

# Electricity, Energy and the Environment

## Summary of Submissions

### 1. Introduction

In June 2003, the Parliamentary Commissioner for the Environment (PCE) released a discussion document entitled Electricity Energy and the Environment. The two-part document formed part of the ongoing process to develop a framework to assess the environmental performance of New Zealand's electricity sector. The overall purpose of the framework is:

*To certify that energy services from electricity are provided in an environmentally sustainable manner through ongoing environmental performance assessments of New Zealand's electricity sector.*

Part A (Making the Connections) sets the context by outlining the terms of reference for the assessment and introducing key concepts and terms. It provides an overview of the existing electricity sector and its impacts on environmental sustainability, while outlining key qualities required to move the sector in a sustainable direction. Part B (Proposed Assessment Framework) outlines the avenues the Commissioner proposes to follow in order to achieve the objectives outlined in Part A. It sets out the proposed framework for the assessments including the conceptual approach and a range of qualitative and quantitative indicators by which progress might be gauged.

The Commissioner sought to generate feedback on the discussion document by asking for submissions from interested parties. A range of key questions was posed at the end of the document to generate feedback, although potential submitters were encouraged to raise any other matters, which they felt were relevant. This report summarises the range of responses from submitters. In total, 40 submissions were received covering a broad spectrum of interests. A list of submitters is included at the end of this report and each has been assigned a number. The sequence of numbers is used to enable the reader to reference the points raised back to particular submissions.

The structure of this summary broadly follows the main sections of the discussion document. It initially reviews comments on the terms of reference and scope of the study, and the proposed timeframes. It then summarises the range of views on the suggested environmental priorities, the proposed conceptual framework, and the range of indicators and associated targets. Finally it lists the suggestions for future focused investigations.

This report seeks only to objectively summarise the responses, which were received. The Commissioner's responses to these submissions will be presented in a subsequent document. While every care has been taken to accurately reflect the opinions expressed by respondents, the PCE does not take responsibility for the accuracy of any of their statements.

### 2. Terms of reference and scope of study

The terms of reference for the assessment framework are contained in an amendment to the Electricity Act 1992, which requires the PCE to examine the extent to which the Electricity Commission (EC) is meeting the Government's objectives and outcomes concerning the environment. The EC was recently set up to take primary responsibility for achieving the Government's policy objectives for electricity. The PCE has also decided to incorporate into the assessment, powers available to him

under the Environment Act 1986 to assess the environmental performance of the broader electricity sector.

Just under half of the submissions, which were received, offered comment on the proposed scope of the assessment. While three out of four who expressed a preference stated their support for the PCE utilising its functions under both the Electricity Act 1992 and the Environment Act 1986 in the assessment framework, this support came with a number of qualifications.

Some considered that a wider assessment is entirely consistent with the desirability of taking an integrated approach to sustainability, which recognises that the underlying drivers of the electricity sector are not necessarily limited to the influence of the EC (12,13). Two stated that the scope could be even broader to consider the wider energy sector (14,28).

The main qualification to taking a broader approach was that the respective assessments should be clearly demarcated (21,23,31), perhaps compiling them in separate reports. This was argued on the following grounds:

- that the respective mandates under the Electricity Amendment Act and the Environment Act are sufficiently different to warrant clear separation (31);
- that for accountability and transparency reasons, separate reports should be produced and individually costed (21);
- that a wider assessment would not enable the specific performance or influence of the EC to be sufficiently isolated (23).

It was noted that while the Commissioner does have a clear mandate under the Environment Act to undertake a broader assessment, it is perhaps overly ambitious to expect to do both roles justice, given the PCE's resources and the proposed timeframes (18). While it was recognised that the EC will not operate in isolation from the rest of the sector, it was considered desirable to aim to isolate its influence and provide timely and prompt feedback. A wider assessment could render that more difficult (37).

It was also pointed out that the proposed assessment should allow for the government revising its draft policy statement on electricity (GPS). Two reasons were cited: firstly, the fact that it has opted for a government-appointed Commission rather than the original plan, which was for industry-led governance arrangements; and secondly that the revised GPS appears to place a greater focus on environmental sustainability. It was suggested that the PCE should reconsider its terms of reference in light of this change in circumstances and be prepared to revise the terms of subsequent audits based on the results of its data analysis (18). That the EC is still in its establishment phase was cited as good grounds for allowing it to settle in before any decisions are made on how it might be assessed (19). The suggestion was made that the PCE should endeavour to maintain open channels of communication with the EC while the assessment framework is under development (18).

Six submissions stated that the assessment should be limited to the performance of the EC (18,23,24,31,34,37), and the following reasons were cited:

- that a wider assessment would dilute the PCE's resources and was therefore not pragmatic or cost effective (18,37);
- that a wider assessment would duplicate the functions of other agencies (34);
- that the PCE's functions under the two pieces of legislation mentioned above do not necessarily lend themselves to an integrated framework (23);
- that the mandate under the Electricity Act is a fairly specific one which does not necessarily justify a wider assessment framework (23,31);
- that it is the EC, which has the potential to wield the greatest influence on the direction of the sector, so it is there that the PCE should seek to exert the greatest leverage (24).

### 3. Timeframes

The proposed timetable for the assessment is dependent on when the EC is up and running and whether it decides to produce a part year report in June 2004. It was noted that the first full year reporting period might not be until June 2005. One submission commented that the PCE should delay finalising the assessment framework until such time as the roles and responsibilities of the EC have been clearly defined and they have had time to settle into their tasks (19).

