issues that will be included in more detail in the 1 July 2004–30 June 2005 assessment.

3.1 Electricity Commission

Since the electricity market was restructured in 1998–99, there have been concerns the sector is not producing outcomes consistent with the Government's overall objective for electricity to be produced, delivered, and used as efficiently as possible while minimising adverse environmental effects.

The principal concern arises from the sector's failure to supply electricity adequately, particularly in times of low storage in the hydro-electric reservoirs.

The concerns build on problems with the security of supply during 1998 and 2001 and the lack of progress in improving energy efficiency, removing market barriers to emerging renewable technologies, and achieving greater demand-side participation in the electricity market.

Concerns about dry-year risks coincide with the confirmation that the Maui gas field is due to run out.

These concerns resulted in a ministerial inquiry³¹ and a review.³² The industry was given an opportunity to develop a new set of regulatory arrangements and the means to self-govern to improve its performance. However, after 2 years of discussions, agreement could not be reached within the sector, so the Government created a new crown entity, the Commission, to oversee the sector's governance.

3.1.1 Statutory functions

The Commission was established as a crown entity by a 2004 amendment to the Electricity Act 1992.³³ Its primary functions are to oversee the rules and regulations of New Zealand's electricity markets and give effect to the GPS.

A board of commissioners was appointed towards the end of 2003 and the Commission's organisational structure was set up and staffed early in 2004.

In December 2004 the Commission released a report for 1 March–30 June 2004.³⁴ This period is also the focus of this assessment.

The Commission is split into six core work streams.³⁵ A rulings panel deals with potential breaches of the sector's rules and regulations. Seven advisory groups cover wholesale, retail, transmission, transmission pricing, security of supply, common quality, and hedge market development. These groups report to the Commission's board.

3.1.2 Key programmes and activities

During this assessment period the Commission had only just started identifying its programme of activities. However, subsequent activities have indicated the Commission's intentions, so these are briefly commented on here. A full evaluation will be covered in the next assessment and is likely to cover the following five areas.

Rules and regulations

The Commission has started to review the rules and regulations governing the electricity market's operation. These rules and regulations were originally developed as part of the industry-based Electricity Governance Establishment Project.

Considerable consultation on proposed amendments is evident and the next assessment will review how these rules and regulations are likely to affect environmental outcomes.

Supply and security of supply

The Commission has taken over the Government's responsibility for monitoring and ensuring the security of the electricity supply to the wider community.

The next assessment will review the Commission's processes for performing this function. It will also assess the reasons behind any decisions to use the Whirinaki power station as an emergency reserve.

The PCE notes that occasionally in 2004, Whirinaki was in operation for reasons other than low lake levels or unforeseen maintenance. MED was responsible for Whirinaki's operation in 2004.

Transmission upgrading and grid investment test

One of the Commission's key tasks is to evaluate Transpower's first request to expand the national grid.

Transpower has applied to build a 400 kv high-voltage transmission line from south Waikato into the Auckland region. The Commission is reviewing the proposal and ensuring it is appropriate. As part of that review the Commission is studying alternatives and has sought comments on them. This review will be a key component of the next assessment.

To review transmission line proposals, the Commission has prepared and published a grid investment test (GIT),³⁶ which obliges it to weigh up alternatives to building new transmission capacity, such as distributed generation and energy efficiency, and other demand-side initiatives.

The PCE is concerned the GIT seems to disadvantage alternatives or, at least, fails to promote or encourage their development. Such an approach runs counter to the PCE's environmental priorities and the GPS.

The GIT's scope is narrow, as it is based on net economic benefits to market participants. It does not take into account all the costs and benefits to the economy as a whole (including the benefits of fuel switching), and it must facilitate outcomes acceptable to Transpower and designated customers who have a vested interest in promoting the provision of electricity.

The PCE has recommended the Commission amends the GIT to address these concerns.

Demand-side programme

The Commission must maintain and enhance incentives for investment in demand-side management initiatives and strengthen demand-side participation in electricity markets.

The PCE expects methods for achieving this objective will be outlined in the Commission's environmental sustainability framework (see 3.2).

The PCE will consider how these objectives are translated into project activities and how the two advisory groups that deal with the retail and wholesale markets will incorporate these issues. (Currently, the wholesale market advisory group has no demand-side representatives.)

The PCE is pleased the Commission's chair has taken a lead by giving lectures and other public presentations on the opportunities demand-side participation presents. However, the Commission's current demand-side programmes are focused on the lower (or operational) end of the sector (i.e. at the level of residential electricity use and efficient fridges and lighting). These are the types of programmes that EECA has traditionally undertaken. The Commission has not yet focused on removing the market barriers facing the demand side, which is where the PCE believes action is needed.

The PCE considers the Commission's initial focus should be on market-oriented demand-side facilitation, such as arises from load aggregation through contracts. It should also investigate demand-response opportunities and the industries and firms best suited to load shedding and shifting. In particular, a framework could be created for retailers to establish contract structures with their customers that could readily support such demand-side incentives. Ideally this work should be integrated with electricity efficiency initiatives.

EECA initiated a demand-response development programme in 2003, before the Commission was established. EECA's work has continued, in liaison with the Commission, since its establishment.

The PCE considers technical efficiency (i.e. the efficiency of products) should be EECA's focus. The Commission's actions targeting this issue could duplicate EECA's role and may not significantly advance a fully functioning demand-side market.

A clear distinction of roles and areas of focus between the Commission and EECA is required urgently if the Government's demand-side objectives for the sector are to be met.

Electricity efficiency programme

The Commission announced an electricity efficiency programme in October 2004 in response to the GPS requirement for the Commission to promote and facilitate the efficient use and conservation of electricity. Although it is outside this assessment period, the programme includes the development of:

- five investment incentive initiatives (including lighting and water heating)
- partnerships with key parties to improve electricity end-use efficiency in particular regions.

The Commission has asked for expressions of interest for projects, including the design and implementation of pilot schemes and partnership programmes for each project. The pilot schemes are expected to run for up to 1 year.

This programme will be reviewed in the next assessment. However, the PCE notes the proposed focus appears to be on user-end demand-side opportunities (traditionally EECA's focus), rather than innovative market-based demand-side opportunities. The PCE is also concerned the focus on electricity efficiency rather than energy efficiency could result in perverse outcomes with cost-effective improvements not derived from electricity being missed.

The PCE will watch how this programme develops and how the Commission integrates it into its other operations, such as linking it to the identification of alternatives to transmission as part of the GIT. Transmission alternatives include projects that provide incentives for small consumers to reduce electricity use when transmission is constrained.

The PCE hopes that, rather than moving into work EECA has traditionally undertaken, the Commission will focus on developing demand-side initiatives that might help avoid unnecessary transmission upgrades.

3.2 Environmental sustainability framework

At the end of this assessment period, the Commission was developing an environmental sustainability framework to guide its activities. The PCE expects that this framework will be in place for the next assessment.

The PCE will review the framework with the Commission's annual statement of corporate intent and output plan in the next assessment.

In the interim, the PCE is encouraged that the Commission has drawn on the advice of environmental and sustainability experts to help it prepare its environmental sustainability framework. Unlike in other work streams, however, the Commission has chosen not to publish minutes of meetings or the advice provided by these experts on its website. This has made it difficult to determine the extent to which the Commission is considering environmental sustainability in its day-to-day activities. This concerns the PCE as the other work streams appear to have advanced at a greater pace and some (notably on transmission by the transmission advisory group) are deliberating on issues that will have significant effects on the sector's environmental sustainability.

