

Smart meters – everything you needed to know and more



New Zealand has the highest uptake – 72% - of electricity smart meters of any country in the world where installation has not been mandated. Much is made about the benefits that smart meters bring, but what does that really mean for the average customer? Is 100% rollout of smart meters on the horizon or even realistic? How is New Zealand doing compared to the rest of the world? How will smart meters become a tool to help change the way we use electricity and facilitate other new technologies such as batteries and electric vehicles? And why hasn't the NZSO yet performed an ode to old meters?

In this feature article, we take a closer look behind the dial of smart meters...

The benefits

Smart meters around the world work in the same way – simply put they measure electricity in more detail than older style meters. To do this they measure and record usage, and transmit the data to both the retailer and the consumer at least once a day. They range from basic hourly interval meters to real-time meters with built-in two-way communication that is capable of recording and transmitting instantaneous data.

“Bill accuracy is terrific – over 99% - and we get very few complaints regarding estimates, which used to be the bane of our lives”

The most significant benefit of smart meters is the accuracy of bill reading. This alone is worth it for customers, but there is more to be discovered in the value of smart meters as technology develops and more cost-reflective distribution pricing comes into play.

The direct benefits for **customers** can also be no need for frequent visits from a meter reader; there are faster turnaround times for reconnection; they enable customers to be able to keep a closer eye on how much electricity they use and when; and they enable retailers to use the data to create innovative ways to bill electricity by offering new services and plans.

This in turn has benefits to the **retailer** which get passed back to the customer: reduced costs from remote meter reading (including less health and safety issues from dog attacks on meter readers), less unaccounted-for energy loss; more accurate bills saves time and leads to fewer complaints; more innovation and opportunity to differentiate targeted services due to more accurate data; and retailers can get earlier notification of vacant possession, or identify tampering, as well as enact remote connection/disconnection.

“We once had contracted meter readers with vast numbers of keys to properties to access meters. Many of those have been returned and the number of complaints about readers stumbling in on peoples’ lives has drastically reduced”

Having said that, retailers also know their customer base. In some areas (particularly heavily rural/provincial) early smart meter deployment would have added no value to the customer or the retailer. Those retailers have assessed the situation and have been able to maintain a lower cost by using legacy meter assets and meter readers than they could have

achieved by deploying a smart meter solution 5-10 years ago. The lack of cost-reflective pricing on certain networks meant there was limited value in trying to move load around. But those retailers will continue to monitor developments and would lift deployment of smart meters if it became more compelling for their customers.

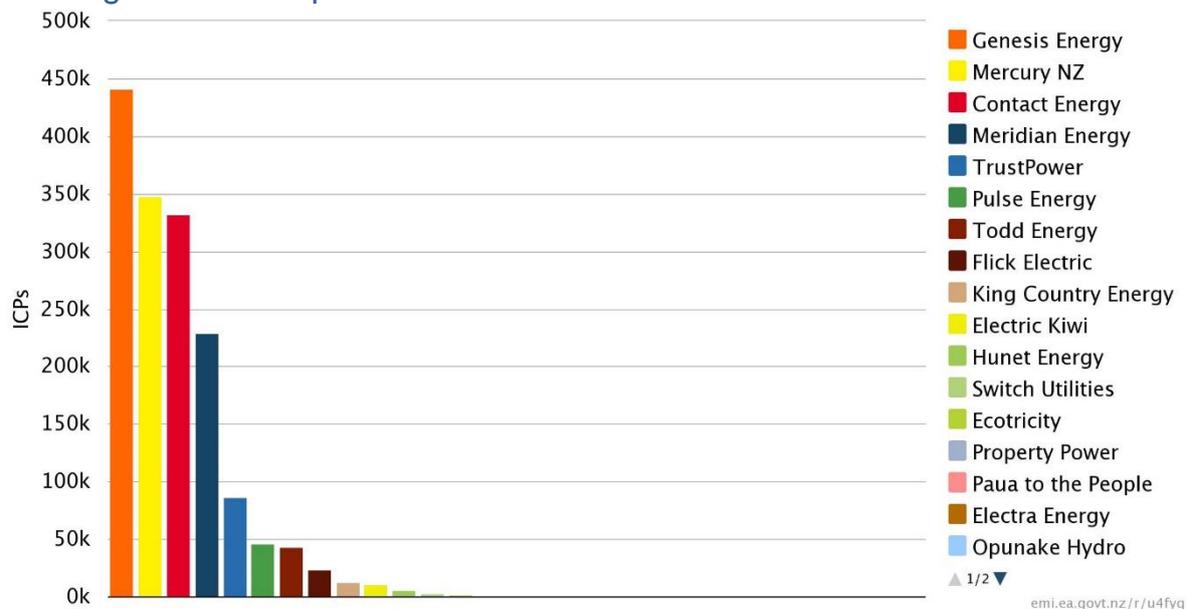
The New Zealand situation

New Zealand opted for a market-led approach to the roll-out of smart meters. The switch to smart meters has been driven by individual retailers with Genesis Energy, Contact and Mercury leading the way. Retailers generally contact with Meter Equipment Providers (MEPs) who charge the retailer for the use and maintenance of the meter at a property.