Others suggested that in order to produce feedback that is useful and can be acted upon, the PCE should endeavour to produce an assessment of the EC in a much shorter timeframe (2,24), ideally within 3 months of the EC's annual performance report (31). It was suggested that the PCE need not wait 2 years before it produces an assessment, irrespective of whether the EC is ready to produce an annual report or not, because a lengthy delay in reporting reduces the chances of effecting meaningful change (2). In addition, the performance measures should be reported and reviewed on an annual basis (24). Two submissions suggested that in order to meet the proposed deadlines, the PCE should limit its assessment to the EC, at least initially (31,37).

The suggested timeframes for the proposed targets associated with the indicators are discussed in Section 7 of this summary.

### 4. Environmental Priorities

This section reviews comments on the environmental priorities for the proposed performance assessment, which were listed in Table 2.3 of Part B of the discussion document. The general comments on the table are reviewed first, followed by the proposed order of priorities. The ranges of views on each of the priorities are then discussed in turn.

Of the 18 submissions, which expressed an opinion, 9 gave their unqualified support to the priorities and their suggested ranking (1,5,13,15,16,27,33,35,39). The following comments were made:

- the priorities appeared soundly based (15);
- offered a clear and achievable start (5);
- are ranked in a logical way, and acknowledge the interconnections (33);
- fill an existing gap in the policy framework for electricity (39);
- recognise that while impacts need to be carefully managed, addressing the underlying drivers avoids the need to manage impacts in the first place (13).

Several others expressed agreement in principle, but with some qualifications (2,12,23,25,26,28):

- while the scope of the priorities seems reasonable in theory, it may not be easy to partition them in practice (28);
- significant overlap exists between the first and third priorities and they could conceivably be combined (23);
- managing impacts is recognised implicitly in the other priorities, but its importance is not necessarily recognised explicitly by ranking it last (12);
- while it is important to promote renewables, not all renewable sources are necessarily sustainable (12);
- the South Island's hydrological cycle may no longer be a sustainable cycle for electricity generation (2);
- the priorities should contain an overarching statement acknowledging the need for economic growth in New Zealand (25);
- the priorities should be reviewed in light of the revised GPS and proposed legislation (23).

One submission offered the view that the priorities are general in nature and aimed at the performance of the sector as a whole, but they do not really address issues surrounding causation and accountability (24). The same submission suggested that the PCE take another look at the roles and responsibilities of the EC. Another questioned whether some of the priorities were really environmental priorities at all, notably energy efficiency, demand-side management, renewables and distributed generation (31). It was also suggested that the priorities and their ordering bore little resemblance to the key environmental priorities and their weighting in the GPS. The GPS, it was claimed, concentrates on efficient energy use, use of renewables and security of supply (34).

Two submissions expressed concern that the government's recent decision to improve reserve thermal generation capacity conflicts with and pre-empts the objectives outlined in the proposed GPS (1,39).

In terms of the ordering of the priorities, one submission observed that the ranking depends on the timeframes under consideration. If the focus is to be on the short-term, then security of supply and managing impacts should be afforded the highest priority, and if the scope is more long-term, then ensuring consistency with government policies on climate change and energy efficiency and conservation should be ranked at the top (29). Three submissions queried the low ranking given to managing environmental impacts (12,14,31), two of which offered qualification: the first three priorities seem to be more economic than environmental, yet they are ranked first (14); and while managing impacts is implicit in the other objectives, it perhaps sends the wrong message by ranking it last (12).

Three submissions agreed with the PCE that significant overlap exists between the priorities (13,23,28), two of which saw this as posing a significant methodological challenge (23,28), particularly if a modelling approach is to be pursued (28). Others commented that the priorities require much more clarification of causation and accountability (24), how they tie in with the conceptual framework (23) and how they will be attained (23,31). Achieving more appropriate balances was also identified as being a desirable goal, in particular between: the supply and demand side; renewable and non-renewable resources; large scale and small-scale power sources; and public and private funding. Past management of the sector, it was claimed, has arguably focused too much on the supply side, has unduly favoured large-scale power sources, especially non-renewables, and has not properly scrutinised the use of public funds, especially by SOEs (1,16).

The lack of specific mention of the effects of externalities was noted as being of some concern (21,23,36). In the pursuit of economic efficiency, it was considered that the full environmental costs of electricity generation, transmission and use should be internalised into decisions (36), and that the EC should develop processes to assess and fix problems, such as incorporating shadow costs for externalities (21). At the moment, the fact that a carbon charge is not included in the price of electricity generated from fossil fuels means that the playing field is not level (23). More detail was also requested on the impacts of the various types of fuels used in electricity generation, and on assessing the ecological footprints of sector participants (23).

It was seen as inevitable that the priorities of the PCE will not necessarily coincide with those of the EC, given that their mandates differ. In order to overcome this potential conflict, the PCE should consult closely with the EC while setting its priorities (23,25). Moreover, the PCE may be expecting more of the EC than they have the capacity to deliver. Reaching agreement on the priorities, which are to be assessed, might produce more meaningful environmental outcomes (25) and would at least let the EC know the basis on which they are to be assessed (23). The review now turns to the feedback offered on each of the priorities in turn.

*Priority 1: Manage growth in electricity demand:*

- *by promoting energy efficiency in all segments of the electricity sector*

- *facilitating and promoting active demand side participation in the wholesale market*

It was suggested that demand side participation should be encouraged in all electricity markets and not just the wholesale part (26). Another commented that the inclusion of managing demand is unjustified on the grounds that it is not mentioned as an objective in the GPS (34). It was also argued that *Priority 1* should perhaps be combined with *Priority 3*, as they essentially cover the same ground in respect of promoting energy efficiency and demand side participation (23).