The PCE expects the Commission's environmental sustainability framework to:

- outline the Commission's interpretation of environmental sustainability for the electricity sector
- indicate the Commission's understanding of its role (alongside other government bodies) in the delivery of the Government's expectations of a sustainable energy future
- be forward-looking in terms of the Commission's expectations of the developments essential for the sector as a whole to deliver a sustainable energy future
- identify the methodologies and strategies the Commission will use to ensure its activities contribute to the delivery of the Government's desired sustainability outcomes.

The PCE recommends that without further delay the environmental sustainability framework is completed and integrated into the Commission's day-to-day activities. It is important the members of the advisory groups appreciate the framework's relevance before they commit to work practices or programmes that may prove incompatible with the framework.

3.3 Operational issues, roles, relationships, and responsibilities

3.3.1 Internalisation of environmental sustainability

During this assessment period the Commission appointed staff and established a management structure. Many new staff were establishing their operational responsibilities, so it was difficult for the PCE to assess how the management structure and individual operational roles would incorporate environmental sustainability within their day-to-day activities.

3.3.2 Internal operation and advisory groups

The Commission has set up seven advisory groups to develop and implement its roles and responsibilities. The advisory groups are predominately populated by traditional electricity sector interest groups (i.e. generation, transmission and distribution, retail, and major electricity users). The PCE is concerned about the limited representation of people and organisations not traditionally associated with the electricity industry (specifically, small businesses and community-based energy user groups, and those representing demand-side solutions).

The Commission has identified the following non-sector representatives in their advisory groups:

- wholesale market advisory group – none
- retail market advisory group – four (out of ten)
- transmission advisory group – none
- transmission pricing advisory group – none
- security of supply advisory group – three (out of eight)

- common quality advisory group – two (out of seven)
- hedge pricing advisory group – two (out of seven).

However, some of these non-sector representatives are consultants with extensive industry links.

The Commission has an opportunity to involve small businesses, community-based energy user groups and providers of demand-side solutions more effectively in its consultation and decision-making processes. Collectively, these groups are significant energy users, but often they cannot participate in the Commission’s formal consultation processes. They do not enjoy the same access to expertise or have the time to prepare submissions on often detailed and complex issues. There is a danger that the valuable experiences and perspectives of these ‘other’ voices may not be heard, which would be a lost opportunity for the Commission.

The PCE would like to see the Commission consider how it might help these groups to become fully involved in its consultation processes. It was a common criticism of the previous regulatory regime that the major generators and users of electricity enjoyed disproportionate access to, and influence over, decision-making. It is to be hoped that the Commission does not make itself vulnerable to this same criticism.

3.3.3 External relationships

The PCE considers that the Commission has established good working relationships with many other key players in the energy sector and involves them in its activities. However, the nature of these relationships will be assessed in the next assessment.

Relationship with the Energy Efficiency and Conservation Authority

The Commission’s responsibility to address electricity efficiency issues, combined with levying funding to finance specific initiatives, has meant it can fund activities that overlap with EECA’s responsibilities.

The GPS requires the Commission and EECA to establish a memorandum of understanding setting out their respective roles and functions. A memorandum has not yet been signed, so it will be assessed next year. The PCE is concerned about the relationship between EECA and the Commission in the absence of a memorandum. The PCE expects the memorandum will clarify the areas of potential overlap, not just to avoid duplication, but for transparency and accountability.

An additional concern is the memorandum’s focus. The GPS refers to the memorandum as a means of establishing “how [EECA and the Commission] will work together co-operatively to minimise any duplication of activity”.³⁷ However, in recent correspondence to the PCE, EECA has noted its understanding of the memorandum’s intention is specific to demand-side initiatives, notably the Commission’s electricity efficiency programme. Further, the PCE notes that the Commission refers to the memorandum as “establishing respective roles and deliverables in relation to electricity efficiency”.³⁸

Given the potential for overlap, the PCE considers the memorandum needs to focus on the relationship between the two organisations, then, where work programmes appear likely to overlap, it should clarify each organisation's responsibilities and focus.

The memorandum should be sufficiently flexible to accommodate the changes that will inevitably occur.

The memorandum should be displayed clearly on both organisations' websites and be clear enough to direct stakeholders to the correct organisation.

The PCE considers it desirable that EECA officials participate in the Commission's advisory groups (perhaps as observers), particularly those addressing demand-side issues, emerging renewable technologies, and energy or electricity efficiency.

Given EECA's role in advising consumers, large and small, the transfer of knowledge between the organisations could yield synergies as both organisations try to provide information and develop awareness in the wider energy sector. This would be conducive to good environmental outcomes.

Relationship with Climate Change Office

It is important New Zealand's climate change policies are consistent with those addressing energy and electricity issues. The CCO is the lead agency in respect of climate change, but the Commission's policies and activities can, and will, affect the electricity sector's future greenhouse gas emissions profile.

One example is how the transmission GIT is interpreted and applied. The GIT will affect investment conditions, and could make it more attractive for companies to develop remote, large-scale generation plants rather than distributed generation and demand-side initiatives.

The Commission is not required or expected to promote renewable sources of electricity generation, but has a role facilitating the removal of market barriers or distortions and is expected to recognise and provide for environmental sustainability.

The Commission is also not expected to impose additional costs on carbon producers; such costs are imposed through the Government's climate change policies. However, the Commission is expected to contribute to the Government's climate change objectives when they are consistent with its other objectives. In this respect, the Commission's electricity efficiency initiatives could defer investment in generation if they are implemented and sustained successfully.

The CCO hopes the Commission's electricity efficiency programme will target the small and medium-sized enterprises most exposed to the pending carbon charge. The PCE notes this concern, but cautions that the electricity efficiency programme should not be driven by a perceived need to minimise the costs of a carbon charge on one sector of the economy. The focus should be on cost-effective initiatives that offer the greatest energy efficiency improvements for the country as a whole.

The PCE will monitor the relationship between the Commission and the CCO. To help the PCE, the CCO has provided a record of its communications with the Commission during the assessment period.

3.4 Consultation and disclosure of information

Although uncertainty remains about the development of the Commission's environmental sustainability framework, the PCE has been pleased with the Commission's efforts to keep the electricity industry and public informed of its intentions and actions. Wide consultation has occurred on policies and external advisers have been included on some projects.

3.5 Monitoring environmental performance

The lack of data on key indicators of environmental sustainability in the electricity sector is a concern, as is the lack of data to assess the role of demand-side measures at wholesale and retail levels.

This lack of data has limited this assessment's scope. This concern was a common theme during the PCE's discussions with other agencies during the assessment period.

The PCE will continue to work with the Commission and other agencies to identify information gaps and develop appropriate environmental performance measures. However, the Commission should also be considering, for its own reasons, how to assess the sector's environmental performance to determine whether its policies and activities are effectively delivering the environmental objectives of the GPS.

3.6 General comment in environmental sustainability

The PCE will watch the methods the Commission uses to ensure the concept of environmental sustainability is an integral component of its activities and decision-making processes and that it is given due weight in the Commission's programmes and policies.

Initial efforts looked promising, in particular the Commission's engagement of leading New Zealand independent sustainable energy experts to develop an environmental sustainability framework. While recognising that the Commission has been under significant pressure to deliver on other issues, the PCE is concerned the advisory groups are operating without a framework; especially as established supply-side interests dominate the groups.

Compared with the amount of information provided on the Commission's other activities, details are limited about its view on sustainable energy, its environmental responsibilities, and what it proposes to do to address its responsibilities.