Over the last 12 years over 1.5 million smart meters have been installed. Latest Electricity Authority figures show that more than half of retailers have more than 80 per cent of their customers with smart meters, while for newer retailers it is 100 per cent as they build business models to take full advantage of the benefits and accept only customers who will use the new technology (see graph below).

By way of comparison, the Australian state of Victoria had a mandated roll-out, which proved to be disastrous. Issues including insufficient engagement and consultation with consumers, lack in choice of meter service, skyrocketing costs, flaws in cost-benefit analysis, up-front costs to consumers before any benefits seen, and lack of incentives for distributors to contain costs saw a huge backlash. Changes were made to the programme and they have moved to a market-led rollout.

Metering Rollout Snapshot



Source: Electricity Authority, EMI as at 31 May 2017

Costs have not been borne by the customer

Another plus for the New Zealand model has been that there has been no up-front cost to customers. New Zealand is one of the few countries where additional lease cost to consumers has not been incurred. Essentially, our structure means that costs and benefits fall on the same participant, and unrequired functionality has not been provided. The Smart Grid Forum reports that retailers have signed 8- to 15-year service agreements with MEPs with annual fees of around \$60 to \$120 per year. These lease costs do not appear on bills, but are absorbed by retailers in cost savings from meters and margin reduction. The Smart Grid Forum noted that the metering service provider or retailer, depending on their agreement, carries the risks of meter deployment and system cost overruns and the risks that their technology is superseded, or that their meter is switched out by a new retailer.

Are they “dumb” smart meters?

There is some criticism that retailers have not provided customers with the highest functioning smart meters available. Particularly those with In-Home Display (IHDs) which provide customers with close to real time information on their electricity consumption, or Home Area Network (HAN) interfaces which enable smart meters to communicate with customers’ digital devices such as computers, security systems and other “smart appliances” (eg. heat pumps, washing machines) and control these remotely.

“Smart data provides customers with greater visibility of their consumption and enables them to make savings by choosing a tariff that matches their usage profile”

The NZIER prepared a report for the Electricity Authority on this point in 2009 which posed the questions whether the inclusion of these additional functionalities would be of net benefit to New Zealand as a whole and, if so, would the net benefits be greater

from inclusion at the time of rolling out smart meters or retrofitting at a later time as consumers demand these additional functionalities?

The NZIER cost-benefit analysis concluded that the demand response to the additional functionalities would not be sufficient to offset the extra cost. I.e. until more New Zealanders have smart appliances and systems to manage their energy consumption, it would not be efficient to install those more expensive smart meters if people weren't going to use them. These issues will continue to be reviewed as technology develops, especially in light of changes forecast for distribution pricing models which will allow pricing that enables more informed consumption decisions.

Is 100% uptake realistic?

Smart meters are not universally welcomed and the data they provide needs careful management and is subject to regulation which retailers are bound to uphold. Two main factors affect the target of 100% uptake in New Zealand, making a 90% roll-out more realistic.

First, there are groups that claim there are both health risks from electromagnetic fields or privacy issues through the shared information transmitted by the meters. The concerns exist in every country where the meters are being installed and groups exist to oppose smart meter installation (stopsmartmeters.org.nz). It is an individual's right not to have a smart meter if they so choose, and the concerns can be very real. In some cases, where a customer is opposed to having a smart meter, retailers are cutting their losses and telling them to find a supplier that won't insist on a smart meter. As one said: *"We have moved from trying to accommodate those customers who don't want a smart meter to instead encouraging them to find another retailer who does not have a smart meter programme."* There is now, in fact, a company (The Legacy Metering Group) which exists to manage and install "legacy meters" to meet that niche customer demand.

In terms of the health concerns, the Ministry of Health (in line with findings overseas) has not found validity in the health claims, saying exposure to radiofrequency radiation is well below the radiofrequency exposure standard¹. The Electricity Authority has also released useful guidance on the matter².

