



Parliamentary Commissioner  
for the **Environment**  
Te Kaitiaki Taiao a Te Whare Pāremata

# Submission to the Finance and Expenditure Committee on the **Electricity Industry Bill**

26 February 2010

*“Nobody is currently taking leadership in the country; and this is certainly not helped by the fact that the electricity industry structure in New Zealand is rather unique. While the line companies (distributors) would accrue the greatest benefits from a smart grid, the retail companies are the ones that have been put in charge of the so-called smart meters.”*

Paul Budde, Chair of New Zealand’s first Smart Grid Summit

Thank you for the opportunity to submit on this Bill. I would like to speak to this submission.

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## Introduction

***“The smart grid will spur the kind of transformation that the internet has already brought to the way we live...” (USA Department of Energy)***

The Electricity Industry Bill aims to improve competition in the electricity market and improve security of supply. In this submission, I draw on the experience gained while investigating the roll-out of smart meters in New Zealand. My advice is focused on one key aspect that will help to achieve the bill’s aim of improving competition and security of supply. This is the development of a smart electricity grid.

A smart electricity grid will be the most important electricity infrastructure development for the foreseeable future. A smart grid makes use of modern digital technology to upgrade the current electricity system, ultimately giving much finer control. A smart grid will provide for:

- ✓ improved efficiency
- ✓ improved security of supply
- ✓ lower power bills for consumers
- ✓ reduced greenhouse gas emissions
- ✓ reduced need for new power lines and power plants, and associated environmental impacts
- ✓ in the future, electric vehicles and distributed generation

While my interest as the Parliamentary Commissioner for the Environment in a smart grid is in its potential to benefit the environment, the development of a smart grid is also clearly aligned with the intent of the bill.

There are many approaches that can be taken to develop a smart grid with different parties gaining different benefits and having different requirements. With the industry currently locked in a number of stand-offs, progress towards a smart grid is being hindered. And the consumer and environmental benefits it will bring.

To support the efficient operation of the electricity market, the Government needs to take active steps to resolve these stand-offs. By working with industry to identify key standards, the Government can coordinate the needs of all the different parties, and remove the barriers to progressing a smart grid.

I see this bill as a positive step forward. The new Electricity Authority will be well placed to ensure a fully functional smart grid is developed.

**I recommend that the Electricity Authority be required to amend the Electricity Industry Participation Code to provide for the development of a smart grid.**

This could be done by adding “g. mechanisms to enable the development of a smart grid” to Clause 45(2). This clause identifies “specific matters” that must be included in the Electricity Industry Participation Code.

# 1 The smart grid: what will it do for NZ?

New Zealand is just one of many countries who are pushing against the limits of their electricity infrastructure. As a result, there is a worldwide trend to become smarter about electricity use by developing smart grids.

*Australia, the United States, and many countries in Europe are already laying the building blocks for the smart grid.*

Described as the ‘energy internet’, the smart grid uses modern technology to upgrade the whole delivery chain – from generation through transmission, lines, and metering, to electric appliances.

The components that make up a smart grid include a wide range of devices such as sensors, controllers, and communication transmitters and receivers. Such devices, along with the supporting computers and software, allow electricity supply to be managed in a much more finely tuned and responsive way. For example, smart devices on power lines could sense system overloads and reroute power to prevent power cuts or at least contain them to a small area.

A smart grid will provide rich up-to-date information. With access to this information, all market participants will be able to make more informed decisions leading to a much stronger and more efficient electricity market (see table below). In addition, the smart grid will increasingly bring environmental benefits such as:

- reduced greenhouse gas emissions
- reduced local impacts due to fewer new power plants and power lines
- provide for distributed generation and large numbers of electric vehicles

## Advantages of a smart grid

Generators	<ul style="list-style-type: none"><li>✓ avoid having to build costly excess capacity</li><li>✓ better match supply and demand in real-time to cope with the intermittency of renewable generation</li><li>✓ support distributed generation</li></ul>
Retailers	<ul style="list-style-type: none"><li>✓ reduce costs through remote meter reading</li><li>✓ potentially increase their customer base through offering niche products</li></ul>
Lines companies	<ul style="list-style-type: none"><li>✓ able to run existing power lines harder</li><li>✓ avoid having to build costly excess capacity</li></ul>
Consumers	<ul style="list-style-type: none"><li>✓ access to much better information</li><li>✓ able to have greater control over electricity consumption</li><li>✓ able to reduce power bills</li></ul>
Appliance manufacturers	<ul style="list-style-type: none"><li>✓ innovate through manufacturing smart appliances</li><li>✓ diagnose appliance faults remotely</li><li>✓ repair and upgrade appliances remotely</li></ul>

## 2 Making a smart grid happen: the smart meter roll-out

A critical step towards developing a smart grid in New Zealand is already underway with the roll-out of smart meters. These smart meters are electronic meters that, at a minimum, provide communication between the meter and electricity suppliers (see illustration for an example of how they appear). Beyond this, what smart meters are capable of depends on their exact specifications: There is a range of possible functions to choose from.