The PCE welcomes the establishment of a permanent environmental advisory panel. A key task for such a panel would be developing environmental benchmarking within the sector. This would inform the Commission and the Government of progress towards environmental sustainability.

4 Assessment of wider electricity sector's environmental performance

This section addresses the issues affecting the electricity sector's environmental performance that lie outside the Commission's scope.

4.1 Government policy for electricity

The PCE will consider the effect of the Government's environmental policies for electricity in the next assessment.

There still appears to be a lack of recognition in government policies of the effect that gas regulation and governance have on the electricity sector. Electricity and gas issues continue to be addressed separately, rather than as 'energy' issues. By addressing these sectors separately the efficiency benefits from fuel switching (from electricity to gas) do not appear to be considered by regulators.³⁹ However, *Sustainable energy* does recognise this issue.⁴⁰

The PCE supports further government initiatives to address this policy failure.

4.2 National Energy Efficiency and Conservation Strategy

The PCE has supported EECA and NEECS since their inception in 2001. The PCE will continue to support an organisation tasked with raising New Zealander's awareness about the benefits of energy efficiency and developing renewable and efficient forms of electricity and energy generation.

It is disappointing, however, that energy efficiency in New Zealand improved by only 1 percent in the 2 years to March 2003. This is less than what is needed to achieve the nation's energy efficiency target.⁴¹ It is unclear whether current energy efficiency programmes in the residential and business sectors will be sufficient to achieve the NEECS targets (i.e. an energy efficiency improvement of 20 percent and renewable energy contributing an additional 30 PJ by 2012).^{42 43}

It may be appropriate to revisit, through an independent review, the programmes set out in the NEECS that address energy efficiency improvements in the residential and business sectors. The review would assess needs, identify successes that could be built on, and identify failures and the changes needed.

The Energy Efficiency and Conservation Act 2000 provides for the NEECS's regular review. EECA has initiated such a review with the Minister of Energy's approval. This review is expected to be divided into three phases: a situational assessment phase,⁴⁴ a strategic phase, and a redesign phase. The situational assessment is expected to be completed by December 2005 and the other phases (if required) by December 2006.

Progress needs to be assessed region by region. Some regions are better placed than others to achieve positive energy efficiency outcomes. In particular, it would be valuable to understand the specific achievements and therefore the effectiveness of programmes such as the Energy Audit Grant Scheme, the Large Electricity Users Audit Grant Scheme, and the Crown Loans Scheme. An additional focus on businesses in Auckland could be linked to the Commission's amended GIT process. This would ensure a wide range of initiatives addresses Auckland's demand for energy services.

It is acknowledged that EECA has established programmes concentrating on the largest energy-using businesses. The PCE appreciates that these large organisations use the greatest proportion of the energy used by New Zealand businesses. However, it is more likely these organisations have sufficient resources to address energy issues and their barriers to the uptake of energy efficiency are lower. Despite the difficulties, significant merit exists in targeting small and medium-sized businesses and their use of energy or electricity. Individually, these users have insignificant consumption, but more than 95 percent of New Zealand businesses are small or medium-sized, so their collective energy use is important and the potential for saving significant. EECA could have considerably more effect targeting these smaller organisations, as they have fewer resources to focus on energy management programmes themselves.

The PCE understands, however, that EECA is developing a programme to address this issue. In addition, the Government has announced new measures to drive innovation and energy efficiency within energy-intensive businesses.⁴⁵

The target for renewable energy appears to be on track as a result of the activities of the generating companies and their investment in renewable generation (predominantly wind). In addition, the Government's Projects to Reduce Emissions programme is beginning to deliver results with respect to smaller scale renewables projects.⁴⁶

The PCE considers that while the large electricity market players can initiate generation projects independent of EECA's activities, EECA has a significant role promoting and raising awareness about smaller-scale renewable opportunities. EECA has enjoyed particular success collaborating with the Solar Industries Association to promote solar water heating. From 2001 to 2004 the area of solar water heating collectors increased by 535 percent across the country.⁴⁷ Similar activities could focus on other small-scale renewable distributed generation that currently lacks support. The PCE understands that EECA plans to do more in this area.

It is essential EECA's objectives remain focused and subject to regular review, and that it concentrates on areas where it can achieve the greatest outcomes. Its policies and programmes must make a measurable difference.

To ensure progress towards the outcomes described in the NEECS is monitored effectively, the PCE recommends that EECA publishes a detailed progress report annually. While a report is published on progress towards the two specific high-level targets, information is not available on the progress of specific action

plans or the projects within the action plans. This lack of information makes it difficult to determine why a high-level target is not being achieved and the corrective action needed to get it back on track.

4.3 Access to energy and electricity information and resources

MED provides policy advice to the Government on network industries and the management of resources, including those related to energy. It needs to work with the Commission and EECA to develop measures that will determine the success of the GPS. No indicators assess the uptake of demand-side measures in the market (including the role that price tariffs play in encouraging the efficient use of electricity).

The PCE is also concerned that data on the extent of small-scale distributed generation is limited. Mechanisms are needed to collect and analyse this type of data so policy advice is comprehensive and informed.

4.4 Electricity distribution

Potential developers are securing good wind farm sites. However, some projects may not proceed because of a lack of network capacity near suitable sites. This raises a question about access to adequate network capacity for distributed generation and whether a 'first in, first served' approach produces the best outcomes. A developer in talks with the network operator may, in effect, 'lock up' capacity, preventing other developers from proceeding. The PCE would be concerned if such barriers to market entry exist; particularly, if they may result in poor environmental outcomes.

The PCE will be raising this concern with MED during the next assessment.

4.5 Climate change policies

The first initiative in the Projects to Reduce Emissions programme has enabled 15 renewable projects to get off the ground: four wind projects, four bioenergy (including landfill) projects, five small hydro projects, and two geothermal projects.

This initiative's success can be judged only when the projects are commissioned and operational. However, it is noteworthy that the programme has enabled smaller-scale renewable projects to be progressed sooner than otherwise would have been the case.

Typically, the large generating companies can fund large renewable energy developments relatively easily. The Projects to Reduce Emissions programme is the first government initiative that has assisted small development opportunities successfully. Further assistance is needed and significant environmental gains can be achieved.

4.6 Wider policy direction for energy

In terms of wider policy, the PCE notes the apparent lack of an overarching framework or strategy on energy policy and direction for New Zealand. Since 2001, several developments have occurred in terms of policy and the establishment of the electricity governance structure. Despite this, the PCE notes that since the Government's October 2000 energy policy framework,⁴⁸ no cohesive energy policy has built on where the New Zealand energy or electricity sector has been, where the sector is going, or where the Government feels it needs to get to for a sustainable energy future for New Zealand.

Energy sector activities appear to be independent of one another. No single document offers an insight into the direction the Government wants the sector to go.

The PCE welcomed *Sustainable energy*⁴⁹ (as part of the sustainable development programme of action).⁵⁰ However, it focuses on initiating a discussion and offers no indication of what direction, if any, the Government intends to pursue. It offers no details of the time-frame for developments the New Zealand energy sector will be expected to take part in or deliver over the next 5, 10, or 50 years. These details are necessary for planning how to deliver on the Government's commitment to a sustainable energy future. The next steps must focus on *outcomes* rather than more *discussion*.

This lack of vision is of considerable concern, particularly given that the sector now has to make a number of major decisions, the outcomes of which will determine the shape of the sector for decades to come. A cohesive programme of activities across the energy sector is needed immediately, so ideas can become actions. Furthermore, an overarching strategy document could demonstrate clearly the links, relationships, roles, and activities of the government organisations active in the sector.