*Priority 2: Promote the development and role of renewable technologies, in particular new and emerging technologies.*

The focus on new and emerging technologies was questioned on the grounds that improved energy efficiency and environmental outcomes can be achieved by promoting the efficient use of all renewables (23). A link was made with the Brundtland definition of sustainable development to claim that a sustainable electricity sector need not be dependent on renewable sources of energy (21). It was claimed that the Brundtland report only states that a sustainable electricity sector will meet the needs of current electricity consumers without compromising the ability of future generations to meet their own electricity needs. This, it was claimed, does not necessarily rule out fossil fuels or even nuclear power.

One submission drew attention to the fact that while renewable energy sources can make a significant contribution to a sustainable electricity sector in principle, their impacts are not necessarily environmentally sustainable in practice (12). In this context, it was suggested that the word 'renewables' could be replaced with the term 'sustainable'. It was seen as desirable to also promote new and innovative methodologies and market arrangements (26).

Another submission expressed concern at the apparent change to the hydrological cycle in the South Island, which is impacting not only on the reliability of the system, but also on the environment, especially if there is a consequent excessive lowering of hydro lakes, such as occurred at Lake Tekapo (2).

*Priority 3: Promote the efficiency and security of the electricity system by:*

- *ensuring that the use of distributed generation is facilitated*
- *facilitating and promoting active demand side participation in the wholesale market*
- *ensuring that energy resources are used efficiently*
- *ensuring renewable resources are used within their natural rates of replenishment*
- *facilitating and promoting the complementary use of energy resources so as to overcome supply limitations, in particular for renewable sources of energy.*

It was suggested that the point relating to distributed generation should contain the caveats that it should not compromise either power quality (26) or the security of the transmission and distribution networks (23). An increase in the number of wind stations may have implications for security of supply (39). It was also pointed out that present power prices offer insufficient incentives for demand side participation in the wholesale market (39). Distributed hydro generation was seen as offering a partial solution to the issue of transmission losses (39).

Regarding the last bullet point, it was noted that considerable benefits can be realised from coordinating hydro and wind power according to the prevailing climatic conditions, using more water

when the wind drops and less water when the wind blows. It was argued that for ease of coordination, these resources should be held under common ownership (39).

In respect of these first three priorities, the question was raised as to whether they are actually more means to an end (i.e. mechanisms) than ends *per se* (31).

*Priority 4: Ensure consistency with government policies on climate change and energy efficiency.*

Two submissions suggested that this priority is too narrow in focus (23,26). One qualified this view on the grounds that if it is focusing on government policy, it should also include objectives such as maintaining security of supply, promoting information disclosure, encouraging lower fixed charges and facilitating the development of hedge and futures markets (26).

Alternatively, the appropriateness of having low fixed charges was questioned, as was the applicability of 'day ahead' markets to New Zealand conditions. It was noted that because New Zealand has a mainly hydro base, seasonal forward contracts are the minimal contract length sought by commercial customers (39).

The benefit of the carbon credits scheme in facilitating the uptake of otherwise marginal wind power was noted (39). It was also seen as important that managing climate change risks and opportunities should be viewed in a wider context that solely the impacts associated with electricity generation, in particular on the grounds that New Zealand needs more thermal power plants, but also because other sectors of the economy make a much more significant contribution to greenhouse gases (21).

*Priority 5: Minimise greenhouse gases through:*

- *using energy and other resources efficiently*
- *minimising avoidable hydro spill*
- *efficiently managing transmission losses and constraints*

Two submissions suggested that the use of the word 'minimise' is inappropriate, but for different reasons. One suggested that the word 'constrain' should be inserted instead, because it was seen as inevitable that emissions will rise in the future (26). Conversely, the other commented that it was more apt to aim to 'reduce' greenhouse gas emissions (23). A third submission claimed that the overriding mechanism for achieving sustainable development is the pursuit of economic efficiency and that attempting to minimise CO<sub>2</sub> emissions may not be compatible with this objective at all (21).

In respect of aiming to minimise avoidable hydro spill, the following comments were offered:

- reference to hydro spill should be deleted, on the grounds that the efficient use of hydro resources is captured in the first bullet point and it places an unfair emphasis on a renewable resource (23);
- in some circumstances hydro spill is unavoidable if a station is running close to capacity (23);
- what constitutes 'avoidable' spill was noted to be quite subjective and involves consideration of a number of complex parameters (24);
- there are trade-offs between hydro spill and recent developments in reserve thermal capacity. It was claimed that more water is likely to be spilled now that the Huntly power station is planning to base load on take-or-pay coal (39).

The third bullet point, which refers to managing transmission losses and constraints efficiently, could be qualified by stressing that this does not just mean erecting more transmission lines (26).

It was also recommended that three further bullet points could be added to this priority so that greenhouse gases could also be minimised by:

- minimising co-emissions from electricity production;
- utilising Kyoto Protocol market mechanisms;
- using the Kyoto Projects Mechanism for assistance in funding marginally economic greenhouse gas reductions (24).

*Priority 6: Avoid, remedy or mitigate new or existing impacts on the environment, including impacts on:*

- *biodiversity*
- *air, water and land.*

This priority was seen as an unnecessary addition, on the grounds that it is already adequately dealt with under the RMA (24). As noted above, other submitters believe that this objective implicitly underpins all the others and on the strength of this argument, it either transcends the listed priorities or should appear at the top of the list (12,13).

