Issued on 28th January 2010

‘Smarter’ Meters in New Zealand

Is the NZ Electricity Industry’s rollout as ‘smart’ as it needs to be?

We are a group of consumer-owned and council-owned electricity distribution companies acting for the benefit our consumers: -

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Our objective is to widen our Government’s focus for smart metering in New Zealand.

The smart meter is a significant ‘building block’ of a smart grid that could enable smart generation throughout New Zealand, and influence consumption patterns to smooth demands. It could cope with distributed generation, distributed electrical storage, electrically propelled vehicles and other emerging technologies, such as smart appliances and who knows what…

In Australia and many countries in Europe and parts of America, the smart grid is a definite objective, and important issues such as this are coordinated by central government.

There is currently no regulation governing smart meters in NZ. The Electricity Commission’s Advance Meter Infrastructure (AMI) guidelines are not mandatory. Consequently, retailers are installing meters solely for remote meter reading purposes to the detriment of generation, distribution and consumers both now and for decades to come, since this is likely to be a long term investment.

The government estimates that 1.3 million homes will have smart meters installed by 2012 (Electricity Market Review December 2009) so this issue demands urgent government intervention. Otherwise a smart grid will not emerge in NZ, and consumers will miss out on significant benefits. Instead consumers are likely to experience energy price increases that could have easily been deferred or avoided by a coordinated strategy (requiring regulation).

Continued overleaf…

Benefit of Fully Smart Metering: -

- Accurate, timely and consistent billing information – no more bill queries
- Open communications architecture and secure access – share IP connection with gas and water utility, consistency of back office systems, data format, etc
- Improved security and quality of supply – real time information
- Load balancing and smoothing – increases utilization, defers capital investment
- Loss accounting and audit – everyone pays fairly – complete information
- Power quality information – to inform operations and planning decisions – enables focus on improving Power Factor at ICP level – optimise transmission & distribution, and identify the actual source of unwanted harmonics
- Lower operating and asset investment costs than would otherwise be the case
- Increased utilisation and efficiency also translates into lower carbon emissions

Cost of Not Having Fully Smart Metering: -

- Competition is very likely to be compromised by the introduction of a range of incompatible meters, and communications / standards at each retailer / meter service provider
- Energy efficiency cannot be incentivised due to lack of consumer participation
- Technology and smart grid benefits will not materialise
- Possible loss of control of hot water demand used to smooth peaks
- Consumers could lack empowerment to manage consumption
- Utilisation will not be optimised, therefore prices for generation and transmission will increase far more than would otherwise have been the case

Please Note

The Electricity Commission is about to report on whether its AMI guidelines should become mandatory. The Commerce Committee is considering a recommendation from the Parliamentary Commissioner for the Environment: Ministerial Review of Electricity Market Performance to, "ensure that guidelines and standards on smart meters provide for energy efficiency capability, open access communications, customer switching, and the development of smart networks".

The Parliamentary Commissioner for the Environment supports this position, that the AMI guidelines should be mandated. The authors of this paper would much prefer the Electricity Commission to facilitate discussions to establish agreed standards which meet the needs of electricity distribution companies and electricity consumers as well as the needs of retailers.

Please refer to the Appendix, or contact SmartMetering@northpower.com if you need further information

Appendix to 'Smarter' Meters in New Zealand

It is included to inform those with a need for detail that underpins assertions made in the summarised version.

Background

In September 2005, the first 'smart' (advanced) electricity meters were installed into homes in Central Hawkes Bay. Since that time, smart meters have been rolled out in Auckland, Christchurch and Hawkes Bay with other cities set to get them over the coming year. Government is projecting that about 1.3 million homes will have smart meters installed by 2012 (Electricity Market Review December 2009).

While giving the industry a pat on the back for its openness to experimenting with new technology, we believe that the industry could and should have done better. Smart meter installations to date have been led by the electricity retailers who have been intent only on automating and improving billing services**.** While it is important to improve the accuracy of metering information for billing purposes, smart meters can provide many more benefits to consumers and the country if their design incorporates the needs of the electricity distribution companies. For example, retailers have stated that one of the benefits of smart meters is to reduce losses, but in fact the business cases only state the benefit of increased revenue collection through reduced accounting for and measurement of losses. This does not help drive economic or environmental benefits for the country and for consumers through, for example, reduced technical losses.