By 2012, 1.3 million New Zealand households will have smart meters. The roll-out is happening at a very fast pace compared with roll-outs in other countries and New Zealand is the only country in which the roll-out is being driven solely by electricity retailers.

There are two serious problems with the New Zealand roll-out. First, the roll-out is failing to deliver benefits to all the industry participants, including consumers. Second, there is a lack of key standards. These problems are discussed below.

### Roll-out of smart meters fails to deliver all the benefits

The smart meters currently being installed fail to meet the needs of lines companies, consumers, and appliance manufacturers. Consequently, they will not deliver the environmental benefits.

Retailers control the installation of residential smart meters and therefore control the specifications of the meters. This is partly a consequence of Electricity Governance Rules that give retailers responsibility for meters.<sup>2</sup>

As a result, other parties with a stake in the electricity system are not able to influence the specifications of the meters. Last year, I released a report on smart meters.<sup>3</sup> I highlighted that retailers were leaving out a key function of the meters. Consequently consumers and the environment were missing out on benefits. Lines companies and appliance manufacturers have also said that their needs are not being met.<sup>4,5,6,7,8,9,10</sup>

Retailers are rolling out smart meters that, without expensive retrofit, cannot deliver benefits to lines companies, consumers, appliance manufacturers, and the environment.

## Industry stand-off

Relationships between the different parties are strained. Two major stand-offs have already emerged.

The *first stand-off* is between retailers and lines companies. A group of lines companies has stated that:

*“... retailers are installing meters solely for remote meter reading purposes to the detriment of generation, lines, and consumers ...”*

The *second stand-off* is between retailers and appliance manufacturers. Retailers say they are waiting for the manufacturers to determine the standards necessary so that electricity meters and smart appliances can communicate.<sup>11</sup> However, manufacturers report that they are waiting for retailers to determine standards; Fisher & Paykel has adopted a “*wait and see philosophy*”.<sup>5</sup>

## Lack of standards leads to inefficiency

Retailers plan to take different approaches to how the meters will communicate (if at all) with smart appliances and in-home displays.

While allowing companies flexibility to make their own technology choices is usually the most efficient approach, this is not always the case. Key standards are critical for setting up a playing field where competition can flourish. A lack of key standards will lead to inefficiencies in the wider electricity system.

Suppose Wellington had different electrical sockets and plugs from Auckland. This is equivalent to what could happen with smart meters. For example, when moving house a family may discover that the meter at their new house will not “talk to” their smart refrigerator, washing machine and other smart appliances. This problem will stifle the widespread adoption of smart appliances.

*Fisher & Paykel needs to know that their products “will be compatible with the majority of smart meters that are deployed” before they can manufacture smart appliances.*<sup>5</sup>

## The wider industry calls for standards

The New Zealand market for smart appliances will never develop if different retailers adopt different communication standards. Appliance manufacturers do not need a perfect system. Rather they need to see enough consistency between different smart meters so that they can develop smart appliances.

According to Fisher & Paykel Appliances, manufacturers need to know that their products “*will be compatible with the majority of smart meters that are deployed*”.<sup>5</sup> Consequently, they see developing standards as “*an extremely important step*”.<sup>5</sup>

Lines companies also need standards in order to benefit. According to a discussion document released by eight lines companies<sup>4</sup>:

*“In order for consumers to get the maximum benefits from smart meters over the long-term, retailers and lines companies from all utilities must agree on the specifications for the smart meter rollout in each lines network.”*

### 3 Reducing barriers to smart grid development: lessons from the smart meter roll-out

There are two major failings in the current roll-out of smart meters.

- Parties with a stake in smart meters are being locked out of the decision making. With retailers in control of the roll-out, potential benefits to lines companies, appliance manufacturers, consumers and the environment have not been delivered.
- A lack of key standards is leading to inefficiencies in the wider electricity system. For example, the New Zealand market for smart appliances will never develop if every retailer has a different communication standard.

*These failings demonstrate that a completely voluntary approach to developing a fully functional smart grid will not be effective. The Government needs to actively support and coordinate the development of the smart grid, as is being done in other countries.*

## **Mandatory standards are needed for the smart grid**

The industry is best placed to address the technical issues associated with smart grid. However, setting the overall direction must be done with a wider, strategic, perspective that goes beyond the limited interests of some industry participants. This clearly does not fit with the more limited interests of industry. Developing common standards requires compromise and is unlikely to happen if industry faces no mandatory requirement to do so.