Another asked that impacts on essential infrastructure be added to this priority, on the grounds that threats to energy or water supply, or to transport infrastructure, are potentially just as serious as threats to the natural environment (26). One submission drew attention to the desirability of avoiding any impacts on nature and heritage conservation land, ideally by rendering it off-limits for energy projects (32). Conversely, others stated that the benefits of proposed hydro schemes should be given greater weighting when considering the possibility of access to conservation land. It was argued that the national benefits of doing so may outweigh any loss of conservation land (3) and that environmentally sustainable projects on conservation land are preferable to developing more fossil fuel-based projects elsewhere (39).

## **5. Conceptual Framework**

The discussion document introduced a combined conceptual framework, loosely based on two models, which guides the development of the subsequent set of assessment indicators. The two models in question are the Performance Based Regulation (PBR) approach (also sometimes referred to as the Dimension-Measure-Target framework), which guides the regulation of most electricity markets, and the Pressure- State-Response (PSR) model, which was introduced by the OECD to guide the development of environmental performance indicators.

The PCE proposes to integrate these two models into a hybrid assessment matrix. At the extremes, submissions viewed this strategy as being both innovative and useful on the one hand (14,35) or risky and lacking precedent on the other (23). Some expressed support in principle for the approach (26,27,33,35,39) on the grounds that:

- it is an appropriate method of assisting the sector to become more sustainable (27);
- it should enhance understanding of the environmental effects associated with electricity production, distribution and use (33);
- in association with annual monitoring, it will identify trends in the sector (33);
- it is ground-breaking in character and will encourage inventive and original solutions (35).

Others stated that the integration of the two models and how they tie in with the proposed indicators needed to be justified and explained much more fully (23,28,34):

- there could be a linking diagram, which clarifies not only the concerns mentioned in the previous point, but also explains the links with the OECD criteria more fully and how the conceptual framework and the proposed indicators are linked (23);

- it should also be explained why the application of the PBR or PSR alone will not meet the PCE's stated objectives (23);
- a more detailed explanation of how and why the combined framework generates the proposed indicators would enhance the level of understanding (34) and enable a more substantive evaluation to be made (28).

Two submissions offered alternative assessment models, which are numerically based, more reductionist in nature and produce more quantitatively measurable outcomes (7,28). Another suggested that the combined model may not be universally applicable, with respect in particular to both the core (i.e. to the EC) and the complementary (i.e. focused) investigations, and that the methodologies should be tailored to suit specific subjects (26). In support of the combined model, it was noted that given the nature and dynamics of electricity supply and use, it is entirely appropriate to incorporate both trends and targets into the monitoring and assessment framework (14). The combined model also lends itself to an assessment of the wider energy sector (14).

That it is preferable to focus on the problems, rather than the symptoms was also raised as a concern. In other words, if the underlying drivers are controlled then there may be less undesirable impacts to manage in the first place (13).

The PBR model was seen as perhaps being too generic to be of great use, and as it stands it does not take into account the variability within the sector. Moreover, it also relies on an accurate and comprehensive data set, which may not be practically achievable (23). The same submission also stated that implementation of the PBR model requires objectives to be set on incentives and penalties, which are largely outside the PCE's control. For better clarity, it was suggested that the terms 'performance measure' and 'performance target' be replaced with 'current state' and 'desired state' respectively (35).

The applicability of the PSR model was supported on the grounds that it is broadly consistent with the MfE's Environmental Performance Indicators Programme, and hence it would enable data sharing (29). However, MfE's current priorities do not place an emphasis on energy indicators (35). It was also pointed out that the PSR model is increasingly being used to assess environmental outcomes within economic and social contexts too, but the proposed assessment framework may not consider social impacts or indicators at this stage (29).

The proposed exclusion of social indicators in the model at this stage was questioned (5,12,14,23,40), based on the following grounds:

- that energy efficiency has social consequences and that the trade-offs between environmental, economic and social dimensions should be considered in a holistic manner (23);
- that the strong sustainability model, which the PCE is proposing to follow, encompasses social aspects (23);
- that social goals are included in the GPS (14);
- that the performance of the electricity sector has significant social impacts, especially for the health and well-being of low income groups (12);
- that the restructuring of the electricity sector has concentrated power and influence to the detriment of less influential and non-market participants, whose participation is under-represented (14);
- that regional and district councils are now addressing health and safety and aesthetics in their planning policies, so the PCE could incorporate their information into the assessment framework (5);
- that community-driven solutions are more likely to produce sustainable outcomes (40).

On the other hand, it was considered that while social indicators were perceived as being desirable, they are also more contentious than the environmental and economic indicators (1).



There was general acknowledgement of the potential difficulties in collecting data on 'state' indicators, a point that the discussion document acknowledges. One submission drew attention to the complication of measuring effects, which are attributable solely to the electricity sector, in particular to air quality. They suggested that the focus should instead be on pressure indicators (12).

## 6. Indicators

Submissions were generally supportive of the PCE developing a comprehensive set of indicators. Attention was drawn to the requirements for, and practicalities of, assembling such a large data set (23,26,31,34). It was suggested:

- that this poses methodological difficulties in analysing such an array of potentially conflicting information (23);
- that this may result in superficial coverage (26);
- that it could impose an additional burden on participants who are already required to report to other agencies (34).

One submission claimed that the proposed indicators were not necessarily consistent with the objectives outlined in the GPS, and that the PCE assessment process should be driven by the GPS alone and not by the pursuit of a wider range of indicators (34).