4.7 Environmental performance standards for electricity sector

On an international level the activities of organisations such as the United Kingdom's electricity and gas regulator, the Office of Gas and Electricity Markets can provide some guidance as to how a New Zealand electricity regulator may operate.⁵¹ The office's annual environmental action plan and regular environmental or sustainability reporting on the energy and electricity sectors are undertaken alongside the annual financial reporting process.

Several sector players in New Zealand report in such a way, but it is uncommon and these reports are not subject to independent scrutiny. However, the Electricity Act 1992 enables the PCE and Office of the Auditor-General to scrutinise the Commission.

The merits of regular environmental or sustainability reporting include the effective communication of a company's activities and commitments, sound asset risk management, and positive stakeholder engagement.

The PCE also notes MFE's limited involvement in the electricity and wider energy sectors, in particular with respect to leadership on environmental sustainability reporting. MFE could work with the Commission to develop environmental and social key performance indicators (KPIs) for the electricity sector. These would form the basis for the annual monitoring of the sector's key players. There is potential to build on *Environmental performance indicators: Proposal for indicators of the environment effects of energy*.⁵² Key performance indicators for the electricity sector, and possibly the wider energy sector, could improve the sustainability-related data that is collected.

4.8 Environmental and community interests

Meaningful consultation with environmental and community interest groups on energy developments is essential if projects that support environmental objectives are to be supported by the communities they affect. This applies to demand-side as well as supply-side solutions.

The general community was not involved in the consultation process for the GPS. Submissions on the 2003 draft GPS were predominately from electricity generators and retailers, and line companies, with businesses and major industry users of electricity also having significant voices in the consultation process.

It appears the Commission's relationship focus is with electricity companies and large users. The Committee seems to be doing little or nothing to build relationships with small users.

An effective consumer advocacy group or 'watchdog' is needed to represent individuals, small businesses and non-traditional energy service providers (such as Energywatch in the United Kingdom).⁵³ Interested individuals, small groups, and non-energy organisations, such as the Consumers' Institute, cannot effectively represent small consumers on these technical issues.

At the same time, small consumer and sustainable energy advocates also need to recognise the importance of their involvement in the consultation exercises the Commission manages. These groups must develop their ability to be involved in processes such as the GIT's development.

It is essential sustainable energy and environmental and community interest groups participate in these debates *effectively*. To contribute effectively, they must have access to a broad range of professional advice. Initially they could be helped to prepare substantive proposals for demand-side or distributed generation. Then, communities could be supported to prepare critiques of the documents prepared by industry groups. This would help to ensure decisions were taken after *everyone's* views were considered.

The Commission could take a lead promoting and facilitating informed community participation. A more informed debate would occur if the Commission actively engaged in capacity building with communities.

4.9 Retail issues

The PCE is concerned about the lack of competition in the electricity retail market. Table 4.1 shows that, other than in a few major centres, few areas have meaningful competition for domestic customers.

Without competition, retailers have even less incentive to promote services to facilitate their customers' energy efficiency or conservation. Of prime concern is the lack of promotion, by retailers or distributors, of advanced technology electricity meters that provide better information to customers on their electricity use and what it will cost. These meters allow the application of tariffs that better reflect the real cost of electricity (e.g. the differences between providing electricity during the day or night or during a wet or dry year).

The PCE has been unable to determine the extent of the uptake of advanced meters or whether retailers are offering tariffs that promote, or allow for, energy efficiency and conservation. The PCE is working with the Commission and MED to determine how and by whom this data might be collected.

4.10 Distribution

Two issues relate to the incentives electricity network companies face when investing in renewable energy and energy efficiency.

- The benefits of distributed generation to strengthen supply in vulnerable parts of a network are not rewarded by the government-mandated valuation and pricing methodologies. The network companies' asset valuation is calculated using optimised deprival valuation (ODV).⁵⁴ Optimised deprival valuation does not take account of the value to the company of having added reliability from investing in distributed generation.⁵⁵ In addition, network companies may not be able to fully recover any investment in distributed generation, as the CPI-X caps prices.⁵⁶
- The PCE is waiting for the regulations and inter-connection terms and conditions for distributed generation, which MED is developing. The Electricity Act 1992 makes it possible for line companies to invest in their own generation projects up to certain limits. However, the need for separate management structures is a major barrier to any investment beyond those limits.
- Network companies could invest in energy efficiency among their customers to reduce or slow the growth in electricity demand.⁵⁷ However, such investment is counterproductive in terms of company revenue. About 90 percent of a line company's costs are fixed, with most revenue coming from the variable charge, which is, of course, consumption driven.
- A network company that promoted energy efficiency or load control within its customer base would be financially penalised by the CPI-X pricing regime. The CPI-X places a cap on prices so any decline in consumption due to energy efficiency improvements would adversely impact on the network company's revenues.

Table 4.1 Competition in the retail sector, as at February 2005

As at February 2005

Line Company	Retailer									No. of Retailers	
	Bay of Plenty	Contact	Empower	Energy Online	Genesis	King Country	Mercury	Meridian	Truspower		Wanganui Gas
Alpine Energy Limited		✓						✓	✓		3
Aurora Energy (Central Otago)		✓						✓	✓		3
Aurora Energy (Dunedin)		✓						✓	✓		3
Buller Network		✓						✓	✓		3
Centralines		✓						✓			2
Counties Power Limited		✓			✓		✓				4
Eastland Energy Ltd (Eastland)		✓						✓			2
Eastland Energy Ltd (Wairoa)		✓						✓	✓		3
Electra		✓		✓				✓			3
Electricity Ashburton Limited		✓						✓	✓		3
Electricity Invercargill (Powernet)		✓						✓	✓		3
Horizon Energy Distribution	✓	✓					✓	✓			4
Kaipoi Electricity		✓						✓	✓		3
MainPower NZ Ltd		✓						✓			2
Marlborough Lines Limited		✓						✓	✓		3
Nelson Electricity		✓						✓	✓		3
Network Tasman Limited		✓						✓	✓		3
Network Waitaki		✓						✓			2
Northpower Limited		✓	✓		✓		✓	✓			5
Orion New Zealand Limited		✓	✓					✓	✓		4
Otago Power (Powernet)		✓						✓	✓		3
Powerco Limited (Hawera)		✓			✓		✓	✓	✓		5
Powerco Limited (Manawatu)		✓	✓		✓		✓	✓	✓		6
Powerco Limited (New Plymouth)		✓			✓		✓	✓	✓		5
Powerco Limited (Stratford)		✓			✓		✓	✓	✓		5
Powerco Limited (Tauranga)	✓	✓	✓	✓	✓		✓	✓	✓		8
Powerco Limited (Thames Valley)	✓	✓	✓	✓	✓		✓	✓			7
Powerco Limited (Wairarapa)		✓	✓		✓			✓	✓		5
Powerco Limited (Wanganui)		✓	✓		✓		✓	✓	✓	✓	7
Scanpower Limited		✓						✓			2
The Lines Company (King Country)				✓		✓		✓			3
The Lines Company (Waitomo)				✓		✓		✓			3
The Power Company (Powernet)		✓						✓	✓		3
Top Energy		✓					✓	✓			3
Unison (Hawke's Bay)		✓		✓				✓			3
Unison (Rotorua)	✓	✓	✓	✓	✓		✓	✓	✓		8
Unison (Taupo)	✓	✓	✓	✓	✓		✓	✓	✓		8
United Networks (Waitemata)		✓	✓	✓	✓		✓	✓			6
United Networks (Wellington North)		✓	✓		✓			✓	✓		5
United Networks (Wellington South)		✓	✓		✓			✓	✓		5
Vector Limited		✓	✓	✓	✓		✓	✓			6
Waipa Networks Limited		✓		✓	✓		✓	✓	✓		6
WEL Energy Group Limited		✓	✓		✓		✓	✓			5
Westpower Limited		✓						✓	✓		3

5	42	14	11	18	2	17	44	27	1
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Incumbent Retailer

The Commission needs to work with MED to ensure the incentives facing electricity network companies do not discriminate against them investing in energy efficiency initiatives. Such projects make sense from a network operations perspective, but erode shareholder value.