One key factor is Electricity Governance Rules Part D Rule 3.1, which makes retailers solely responsible for metering. To date business cases for smart metering have been justified by reduced operating costs for retailers. Consequently some retailers have purchased stripped down meter and communications hardware which meets their functionality requirements but which does not fully comply with the Electricity Commission's voluntary Advance Meter Infrastructure (AMI) guidelines. The potential benefits available for transmission, generation and distribution companies have been largely ignored – unlike Australia where these factors have been key drivers. The Electricity Commission is reviewing Part D of its rules, but to date it has shown no inclination to alter the rule which is allowing retailers to behave in this way.

The Electricity Commission is due to report whether its voluntary AMI guidelines should become mandatory; parliament's Commerce Committee is considering a recommendation from the Parliamentary Commissioner for the Environment for urgent ministerial intervention to end the installation of stripped down hardware; government has accepted a recommendation of the Ministerial Review of Electricity Market Performance that it should "ensure that guidelines and standards on smart meters provide for (or allow upgrades for) energy efficiency capability, open access communications, customer switching, and the development of smart networks"; and the Parliamentary Commissioner for the Environment has recommended that the words in parentheses should be deleted.

What's the Problem?

The ultimate purpose of smart meters is to provide the platform to create an intelligent distribution network from generators through to consumers. An implementation programme driven by retailers and the fragmented ownership of the distribution chain has meant that there is no common vision of how to create a smart grid.

Investment in a common vision will create benefits right through the value chain whereas investment in automated meter reading systems will short change consumers and distribution companies alike. If electricity retailers continue to focus exclusively on automated meter reading systems, consumers will pay the price of more expensive equipment on their meter board. They will miss out in a number of ways:

1. **Hot water charges may increase** Currently, distribution companies initiate the signals to control electricity to consumers' hot water heaters. Consumers benefit from load control through lower

electricity bills with the differential in the retail price between controlled and uncontrolled supply being set predominantly by the difference in the distribution company's line charge. To date, retailers and distribution companies have not agreed on the incorporation of load control into smart meters, meaning that consumers may well lose the cost-saving advantages of controlled hot water. How much will hot water charges increase? It is estimated that a homeowner with an average electricity bill of $120 per month would see an increase of up to $30 per monthdepending on location.

2. **Meter charges may increase** The cost of a consumer's electricity meter is bundled into the electricity tariffs and the current approximate cost is $52 per year. If retailers continue smart meter rollout without the opportunity of including network benefits, the annual cost for a consumer's new meter seems likely to rise. However, if retailers work with distribution companies this cost could decrease significantly possibly even beating today's current cost.

3. **Competition is threatened** There is no evidence from electricity retailers that they have worked through the details of how consumers will switch from one retailer to another once a smart meter is installed on their property. Despite the recommendations of the Ministerial Review it remains possible that switching retailers will mean consumers must remove their current meter and install another different meter. This inconvenience (or perception) is likely to make consumers feel 'locked in' to one retailer and greatly inhibit competition

4. **Energy efficiency will decrease** At present distribution companies control electricity to consumers' hot water cylinders and the industry as a whole benefits through the efficient use of electricity. Electricity retailers are touting the energy efficiency benefits smart meters will provide through "demand side load control" of consumers' plant. In fact, energy efficiency is threatened because retailers are not allowing for the integration of load control in their smart meters, to serve technical, as well as commercial, functions throughout the value chain. Nor are they installing or making plans for future introduction of In Home Displays (IHDs), whereas international research shows that some form of consumer messaging system is pivotal to influencing consumer behaviour.

5. **Technology benefits will fail to materialise** The technology currently being deployed is being done so in the shortest possible timeframe to accrue benefits as early as possible to both the meter owner and the retailer. The meters themselves, once installed, nominally have a ten to twelve year lifespan. The consequence is that, because of the large numbers being deployed and the need to gain economic benefits from such a massive investment, incremental opportunities for deployment of ever smarter meters will be limited until the economic life of the assets is achieved (or exceeded). That is, there will be no economic driver to improve the technology deployed once it has been installed. There is a need to ensure that drivers to 'secure' market share are balanced against industry co-operation and robust outcomes.

6. **Other benefits will fail to materialise** Properly specified and used, smart meters can enable consumers to manage their own energy use and power bills much more effectively. However, if used as part of a smart grid they will have other benefits, as outlined below. Smart grids will enable distribution companies to improve system reliability, improve the management of peak demand on the networks and reduce capital and operating costs, each of which has a flow on effect for consumers.