It was suggested that to resolve potential problems with data collection, the PCE should:

- liaise closely with other agencies who also collect data, to avoid duplication (26);
- consult with sector participants who might provide it, to assess its availability and the cost of obtaining it (35);
- consider carefully the issue of commercial sensitivity (34);
- if possible avoid placing another burden on industry participants to provide information (34).

Given the wide scope of the indicators, some stated that it may be necessary to prioritise them and focus on areas where the greatest net benefits can be achieved (7,26,38), although no suggestion were offered on where these may lie. Moreover, it may also be desirable to target the indicators more clearly. In other words, make explicit exactly who is being assessed and on what basis (34). This would greatly assist in determining causation and accountability (24). The indicators could also be linked to the PSR model more explicitly and categorised accordingly (23).

Another general comment is that a greater level of detail is required on those indicators, which specifically refer to the EC. This is to ensure that its rules and operating procedures enable meaningful progress to be made in facilitating the desirable behavioural and attitudinal changes and do not merely rest on paying lip service to them (24). In conjunction with this objective, the PCE should assess carefully the market design and rules set by the EC, with respect in particular:

- to ensuring that the price of electricity reflects all its costs and its scarcity (24);
- that they do not favour one particular sector (24);
- that they facilitate progress towards more effective demand side participation (13,24).

One submission stated that consumers would not necessarily support demand side participation, especially if it meant an interrupted supply of power (34).

The need to carefully consider the possible trade-offs between some of the indicators was highlighted, as was the need to consider the presence of externalities and how they impact on the energy and economic efficiency of the sector (24). Several additional indicators were suggested for inclusion in the assessment matrix:

- an estimation of known reserves of indigenous non-renewables (16,27), possibly including geothermal sources (1);

- a measure of the number of household units using distributed renewable energy resources, on and off-grid (27);
- an assessment of the impacts of take-or-pay contracts on the environmental priorities (1);
- a comparison of proportionate investment between the supply and demand side, between fossil fuels and renewables, and between large scale and small scale sources (16);
- an improvement in the energy efficiency of appliances (25).

On related matters, it was also proposed that a comprehensive matrix be developed to assess the relative costs and benefits of each type of generation, each type of demand side management, different energy efficiency options, and transmission and distribution enhancements (39).

The second part of this section considers the comments offered on particular indicators in more detail.

*Table 5.1 Dimension: physical environment, efficiency and social*

*Sub-dimension: Environmental sustainability and sustainable development*

This indicator is very general in nature and possible too vague to be of practical use (24). A possible addition could be a measure of the ecological footprint created by electricity production and distribution (12,29).

*Table 5.2 Dimension: physical environment*

*Sub-dimension: Climate change*

This dimension could also be more focused, perhaps by aiming to produce a single indicator of CO<sub>2</sub>-equivalent emissions attributable to electricity production and use (16), or even more specifically, to measure emissions attributable to particular parts of the sector (24). It was observed that the indicator measuring emissions of non-methane volatile organic compounds (NMVOC) presently lies outside the Kyoto Protocol and so should be assessed as an air quality indicator (16). It was also seen as important that this sub-dimension should be placed in a wider context than just electricity production (23). Participation in Negotiated Greenhouse Agreements (NGAs) was viewed as potentially incompatible with achieving meaningful Greenhouse Gas (GHG) reductions (24), although no explanation was offered as to why this may be the case.

*Sub-dimension: Air, water, land and biodiversity*

It was suggested that ‘land’ could be expressed as ‘land and minerals’, on the grounds that ‘land’ does not necessarily encompass resources such as coal and oil (5). The use of RMA consent violations was not viewed as being particularly useful by one submission on the grounds that consent conditions for similar projects vary and that mere compliance does not necessarily lead to improved environmental outcomes (23). It might be useful to measure the impacts of electricity production on the natural character of the environment, particularly on water bodies and the coastal environment (36). Concern was expressed that present ODV reporting requirements provide insufficient incentives for line companies to pursue a programme of placing more of their network underground (22).

*Table 5.3 Dimension: Economic/Efficiency*

*Sub-dimension: Resource efficiency*

Hydro spillage was seen as being useful to monitor, but it was argued that avoidable spillage is highly subjective and that the PCE doesn't understand the complexities of the issue (23). From another perspective, it was suggested that the PCE should strive to provide a more robust assessment of the alternatives to overusing hydro lakes and the consequences of operating them inappropriately and to environmentally damaging levels (2).

*Sub-dimension: Energy efficiency*

The indicators measuring energy consumption attracted several comments. Firstly, it was noted that they could be more specifically targeted (23). Several submissions pointed out that the objective of reducing consumption, both absolute and per capita, was potentially incompatible with other government objectives, particularly the pursuit of economic growth (23,26). Another claimed that increasing levels of electricity consumption and demand were not necessarily detrimental to the overall economy (34).

Measuring the proportion of operating reserve supplied by the demand side was also questioned, partly because the required information may not be available (23) and partly on the grounds that it may not even be a worthy objective, because it is inconsistent with providing sufficient long-term generation capacity for the economy and would require further major restructuring of the electricity market (34).