The PCE will focus on these issues in the next assessment.

4.11 National interest and security of energy services

The Government has been focusing its efforts on supply-oriented solutions to energy security (e.g. developing the Whirinaki plant and entering into a risk-sharing agreement with Genesis Energy for the Huntly e3p plant).

It is important to understand why the Government needs to intervene in the market and to consider the implications of intervention and what can be learnt from it.

The PCE recognises that construction of the Whirinaki and e3p plants provides a ‘breathing space’ during which efforts must focus on alternatives to investment in new electricity generation. This time must be used productively. Therefore, the PCE will watch with interest the Commission’s and EECA’s activities in this area (e.g. the promotion of market-based demand-side measures, incentives for load shedding and shifting and load aggregation and development, and the use of demand exchanges).

It is pleasing to note that the Government wishes to see more reserve capacity provided from the demand side. The PCE will monitor the development of policies to deliver this.

However, it is clear from the Government’s intervention that existing market failures need to be addressed. It also indicates that cost-effective demand-side solutions, as a result of the Government investing in generation, may remain undeveloped.

The Government’s lack of commensurate support for long-term renewable energy solutions consistent with government policy for renewable energy remains a concern.

The PCE hopes the Commission, which has taken responsibility from the Government for addressing such issues, will take a more balanced approach by ensuring demand-side and renewable solutions make a greater contribution to the security of energy services.

4.12 Operation of Whirinaki power plant

On 22 October 2004, the then Minister of Energy advised the PCE that the Whirinaki power plant had been connected to the national grid on 11 days since being commissioned in May 2004. The reasons given were:

- the suspension of the reserves market, compelling spinning reserve to be offered as generation
- low inflows of water in hydro lakes

- Contact Energy deciding not to bid in its Taranaki plant (because prices were too low)
- problems with the high-voltage direct current link (the Cook Strait cable) and an inability to transfer power north quickly
- a lack of North Island reserves (primarily due to network companies actively managing load and withdrawing reserves in the form of sheddable hot water heating load).

Some of these factors suggest problems with the market's form and function.

When commissioned, it was stated policy that the Whirinaki plant would be ring-fenced from the market's normal operation.⁵⁸ The PCE is concerned the ring-fencing is not as robust as initially intended. This undermines market signals that promote energy efficiency and conservation, resulting in, for example, higher levels of greenhouse gas emissions.

The PCE will continue to assess the events leading to the Whirinaki plant's operation.

4.13 Investing in Huntly e3p plant

The decision to proceed with the Huntly e3p plant is unlikely to affect current investment plans for renewable energy. The plant was widely expected to proceed and investors would have already factored it in. Further, MED modelling suggests most new generation to 2020 is expected to come from renewable sources, including wind, hydro, and geothermal sources, because these are expected to be the most cost-effective sources. However, to reach the level of renewable generation desired, market barriers and distortions that favour non-renewable generation need to be addressed.

The Government's apparent lack of consideration of the merits of direct gas use and the decision to support the development of the e3p plant are concerning.

4.14 Investment in hydro generation

Further significant hydro projects will be proposed. However, investors and affected parties face significant costs resolving the concerns arising from these projects. Project Aqua demonstrated the difficulties and highlighted the need for clear policies on issues such as water allocation and the protection of in-stream values. These policies need to be part of, or closely linked to, an overarching energy policy framework.

4.15 Distributed generation

The PCE considers that developing policies and practices to facilitate the growth of distributed generation in New Zealand should be the Commission's major focus. Distributed generation has considerable value, as it 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. Accordingly, it is important that there are no unnecessary barriers to its development.*⁵⁹

MED is leading activity in this area and is responsible for designing and preparing the first regulations for distributed generation. An initial paper, which is with a Cabinet committee, seeks approval for MED to draft regulations. The detail has been determined for the 10 KW-and-below category and for various processes. However, work is still needed on distributed generation above the 10 KW threshold, including rules relating to connection costs, the recognition of avoided costs, ongoing fees, and the rights of distributed generation owners.

The PCE will consider the compatibility of these rules with environmental priorities in the next assessment.

It is intended that focus group meetings will be held with generation interests and distributors to discuss the finer details, so as to better define the distributed generation regulations. The Commission and EECA are involved as observers at meetings and peer reviewers of reports. When the regulations are complete, the Commission will be responsible for monitoring them and recommending required changes. In this context the Commission will be responsible for delivering on the GPS requirements for distributed generation. These requirements relate to:

- facilitating distributed generation's access to lines
- removing barriers for retailers to purchase surplus generation from small scale consumers that are also distributed generators (those customers that consume less than 40,000 KWh/yr).

The Commission also has a role in developing non-regulatory arrangements to achieve these objectives. It can, however, recommend regulations or rules if voluntary arrangements are unsuccessful in achieving the Government's desired outcomes.

The lack of progress with respect to voluntary agreements for distributed generation is disappointing. This issue is important and should be a priority for the Commission. Without these types of agreements, significant distributed generation opportunities will be further delayed with the risk that some are displaced by large-scale remote generation projects.

4.16 Regional energy initiatives and issues

Over the past couple of years a few regional development agencies have identified sustainable and secure energy supplies as an issue of paramount importance to their region's economic development. These agencies, such as Venture Southland, the Canterbury Forum, and the Tairāwhiti Taskforce (Gisborne and Wairoa districts), have produced regional energy assessments of their region's energy use and resources, and considered transmission, distribution, and generation.

That some regions are pursuing their own sustainable development objectives is to be welcomed. The regional level is often the most appropriate place for these initiatives to be pursued. As regions make clear their targets and strategies in their plans (e.g. regional, district, and long-term council community plans), they also make the area's energy goals clear to communities and investors.

The role of regional economic development agencies in the energy debate cannot be underestimated. The PCE would like to see them involved more in the Commission's decision-making processes.

The PCE will assess regional initiatives in future assessments.

4.17 Potential for excessive profits by electricity generating and retailing companies

As shown in Table 4.1, few areas have effective electricity retail competition. This provides an environment where prices can be unconstrained. If there is monopoly behaviour in the retail sector it affects those least able to find alternatives. This is a concern as environmental sustainability also encompasses equity and social sustainability.

The Commerce Commission regulates electricity network companies but there is no equivalent surveillance of electricity retailers. In other jurisdictions, electricity prices are regulated.

The PCE will raise this concern with the Commerce Commission.

4.18 Environmental performance monitoring

The PCE is frustrated by the lack of consistent and comprehensive environmental monitoring and data collection in the electricity and wider energy sectors. It has initiated discussions with the relevant government agencies about the need for information and these discussions will continue and be reported on in the next assessment. Promising initiatives are not being implemented due to a lack of resources.

4.19 Conclusions

Few motivators exist for New Zealand's electricity industry to perform in a more environmentally sustainable manner. The Government has set out its expectations in an electricity GPS,⁶⁰ but progress is not monitored and the Government is not required to ensure the objectives in the GPS are achieved.