## **Growing a smart grid: time delay will cost**

Creating a smart grid will be a gradual process over many years and will require significant investment.

If the work towards common standards is not begun now it will be much harder to achieve a smart grid later. This is because different industry companies will have made investments in technologies that are incompatible.

Unnecessary investment will be made if different companies each install their own infrastructure and some has to be doubled up.

Lines companies make investments based on a 40 to 70 year lifetime. This means that they need to begin making investments in a smart grid now in order to support the penetration of electric vehicles and distributed generation over the 10 to 20 years.

*Delay will result in industries investing in technologies that are incompatible and redundant.*

## **4 Lifting performance: the need for Government co-ordination**

The Electricity Industry Bill presents the opportunity to move forward on a smart grid because it sets up a new regulatory body, the Electricity Authority, that has greater powers than the Electricity Commission.

The Electricity Authority will have the ability to set mandatory requirements for a New Zealand smart grid through the Electricity Industry Participation Code. Coordinating the development of the smart grid sits well within the Authority's objective to "*promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers*".

The Electricity Industry Participation Code provides the vehicle to work toward the development of a smart grid. The code provides an opportunity for industry to be involved with the “smartening up” of New Zealand’s grid.

The Electricity Authority must be given the mandate to develop standards for a smart grid. Without a clear mandate, the Authority may end up locked in perpetual delay and uncertainty.

**I recommend that the Electricity Authority be required to amend the Electricity Industry Participation Code to provide for the development of a smart grid.**

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## Endnotes

- <sup>1</sup> Budde, Paul. 2010. *New Zealand - Smart Grids Analysis 2010*. BuddeComm. Available online at [www.budde.com.au/Research/New-Zealand-Smart-Grids-Analysis-2010.html](http://www.budde.com.au/Research/New-Zealand-Smart-Grids-Analysis-2010.html)
- <sup>2</sup> Part D Rule 3.1 of the Electricity Governance Rules.
- <sup>3</sup> Parliamentary Commissioner for the Environment. 2009. *Smart electricity meters: how households and the environment can benefit*. Available online at [www.pce.parliament.nz/reports\\_by\\_subject/all\\_reports/energy\\_and\\_climate/smart\\_electricity\\_meters\\_how\\_households\\_and\\_the\\_environment\\_can\\_benefit](http://www.pce.parliament.nz/reports_by_subject/all_reports/energy_and_climate/smart_electricity_meters_how_households_and_the_environment_can_benefit)
- <sup>4</sup> Northpower, Counties Power, WEL Networks, The Lines Company, Buller Electricity, Alpine Energy, Aurora Energy, PowerNet, . 2010. "'Smarter' Meters in New Zealand". *Smart Metering Briefing Paper*. 28<sup>th</sup> January 2010. Available online at [northpower.com/news/entry/smarter\\_meters\\_in\\_new\\_zealand/](http://northpower.com/news/entry/smarter_meters_in_new_zealand/)
- <sup>5</sup> Neil Cheyne, General Manager Electronics Design, Fisher & Paykel. 2007. Submission on the Advanced Metering Infrastructure consultation. Available online at [www.electricitycommission.govt.nz/pdfs/submissions/pdfsretail/Advanced-metering-infrastructure/Fisher-and-Paykel.pdf](http://www.electricitycommission.govt.nz/pdfs/submissions/pdfsretail/Advanced-metering-infrastructure/Fisher-and-Paykel.pdf)
- <sup>6</sup> Fisher & Paykel. 2009. Personal Communication.
- <sup>7</sup> Consumer. 2009. "Not-so-smart meters". 30 Oct 2009. Available online at [www.consumer.org.nz/news/view/not-so-smart-meters](http://www.consumer.org.nz/news/view/not-so-smart-meters)
- <sup>8</sup> The Electricity and Gas Complaints Commission has received a number of complaints from consumers regarding smart meters.
- <sup>9</sup> Domestic Energy Users Network. 2009. Submission to the Commerce Select Committee. 14 September 2009.
- <sup>10</sup> The Timaru Herald. 2010. "Grey Power wants hold on smart meters". 12 January 2010. Available online at [www.stuff.co.nz/timaru-herald/news/3221882/Grey-Power-wants-hold-on-smart-meters](http://www.stuff.co.nz/timaru-herald/news/3221882/Grey-Power-wants-hold-on-smart-meters)
- <sup>11</sup> Contact Energy Limited. 2009. Submission to the Commerce Select Committee. 30 September 2009. Meridian Energy. 2009. Submission to the Commerce Select Committee. 18 September 2009.