Others agreed that it is an entirely appropriate measure, as demand side participation is a key element of the GPS, but that it needs to be closely tied to the formation of market rules and procedures to identify any barriers and enable it to work effectively (1,13,16,24). The following qualifications were offered:

- when supply is scarce, pricing signals should flow through to consumers to provide sufficient incentives to enable them to make appropriate demand side responses (13,24);
- demand side participation is a more sustainable response than a short term focus on security of supply (16);
- the market is presently skewed in favour of supply side options, so measuring demand side participation can reveal if more balance is being achieved (1,24);
- it will provide a useful comparison of the relative costs and benefits of investing in supply-side options versus investing in demand side management (16).

One submission suggested that the PCE could clarify why more active demand side participation in electricity markets will lead to desirable outcomes and how the PCE proposes to assist and assess the EC on this topic (23).

Support was also expressed for the objective of facilitating distributed generation (1,16,23,24), for the following reasons:

- that the objective of identifying and removing any barriers to distributed generation is entirely consistent with the GPS (24);
- distributed generation has the potential to make a positive contribution to environmental sustainability and energy efficiency (23);
- it is a better alternative than expanding the transmission network, which may have significant adverse environmental and cultural impacts (2);
- it was noted that the PCE could be clearer in explaining how it might be encouraged, which could conceivably involve a focused investigation (23).

It was suggested that the access to process indicator should be qualified to ensure that it is 'effective' access (1) and that it should be more clearly linked to other indicators to ensure meaningful outcomes are achieved (24). It may also be better placed under the sustainable development section (1).

The focus on identifying barriers to the uptake of 'new' renewables was also challenged and the PCE asked to justify why this should not apply to all renewables (23). Two submissions drew attention to barriers presently facing solar power, in particular the relatively large set up costs and slow payback times. Government support could significantly reduce these barriers (9,10). Similar comments were offered in support of bio fuels (4,6).

The indicator assessing the efficiency of thermal generation should be more detailed and particular attention paid to the potential benefits of 'best practice' geothermal power (33). It was stated that geothermal energy can legitimately be considered a renewable resource if sound practices are adhered to (20).

The collection of data on the generic types of tariffs was questioned and the PCE asked to justify why this is positive for environmental sustainability (23). Other submissions drew attention to the linkages between tariff structures and incentives for energy efficiency, demand side participation and distributed generation (1,13,16,24).

## **7. Targets**

This section elicited several comments. Recurring themes were:

- that the targets should be realistic and achievable (5,12,35);
- that they should be prioritised to focus on those which are likely to make the greatest contribution to environmental sustainability (13,24);
- that the targets and the timeframes for their implementation should only be set after those who are directly affected have been consulted (23,35);
- that some of the targets need to be defined more precisely, in terms of both their magnitude and timeframe, and that they should be subject to regular review (24,35);
- that clear benchmarks need to be set to enable comparisons to be made between the desired state and the actual state (11);
- that the targets must be consistent with present government policy (23).

It was considered that many of the targets were unrealistic, given the wide scope of the proposed assessment, and two submissions took the view that it was premature to define targets at this stage, given that the EC is not yet up and running (19,29). However, another commented that while some of the targets may appear to be ambitious, notably in respect of distributed generation, this could actually help to induce more rapid change (12).

Several submissions offered comment on the targets relating to greenhouse gases. At the extreme, it was argued that aiming to reduce emissions is totally unrealistic on the grounds that more thermal power stations will be needed to cater for future demand (21) and that in any case, given present government policy, it is inappropriate for the PCE to be setting its own targets, or even to be monitoring this aspect at all (34). Conversely, other submissions pointed out that the primary aim should be to achieve long-term absolute reductions in emissions rather than settling for a carbon neutral state (16,27).

The targets for renewables also attracted several comments. One asked the PCE to justify how the promotion of renewables was directly related to sustainable development (21). Others asked that the targets should be set more specifically, to aim for a certain percentage increase in the proportion of electricity generated from renewable sources (1,16,27). It was also recommended that the targets should aim for a proportionate increase in investment in renewables compared with non-renewables (1,16). One suggested a target of a 1% increase per year (27).

In respect of the targets pertaining to managing electricity demand, it was stated that there needs to be greater emphasis placed on demand side management rather than simply focusing on the supply side (1,12,16), while one suggested that the long term aim ought to be to reduce demand to a steady state (2). Again, an alternative view was presented that the targets proposed for demand management and energy efficiency improvements were unrealistic and did not take into account the practical operation of the market, notably the perceived need to cater for future growth and enhance supply security (34).

Some additional targets were also suggested. An assessment of the environmental performance of the SOEs was seen as being a useful exercise as it would make transparent any possible trade-offs between their environmental performance and their economic objectives (26). Measures of the land used, or the water needed for power generation and the land used for transmission and distribution, were seen as offering useful data on the ecological footprint of the sector (12).

As a long term target, it was also proposed that all power stations should be assessed on a life cycle basis, including decommissioning and site restoration, which would give an indication of their true cost and enable meaningful comparisons to be made (12). Finally it was suggested that comparisons be made on levels of investment in small scale versus large-scale power sources and between public and private expenditure (1,16).

## **8. TBL Reporting**

The main issues raised here concerned the methodologies, which might be employed, the scope of any assessment, the possible information requirements, the range of possible participants to be assessed, and how frequently the assessments would be carried out.

The benefits of undertaking this type of assessment are:

- that it would encourage participants to consider the sustainability of their activities more carefully (5,12,33);
- that it could provide an indication of the degree to which the PCE's message is getting across (5);
- it would enable observations to be made about longer-term trends in the sector, and among sub-groups (12).