It is essential mechanisms are developed to ensure the objectives are met. The United Kingdom Government has developed a possible model and threatened its energy sector with regulation unless it improved environmental reporting practices.

5 Summary of key issues

5.1 Electricity Commission

5.1.1 Openness and accountability

The PCE commends the Commission's significant efforts to ensure openness of process, accountability, and the wide disclosure of information. Consultation documents, minutes of meetings, and a wealth of other useful information are widely available on the Commission's website and elsewhere. This effort is an example to other government organisations.

An unfortunate consequence of the extensive availability of information and unprecedented magnitude of consultation documents is that several sector players (both industry and non-industry) are struggling to keep up with the process and deal with the volume of information emerging from the Commission.

5.1.2 Environmental sustainability framework

The early initiation of the Commission's environmental sustainability framework was welcomed as it is an important component of the Commission's efforts to communicate its understanding of its statutory obligations as outlined in the electricity GPS.⁶¹ The PCE is concerned, however, that this framework is still not publicly available.

5.1.3 Environmental sustainability as key component of activities

During and since this assessment period environmental sustainability has not appeared to be a significant factor influencing the policies the Commission has developed (e.g. the GIT does not include sustainability as a selection criterion).

The PCE will continue to monitor how environmental sustainability is incorporated in decision-making in future assessment periods and encourages the Commission to lead the energy sector on this issue.

5.1.4 Organisational issues and advisory group membership

The PCE notes the development of advisory groups within the Commission and welcomes the apparent transparency of process and public disclosure of information.

However, the Commission needs to address its apparent lack of meaningful interaction with environmental and consumer-focused agencies and non-governmental organisations.

The Commission's processes to populate its advisory groups are commendable, but it is only by including more independent, environmental, and socially focused members that the Commission can fulfil its environmental and social obligations.

5.1.5 Demand-side solutions

In the next assessment the PCE will investigate the opportunities that demand response and demand-side participation present to the electricity market, in the short and long terms.

The Government made it clear in the GPS that the market's demand side is to have a bigger role in the country's electricity market. This implies the Commission should lead initiatives that relate to the market's operation and that EECA should promote complementary demand-side initiatives. For example, EECA has studied market-related demand responses to advise the Commission of opportunities (e.g. *Demand-side participation: A way forward for New Zealand*⁶²).

It is essential the Commission first addresses the barriers preventing full demand-side participation in the wholesale and retail markets.

5.1.6 Transmission and alternatives

The PCE is pleased the GIT aims to facilitate access to alternative means of solving transmission issues. However, it is concerned the GIT:

- does not include environmental or sustainability criteria
- appears to be inherently biased towards investment in transmission capacity compared with alternatives, such as investment in energy efficiency or conservation.

The PCE will continue to assess whether the Commission has addressed these shortcomings.

5.1.7 Development of rules and regulations

It is uncertain whether the Commission's procedures to develop its rules and operational procedures will result in outcomes consistent with the GPS's environmental sustainability objectives.

The Commission should develop criteria so its proposed rules and operational procedures can be evaluated before implementation to minimise the likelihood of perverse market outcomes.

5.1.8 Clarification of roles and responsibilities

Significant uncertainty surrounds the roles and responsibilities across government for energy policy and the implementation of government initiatives. In particular, the respective roles of EECA and the Commission with respect to the Commission's electricity efficiency programmes need to be clarified urgently. Otherwise, duplicated effort, stakeholder confusion, and lost credibility are likely.

The PCE recommends roles and responsibilities are clarified and communicated effectively.

There is no sign of the proposed memorandum of understanding between EECA and the Commission being finalised. This memorandum could form the basis of

similar arrangements with other agencies (e.g. the CCO or MFE). It should be completed as soon as possible.

5.1.9 Distributed generation

The PCE recognises that MED is developing regulations for distributed generation. However, the Commission could encourage and help the industry to develop voluntary distributed generation agreements in the interim.

5.2 Wider electricity sector

5.2.1 Linking gas and electricity policies

There has been a lack of recognition that policies on gas regulation and governance affect electricity. By addressing electricity and gas issues separately, the efficiency benefits of the direct use of gas and opportunities for fuel switching (from electricity to gas) may not be realised. However, an MED discussion document addresses this issue.⁶³

The PCE supports government initiatives that address this policy gap.

5.2.2 National Energy Efficiency and Conservation Strategy

An independent review of government-led initiatives under the NEECS may be appropriate.

It is recommended that MFE publish a detailed progress report annually on EECA's performance, particularly on the progress of the programmes directly related to the NEECS.

5.2.3 Data collection and access

The PCE's assessment framework outlined the role of key data sets in assessing the environmental performance of the wider electricity and energy sectors.

The focus on data in this assessment has not been possible because data has been difficult to obtain. Some data is not collected because, although an institution has the responsibility or power to do so, it may have other priorities and limited resources. Raw data may have been collected for other reasons, so was unsuitable for use in this assessment.

The PCE is especially concerned no measures exist to assess the role and uptake of demand-side measures in the market (including the role price tariffs play in encouraging efficient electricity use).

It is also worrying that data on the extent of small-scale distributed generation is limited.

While the PCE has initiated discussions with relevant government agencies to address these data issues, it also recommends that MED, the Commission, and EECA work together to develop measures to determine the success of the electricity sector in achieving the objectives of the GPS.

5.2.4 Clarity on wider policy direction for energy

The PCE recommends the Government develops a cohesive programme of activities across government to move towards a sustainable energy sector.

5.2.5 Development of electricity sector's key performance indicators

The PCE suggests MFE works with the Commission to develop an appropriate set of environmental and social KPIs for the electricity sector and, ideally, the wider energy sector.

These KPIs would help with the collection of data relevant to the PCE's assessment process and should enable others to develop informed views on the sectors' environmental and social performance.

5.3 Recommendations

The PCE has 12 recommendations for responsible agencies and Ministers.

1. **Deliver the Commission's environmental sustainability framework:** The Commission's environmental sustainability framework needs to be completed so the Commission's understanding of its responsibilities in this area are clearly presented and to ensure the policies it develops are consistent with the Government's objective of a sustainable energy future. [Commission; Minister of Energy]
2. **Improve the representation of wider sector groups:** The Commission must ensure its advisory groups represent *all* interest groups, specifically those that represent small consumers and providers of demand-side management solutions. The Commission should consider how this could be addressed. [Commission; Minister of Energy]
3. **Establish a permanent environmental advisory panel:** A permanent environmental advisory panel could develop indicators for environmental benchmarking within the sector and provide input to the Commission and its advisory groups on environmental issues.
4. **Address market barriers for demand-side initiatives and distributed generation:** The Commission should ensure no market barriers exist at wholesale and retail levels with respect to distributed generation and demand-side measures. [Commission; Minister of Energy]
5. **Consider demand-side initiatives and distributed generation as alternatives to transmission projects:** The Commission's electricity efficiency programmes and its policies to remove barriers to distributed generation should help to develop viable alternatives to transmission projects. [Commission; Minister of Energy]
6. **Examine transmission issues and the role of alternatives more closely:** The GIT criteria should be revised to ensure transmission alternatives are part of the solution. [Commission; Transpower; Minister of Energy]