7. **Ongoing deployment cost** New Zealand's existing meters have been installed over many years and have been maintained, upgraded and replaced as required. One logical consequence of replacing them all within a short time is that all of the meters in the country will be about the same age. Another nationwide deployment and substantial investment will be needed once their working life is up, with associated massive investment and disruption for consumers. If retailers don't want to make the reinvestment, we will be locked into old technology for well past its use by date. Ideally, value-added deployment would be driven by consumer demand.

How will Electricity Consumers Benefit from Smart Grids?

Electricity distribution companies believe consumers will only be able to gain maximum benefit from smart meters when the rollout includes tools for consumers and systems to manage electricity distribution better. This includes real time communications, integration with network SCADA systems and other control-feedback mechanisms, and consumers having easy access to energy use information.

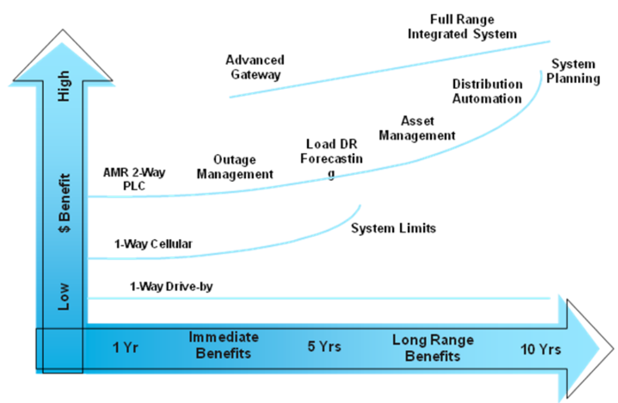
In addition to counteracting the above disadvantages of billing-focused smart meter rollout, consumers will see other benefits:

1. **Increased security and quality of supply** Smart metering coupled with a smart distribution grid will increase the security of supply and decrease the occurrence and length of outages. An example is where consumers can be switched onto another line for maintenance purposes – knowing how much load is being switched will help ensure power is not cut. Low voltage problems sometimes experienced by rural consumers like dairy farmers will also be easier to manage.

2. **Lower Costs** Operating and asset investment costs will reduce over time through better 'visibility' of what is happening in the network: real time meter data can be aggregated to show, for example, power flows, asset utilization, power quality issues and power outages. Cost savings and efficiencies will benefit consumers over time.

   The following graph illustrates some of these benefits, which are only available to distribution companies through the information and automation provided by smart grids.

Time and Investment Benefits



3. **More information** With a smart meter providing half hourly consumption data, consumers will be able to review their own consumption patterns including historical consumption trends, peak usage and expenditure. International studies suggest that large savings can be made by consumers, just by having information available to them. Alternatively, access to data should stimulate value-added services.

4. **More choices** With more information, consumers will be able to take control and make more choices about their power use. The benefits of different 'time of use' pricing regimes will be clearly obvious with smart meters and it will become easier to switch retailers seamlessly.

5. **Impacts on the national generation and distribution network** The obvious impact of reductions in both peak loads and consumption levels is a reduction in the need for increased infrastructure spending by Transpower and generators. Anything which helps to change the trend of large power price increases to build more generation and transmission capacity would be welcome, also noting that the current load control model does not fully capture benefits to the overall market.

6. **Provision for emerging technologies** Distributed generation and energy storage technologies will change the way electricity flows through the distribution network, and distribution companies will need to employ sophisticated equipment to ensure consumers are not adversely impacted by this. Plus, the advent of electric cars will place significant additional demand on the network for battery-charging purposes and this needs to be managed in a way that ensures capital investment requirements are minimised. Smart meters can provide for these technologies if distribution companies are involved in their specification.

What is Proposed?

Our objective in bringing this issue to your attention is to win support in order to widen the focus of smart meter installation in New Zealand.

In order for consumers to get the maximum benefits from smart meters over the long-term, retailers and distribution companies from all utilities must agree on the specifications for the smart meter rollout in each distribution network. It will be to our industry's detriment if we do not have robust discussion and negotiation now, or if we leave it to regulators to impose a solution.

For the above reasons outlined, it would be imprudent to continue smart meter rollouts in their current form. Distribution company considerations must be taken into account – and soon – for the overall benefit of the New Zealand consumer.