Others agreed, but noted that while it would be a useful exercise, it is perhaps not an area of high priority, given the PCE's other proposed commitments (16,26,27). Suggestions were made that the assessments should only be conducted every 4-5 years (29) and that they should be more generic and report on the sector in general, rather than singling out winners and losers (26). If certain companies or parts of the sector were poorly performing, then more targeted assessments could be produced if and as necessary (26).

On the other hand, some stated that such assessments would impose an additional and onerous burden on participants in time and effort (29,34) and could have a negative impact on commercial confidentiality and the relationship between the companies and their shareholders (31,34). Moreover, it was stated that these sorts of sustainability issues are already rigorously assessed under the RMA, the Energy Efficiency and Conservation Act and the National Energy Efficiency and Conservation Strategy (34).

It was seen as desirable by some that the PCE employ assessment methods based on established international best practice, along the lines of UNEP's work (24,29,33), which is summarised in Appendix 2 of Part B of the Discussion Document. In this respect, the PCE would have established benchmarks against which to assess, not just the TBL outcomes of the organisations under scrutiny,

but also on the veracity of their reporting methodologies (29). This would encourage high standards of reporting by participants (24) and add further credence to the PCE's assessment (12).

Some saw problems in applying a set methodology (13,31), mainly on the grounds that considerable diversity exists among possible participants, particularly in terms of the range of their activities and the different size of the organisations. Smaller companies may not have the resources to produce quality TBL reports (13) and not all possible participants presently produce them anyway (13,23). It was also claimed that internationally, companies seem to be moving away from TBL reporting, instead incorporating environmental auditing into their single bottom line (23).

## **9. Focused Investigations**

There was a wide range of topics suggested for focused investigations. These are listed below:

### *Reserve Generation*

Use of public funding to invest in reserve capacity (1).

A comparison of investment in reserve capacity versus investment in energy efficiency measures (1).

What defines a dry year? Is the frequency of dry years changing? What level of security is justified? (16).

Assess the benefits of more non-hydro renewables and the connections with dry-year management (27).

The impacts of reserve generation contracts on climate change policies, especially how they affect implementation of the Kyoto Protocol (23).

### *Gas*

The impact of take-or-pay contracts on the economics of sustainable alternatives (1).

Cradle-to-grave sustainability assessments of power stations (1,33), especially coal (1)

The impacts of the decline in availability of Maui gas on electricity demand and prices (26)

Trends in gas exploration (26) and how best to use any future gas reserves (33).

### *Industry Structure*

An investigation into alternatives to market-based models (2).

An assessment of the impacts on security and co-ordination of reintegrating the SOEs (33)

Present degrees of coordination and cooperation among sector participants (33)

### *New technologies*

The feasibility of developing micro, or home-based wind generation (2)

Establishing subsidies to encourage more small-scale wind and solar generation (5).

The potential for biogas as a fuel for electricity generation (6).

Present barriers and opportunities for adoption of solar water heating (12)

The sustainability of different methods of extracting geothermal energy and an assessment of potential reserves (20).

An analysis of regulations and procedures to identify any technical and operational barriers to the uptake of new technologies (23)

An investigation of the feasibility of green certificate schemes (24)

Present and future options for distributed generation (28)

### *Transmission and distribution*

An investigation of transmission losses, in the context of the geography of production and consumption (2).

The relationship between generation projects and transmission (i.e. if projects are given the green light, will consent for new lines necessarily follow (5))

How will distribution companies act after 2013 deadline expires, in respect of their obligation to guarantee supply and what issues and opportunities will this raise (33).

#### *Scale Issues*

A comparison of the impacts of single large power plants versus numerous small ones (5)

#### *Hydro generation*

Project Aqua (2)

A comparison of the efficiency of using water for irrigation versus hydro power (5)

An analysis of the reasons why hydro spillage occurs (16).

#### *RMA*

How network companies are treated under different District Plans (5).

A review of Regional Policy Statements and Plans and the how they may or may not give effect to energy policy objectives (23).

A comparison of how the RMA treats renewable and non-renewable sources, both the process and the outcomes (23).

#### *Energy Efficiency*

The relationship between the form and function of the electricity industry and trends in energy efficiency (5,12).

#### *Urban planning*

Trends in building design and the feasibility of retrofitting for energy efficiency (12).

Planning for future demand in urban areas and the potential to integrate urban design into energy management (29).

#### *Demand Side*

What motivates people to reduce electricity consumption and what incentives are needed? (1,12)

Present barriers to more effective demand side participation (24)

Current and future options for demand side bidding in electricity markets (33)

The degree of involvement of the retail sector in energy efficiency and conservation projects (23)

#### *WEM*

Identifying the proportion of power traded on the spot market versus longer-term hedge contracts, versus demand side bidding (33).

#### *Miscellaneous*

Considering the alternatives to renewing Comalco supply arrangements (26)

Developing good integrated assessment methodologies, ideally computer-based ones (28)

An assessment of whether the recent reforms are likely to produce a more settled electricity sector (33)

The future role of coal in the sector (23)

#### *Climate change*

An assessment of market participants set against climate change objectives (23)