7. **Clarify roles and responsibilities:** The relationship between the Commission and EECA needs to be clarified to reduce the potential for duplicated work. Finalising the memorandum of understanding would help to achieve this. [MED; Minister of Energy; Commission; EECA]
8. **Review the Public Finance Act 1989:** The Public Finance Act 1989 needs to be reviewed to address the difficulties of the Commission directly funding EECA initiatives on its behalf. [Minister of Finance; Minister of Energy]
9. **Report EECA's performance annually:** An annual report on EECA's progress should emphasise the progress of those programmes directly related to the NEECS. [MFE]
10. **Clarify the wider policy direction for energy:** An overarching energy framework needs to present the strategy for energy (including gas and electricity) in New Zealand. [MED; Minister of Energy]
11. **Introduce environmental performance standards for the electricity sector:** A systematic environmental and sustainability reporting mechanism for the sector could provide information about the achievement of environmental outcomes (including achievement of the NEECS) on an annual basis. [MFE]
12. **Improve data collection:** The Commission and other key government organisations need to improve the data collected for monitoring the electricity sector's environmental performance. [MFE; MED; EECA; Commission; Statistics New Zealand; Building Research Association of New Zealand; Minister of Energy; Minister of Statistics; Minister of Finance]

5.4 Focus for next (full-year) assessment

This report is an assessment of the environmental sustainability of the activities of the leading policy and governance organisations in the New Zealand electricity sector and the wider energy sector. It is a partial assessment of the Commission's performance.

This first report could only ever provide a snapshot of the Commission's activities given the assessment's timing. That said, the PCE has an early opportunity to make clear to the Government, the Commission, and other parties, his expectations for the sector as the second (full-year) assessment process starts.

The PCE will carry out a full-year assessment of the Commission's activities with respect to environmental issues, focusing on six key issues and reporting for the year to 30 June 2005.

- **Environmental sustainability:** The Commission's commitment to environmental sustainability and how this is integrated visibly and effectively into work streams and decision-making processes.
- **The GIT:** The wider public costs and benefits of new or upgraded transmission lines compared with the narrower 'net market benefit'.

- **Demand response and demand-side participation:** The Commission leading market-based initiatives to mobilise and aggregate load shedding and shifting opportunities.
- **Clarity of roles and responsibilities:** EECA and the Commission agreeing on their working relationship and having strategies for cooperating on specific work programmes.
- **Social issues and representation of small users of electricity:** An improved ‘voice’ from the demand side of the market.
- **Wider environmental and sustainability reporting:** The merits of environmental and sustainability reporting in the wider electricity and energy sectors.

More generally, the PCE expects to have further discussions with key players in the sector including policy organisations and market participants to gauge their views on environmental responsibilities and their role in New Zealand’s sustainable energy future. Formalising the roles and responsibilities within government on issues related to electricity and energy is essential. The relationship between the Commission and EECA is of particular concern and requires immediate attention.

Another concern is an apparent lack of systematic monitoring of environmental issues and performance by people and organisations active in the electricity sector (e.g. electricity generation, transmission and distribution companies). The PCE will explore with relevant agencies the possibility of developing a set of sustainability KPIs for these organisations.

Endnotes

- 1 Minister of Energy, 2004a.
- 2 See the Electricity Commission's website (<http://www.electricitycommission.govt.nz/>).
- 3 PCE, 2003, Part A.
- 4 PCE, 2004, Part B.
- 5 Section 172ZQ of the Electricity Act 1992 states that the PCE's functions under that Act are additional to, and do not limit in any way, his powers and functions under the Environment Act 1986.
- 6 These priorities and the reasons for their rankings are discussed in Electricity, Energy and the Environment: Assessment Framework (PCE, 2004).
- 7 Minister of Energy, 2004a.
- 8 Both Acts are discussed in Electricity, Energy and the Environment: Making the Connections (PCE, 2003).
- 9 MED, 2003b.
- 10 DPMC, 2003.
- 11 *ibid.*
- 12 DPMC, 2003: 16.
- 13 The goal was subsequently modified in the electricity GPS with "sustainable" changed to "environmentally sustainable" (Minister of Energy 2004a).
- 14 DPMC, 2003: 18.
- 15 Minister of Energy, 2000.
- 16 EECA & MFE, 2001.
- 17 This work programme is set out in a number of documents including Cabinet Paper POL (02) 145 <http://www.climatechange.govt.nz/resources/cabinet/pol-02-145.pdf> [Accessed April 2005]. This work programme is updated annually. See Vote Climate Change and Energy Efficiency 2005/05. <http://www.treasury.govt.nz/budget2005/suppestimates/supp05climen.pdf> [Accessed May 2005].
- 18 Minister of Energy, 2004b.
- 19 Minister of Energy, 2004a.
- 20 This objective is not the same as the PCE's assessment objective of ensuring the security of energy services.
- 21 DPMC, 2002.
- 22 MED, 2004b.
- 23 See <http://unfccc.int/resource/docs/convkp/kpeng.html>.
- 24 EECA & MFE, 2001.
- 25 See EECA's website for the definition and measurement of 'energy efficiency' (<http://www.eeca.govt.nz>).
- 26 EECA & MFE, 2002.
- 27 The Building Code is contained in the Building Regulations 1992. See <http://www.building.dbh.govt.nz/e/uploads/1992150.pdf> [Accessed 30 May 2005].
- 28 <http://www.eeca.govt.nz/news/MediaItemDetails.aspx?s=m&id=192>.
- 29 Minister of Energy, 2004a.
- 30 *ibid.*
- 31 Ministerial Inquiry into the Electricity Industry, 2000.
- 32 Minister of Energy, 2001.
- 33 Crown entities are public sector organisations that are not public service departments or State-owned enterprises (SSC, 2005).

- 34 Electricity Commission, 2004a.
- 35 These are:
- market operations
 - policy and market design
 - reserve energy
 - transmission
 - supply and demand modelling and forecasting
 - electricity efficiency.
- 36 The GIT and supporting material can be found at:
<http://www.electricitycommission.govt.nz/opdev/transmis/git> [Accessed February 2005].
- 37 Minister of Energy, 2004a: 11.
- 38 Electricity Commission, 2004b.
- 39 The same could be said about coal and the opportunities for using coal. It is important the complementary roles of electricity, gas and coal are addressed.
- 40 MED, 2004b.
- 41 Minister of Energy, 2004c.
- 42 EECA & MFE, 2001: 4.
- 43 EECA & MFE, 2002.
- 44 A situational assessment typically reviews the processes for collecting and analysing information, so an organisation can be evaluated in the context of its operational environment. It may also evaluate particular programmes and canvass stakeholders' perceptions of the organisation and its programmes.
- 45 Minister of Energy, 2005.
- 46 CCO, 2003.
- 47 Pers. comm. Chair Solar Industries Association, 2005.
- 48 Minister of Energy, 2000.
- 49 MED, 2004b.
- 50 DPMC, 2003.
- 51 See <http://www.ofgem.gov.uk/>.
- 52 MFE, 2000.
- 53 See <http://www.energywatch.org.uk/>.
- 54 The ODV calculation values the transmission assets based on their replacement value, including the cost of capital, in contrast to the earlier method, which valued them based on their historic cost. The higher the ODV, the higher the transmission costs. Under an ODV system, today's consumers are effectively paying for future replacement costs.
- 55 See previous endnote.
- 56 The CPI-X is a form of price control, pegged to the consumer price index (CPI) minus a factor (X) the regulatory authority determines based on expected efficiency gains. For more information, see Ministry of Commerce (1999).
- 57 This would be done to delay the need to invest in expensive new network assets.
- 58 MED, 2003b.
- 59 Minister of Energy, 2004a: 27.
- 60 Minister of Energy, 2004a.
- 61 *ibid.*
- 62 Demand Response Ltd, 2004.
- 63 Sustainable Energy, MED, 2004b.