## 10. List of Submissions

### a) Chronological

1. *Molly Melhuish, Environmental Consultant*
2. *Rick Barber, Chair, West Coast Tai Poutini Conservation Board*
3. *Gordon Copeland, Energy Spokesperson, United Future*
4. *Justin Ford-Robertson*
5. *Karen Jury, Policy Adviser, Waimakariri District Council*
6. *Thomas Stubbing*
7. *Bob Frame and Richard Gordon, Sustainable Business and Government Group, Landcare Research*
8. *Beverley Muir, Gisborne District Council*
9. *Nigel and Judith Simpson*
10. *Ray and Caryl Clarke*
11. *Anonymous*
12. *Stuart Pringle, Energy Policy Analyst, Canterbury Regional Council*
13. *Rob Jamieson, Commercial Manager, Orion*
14. *Ursula Antunez, Donna Caddie, David Coleman, Jacqui England, David Town, Diana Soloman, Jules Williams, 1<sup>st</sup> Year students, Masters of Environmental Policy, Lincoln University*
15. *Steve Rylands, Department of Environment and Natural Resources, The Treasury*
16. *Steve Goldthorpe, Sustainable Energy Forum*
17. *Krisrina Temel, Crown Minerals Unit, Ministry of Economic Development*
18. *Heather Staley, CEO, Energy Efficiency and Conservation Authority*
19. *David Hunt, Contact Energy*
20. *Andy Bloomer, New Zealand Geothermal Association*
21. *Ralph Matthes, Executive Director, Major Electricity Users' Group*
22. *K. Forrest, Managing Director, Marlborough Lines*
23. *Gillian Blythe, Regulatory Strategy Manager, Meridian Energy*
24. *Barry Barton, Gary Law, Directors, Environmental Defence Society*
25. *Mike Underhill, CEO, WEL Networks*
26. *Alan Jenkins, CEO, Electricity Networks Association*
27. *Ian Shearer, Manager, New Zealand Wind Energy Association*
28. *Robbie Morrison, PhD student, Technical University of Berlin.*
29. *Des Hughes, Manager, Utility Relations, Auckland City Council*
30. *Neil Cherry, Acting Chief Financial Officer, Wellington City Council*
31. *Ralph Craven, CEO, Transpower*
32. *Fergus Sutherland, Chairperson, Otago Conservation Board*
33. *Blair Dickie, Waikato Regional Council*
34. *Rob Hunter, Generation Resources Manager, Mighty River Power*
35. *Marian Hobbs, Minister for the Environment*
36. *Chris Carter, Minister of Conservation*
37. *Andrew Jefferies, Senior Policy Analyst, Energy Markets Policy, Resources and Networks Branch, Ministry of Economic Development*
38. *Ralph Sims, Director, Centre for Energy Research, Massey University*
39. *Keith Tempest, CEO, Trustpower*
40. *Dave McArthur*



b) by category

Electricity Industry

- 13 Rob Jamieson, Commercial Manager, *Orion*
- 19 David Hunt, *Contact Energy*
- 20 Andy Bloomer, *New Zealand Geothermal Association*
- 21 Ralph Matthes, Executive Director, *Major Electricity Users' Group*
- 22 K. Forrest, Managing Director, *Marlborough Lines*
- 23 Gillian Blythe, Regulatory Strategy Manager, *Meridian Energy*
- 25 Mike Underhill, CEO, *WEL Networks*
- 26 Alan Jenkins, CEO, *Electricity Networks Association*
- 27 Ian Shearer, Manager, *New Zealand Wind Energy Association*
- 31 Ralph Craven, CEO, *Transpower*
- 34 Rob Hunter, Generation Resources Manager, *Mighty River Power*
- 39 Keith Tempest, CEO, *Trustpower*

Central Government

- 15 Steve Rylands, Department of Environment and Natural Resources, *The Treasury*
- 17 Krisrina Temel, *Crown Minerals Unit, Ministry of Economic Development*
- 18 Heather Staley, CEO, *Energy Efficiency and Conservation Authority*
- 35 Marian Hobbs, *Minister for the Environment*
- 36 Chris Carter, *Minister of Conservation*
- 37 Andrew Jefferies, Senior Policy Analyst, *Energy Markets Policy, Resources and Networks Branch, Ministry of Economic Development*

Regional/ Local Government

- 5 Karen Jury, Policy Adviser, *Waimakariri District Council*
- 8 Beverley Muir, *Gisborne District Council*
- 12 Stuart Pringle, Energy Policy Analyst, *Canterbury Regional Council*
- 29 Des Hughes, Manager, Utility Relations, *Auckland City Council*
- 30 Neil Cherry, Acting Chief Financial Officer, *Wellington City Council*
- 33 Blair Dickie, *Waikato Regional Council*

Statutory Bodies/ Crown Research Institutes

- 2 Rick Barber, Chair, *West Coast Tai Poutini Conservation Board*
- 7 Bob Frame and Richard Gordon, Sustainable Business and Government Group, *Landcare Research*
- 32 Fergus Sutherland, Chairperson, *Otago Conservation Board*

NGOs

- 16 Steve Goldthorpe, *Sustainable Energy Forum*
- 24 Barry Barton, Gary Law, Directors, *Environmental Defence Society*

### Academics

- 14 *Ursula Antunez, Donna Caddie, David Coleman, Jacqui England, David Town, Diana Soloman, Jules Williams*, 1<sup>st</sup> Year students, Masters of Environmental Policy, Lincoln University
- 28 *Robbie Morrison*, PhD student, Technical University of Berlin.
- 38 *Ralph Sims*, Director, *Centre for Energy Research*, Massey University

### Political Parties

- 3 *Gordon Copeland*, Energy Spokesperson, *United Future*

### Individuals

- 1 *Molly Melhuish*, Environmental Consultant
- 4 *Justin Ford-Robertson*
- 6 *Thomas Stubbing*
- 9 *Nigel and Judith Simpson*
- 10 *Ray and Caryl Clarke*
- 11 *Anonymous*
- 40 *Dave McArthur*