Glossary and acronyms

abatement technology: Technologies that can be incorporated into industries, or other parts of the economy, that reduce emissions of greenhouse gases from these activities.

advisory group: Groups of informed individuals set up by the Electricity Commission to provide non-binding advice to the Commissioners.

base load generation: Generation plant that is used first and therefore runs most of the time.

carbon charge: A low-level government tax that attempts to incorporate the environmental cost of greenhouse gas emissions into the economy and assist New Zealand meet its international climate change obligations.

carbon credit: Generic term for the credit awarded to a qualifying project. The credit recognises the carbon abatement benefits that will arise from implementing the project. One credit is equal to one tonne of CO₂ equivalent.

CCO: Climate Change Office. A business unit within the MFE responsible for leading the development, coordination, and implementation of whole-of-government climate change policy.

combined cycle: An electricity generating technology in which electricity is produced from otherwise lost waste heat exiting from one or more gas combustion turbines. The exiting heat is generally diverted to a steam turbine. The process increases the generation plant's efficiency. Sometimes referred to as co-generation.

Commission: Electricity Commission. A Crown entity set up under the Electricity Act 1992 to oversee New Zealand's electricity industry and markets. It regulates the operation of the electricity industry and markets to ensure electricity is produced and delivered to consumers in an efficient, fair, reliable and environmentally sustainable manner. It promotes and facilitates the efficient use of electricity.

CPI-X: The consumer price index (CPI) less a factor (-X) that accounts for incremental efficiency improvements. A form of price control that caps price increases and places pressure on companies to improve efficiencies.

Crown Loans Scheme: Loans available to government departments, district health boards, crown-owned companies, territorial authorities, regional councils, universities, polytechnics, schools, and crown entities.

demand side: The people and organisations that buy electricity and/or offer to alter their demand for electricity based on the price in the wholesale market.

demand-side management: Methods to change electricity consumers' demand for electricity (e.g. energy efficiency measures, load management, and fuel substitution).

demand-side participation: The process whereby electricity retailers or users operating can sell into the market reductions in their demand for electricity at times of high price.

distributed generation: Any electricity generation facility, usually small-scale, that produces electricity for use at the point of location, or supplies electricity to other consumers through a local lines distribution network.

e3p: The Energy Efficiency Enhancement Project at the Huntly power station.

EECA: Energy Efficiency and Conservation Authority. The government organisation whose role is to promote the benefits of increased energy efficiency and conservation and renewable energy. It also works with others to implement the New Zealand National Energy Efficiency and Conservation Strategy (NEECS).

electricity efficiency: Any change in electricity use that results in an increase in net benefits per unit of electricity. A narrower concept than 'energy efficiency'.

electricity industry: The part of the electricity sector that undertakes to generate electricity, transport it through the national grid and local distribution networks, and sell it to users.

electricity sector: The people and organisations that use the energy services provided from electricity, the providers of electrical equipment and infrastructure (such as buildings) that use electricity, demand management service providers, the electricity industry and the wholesale electricity market (including any secondary financial markets).

emission unit: Alternative term for carbon credit.

Energy Audit Grant Scheme: An EECA-managed scheme to encourage organisations to undertake energy audits on their facilities and implement the audit's recommendations.

energy efficiency: Any change in energy use that results in an increase in net benefits per use of energy.

energy services: Services such as heating and cooling, motive power, and lighting that individuals and organisations can obtain with energy.

generator: A company that generates electricity connected to the national grid of a local network.

GIT: Grid investment test. A test to develop grid reliability standards, ensure the benefits to the electricity sector of proposed grid investments exceed the costs, and enable different investment options to be considered.

GPS: Government policy statement on electricity governance. A document specifying the Government's expectations, objectives, or outcomes in relation electricity.

Government policy statement on gas governance: A draft Government Policy Statement on Gas Governance that was released on 8 July 2004. This statement details the Government's policy for gas industry objectives, governance and

rules relating to the wholesale gas market, and the processing, transmission, distribution, and retailing of gas.

GW: Gigawatt. A measure of installed capacity that is equal to 1 million kilowatts. New Zealand's installed capacity in 2005 is around 8,700 MW.

GWh: Gigawatt hour. A measure of energy equal to 1 million kilowatts operating for 1 hour. New Zealand's annual electricity production is about 40,000 GWh.

hydro spill: Water that could have been used to generate electricity, but was released for other reasons.

in-stream values: Those values associated with a river's natural environment that do not impact significantly on its ecosystem functions and resilience. Includes traditional Maori, recreational, and aesthetic values.

KPI: Key performance indicator. A specification for measuring organisational performance.

kv: Kilovolt. A measure of potential energy, equal to 1 thousand volts. This unit is used to measure the capacity of transmission lines.

KWh: Kilowatt-hour. A unit of energy and the basis of measuring retail sales of electricity.

Large Electricity Users Audit Scheme: An EECA-led audit to help large users identify potential electricity savings projects and co-generation projects on-site that consume more than 10 GW of electricity each year.

load aggregation: The process by which individual energy users form an alliance to secure more competitive prices than they might otherwise receive working independently. Aggregation can be accomplished through a simple pooling arrangement or through the formation of clusters.

load management: Steps taken to reduce power demand (during peak hours, peak days, or peak seasons) or shift some of it to off-peak times.

load shedding: The removal (usually by mutual agreement) of demand from an electricity system when an abnormal load has occurred to maintain the system's integrity and minimise overall demand-side outages.

load shifting: A demand response that involves users changing their behaviour to shift part or all of their demand from a peak period of a system (or a period of constrained supply) to some other period. This provides a key source of flexibility in an electricity system.

MED: Ministry of Economic Development. The government agency with the responsibility for promoting and regulating business and commercial activities.

memorandum of understanding: A written agreement (not usually legally binding) between two parties, recording the basic terms under which they agree to work together on a project.

MFE: Ministry for the Environment. Responsible for the administration of the Government's response to Climate Change and the Resource Management Act 1991.

MW: Megawatt. Unit of electrical power equal to 1 million (10^6) watts.

national grid: The high voltage electricity transmission network that transmits electricity throughout New Zealand. It is owned by Transpower, a state-owned enterprise.

NEECS: National Energy Efficiency and Conservation Strategy. A strategy intended to promote the uptake of energy efficiency, energy conservation and renewable energy in New Zealand. It contains national targets and sets out initiatives that focus on the government, energy supply, industry, buildings and appliances, and the transport sectors.

Network Companies: Also known as line or distribution companies. The companies that operate the local, low-voltage electricity networks.

ODV: Optimised Deprival Valuation. A valuation method based on the replacement value of assets.

PCE: Parliamentary Commissioner for the Environment. An independent officer of Parliament appointed for a 5-year term under the Environment Act 1986 to review and advise on environmental issues and the system of agencies and processes established by the Government to manage the environment.

peak load: High electricity demands experienced for short periods. During a normal day, demand peaks are at about 8 am and 6 pm.

PJ: Petajoule. A unit of energy equal to 10^{15} joules or 277.778 GWh

reserve generation: Back-up generation, usually thermal, which is used in the event of an extreme drought or unforeseen breakdown or maintenance.

spinning reserve: Immediate reserve capacity from generation plants that are synchronised to the national grid, but are not generating electricity. They are already 'warmed up', so can be connected to the grid at short notice.

supply side: The people and organisations that offer (i.e. supply) quantities of electricity to the wholesale electricity market.

wholesale market: The market where purchasers buy electricity from the generators. It includes the half-hourly spot market, longer-term contracts market, and the security and reserves market.

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