In terms of the privacy of the data, in both 2015 and 2017 the Privacy Commissioner looked at issues around the data from meters and did warn that the sector needs to take additional care in how they use, store, and transfer information³. The Commissioner noted that the introduction of smart appliances *"we believe ... has the potential to make the information from smart meters more valuable. We are keeping a watching brief as the technology develops and may adjust our view as necessary in future."* The Privacy Commissioner also noted in May 2017 that *"aggregating the data*

¹ Ministry of Health: <http://www.health.govt.nz/your-health/healthy-living/environmental-health/household-items-and-electronics/smart-meters>

² Electricity Authority: <http://www.ea.govt.nz/consumers/what-are-electricity-meters/>

³ "Does the use of smart meters raise privacy issues?" Office of the Privacy Commissioner: https://www.privacy.org.nz/further-resources/knowledge-base/view/169?t=50826_66176

[collected from smart meters] would alleviate the privacy concerns, allowing for provision of rich data for research and innovation while still protecting consumers' reasonable expectations of privacy.”⁴

The second reason that smart meters are unlikely to reach 100% roll-out is New Zealand's topography means not every home in remote rural areas would be able to transmit or receive data.

So long as consumers can continue to be assured around privacy and health, and while efficiencies and benefits remain unchanged, uptake rates can be expected to continue to climb at pace. A best-guess would be an eventual uptake around the mid 90% range.

The role of retailers

Retailers are now offering more new pricing structures using smart meters, including the availability of time-of-use pricing plans that use the half-hourly data provided. These plans are expected to be enhanced and increased as the distribution networks introduce more cost-effective pricing. Some offer apps and website tools for this, as well as to allow customers to forecast monthly bills, which helps to mitigating “bill shock”, particularly during the heavy-usage months of July and August. Again, these sorts of options are not going to be something that each and every customer chooses or that each retailer provides, but the choice will be on offer.

New retailers are certainly taking advantage of the technology and bringing smart meters to the market by way of new deals and packages that give customers no option: like the deal, get the smart meter. While customer numbers for newcomers remain small compared to the more established players, they are attracting customers, particularly younger ones, to switch as the packages become more sophisticated.

Electricity Authority Chief Executive Carl Hansen sums it up best: *“Many of the new entrants in the electricity market over the last two years have built their business models on the basis of smart meter technology. This is creating new choices for consumers and further enhancing competition.”* The opportunities for the new entrant retailers comes from investment made by the more established players. One retailer noted *“without our investment ... the new boutique retailers would not have a business.”* Ultimately the customer will benefit from the opportunities delivered from smart meters, as these benefits are emerging now.

Sources: ERANZ member companies, Smart Grid Forum, NZ Electricity Authority, Australian Energy Council, European Commission, US Energy Information Administration, Smart Energy GB.

⁴ <https://www.privacy.org.nz/news-and-publications/statements-media-releases/consumers-need-reassurance-over-smart-meter-data-collection-privacy-commissioner/>

Some international comparisons

The New Zealand retail sector can be proud of the uptake rate of smart meters, with only markets that have mandated their installation (such as Europe) doing better, as can be seen in the table below.

Country	Type of roll-out*	Total customers	AMI penetration	Notes
			(based on latest available information)	
Australia - total	Economic	5,535,203	12%	Data really hard to find. Power of choice campaign has made the roll out and structure similar to New Zealand
Australia - Victoria	Large-scale	2,750,000	99%	Widely considered an unsuccessful roll-out due to cost overruns, redundant technology and unsatisfactory customer experience
Austria	Large-scale	5,700,000	Unknown	Rollout started 2010, expected 80% by Dec 2020
China	Large-scale	500,000,000	66%	Difficult to get total consumer numbers
Estonia	Large-scale	630,000	Unknown	Expected 80% by Dec 2020
Finland	Completed	3,300,000	99%	
France	Large-scale	35,000,000	1%	Expected 95% by Dec 2020
Germany	Economic	47,900,000	0%	Possibly 80% by Dec 2020 - rollout just started, some articles quote 15% by 2020
Great Britain	Large scale	30,000,000	1.20%	Expected 100% by Dec 2020, significant delays
Ireland	Large scale	2,200,000	0%	Expected 100% by Dec 2020
Italy	Large scale	36,700,000	100%	
Malta	Large scale	260,000	100%	
New Zealand	Economic	2,126,176	72%	Expected natural maximum of 85% to 90% by Dec 2018
Poland	Large-scale	16,600,000	5%	Expected 80% by Dec 2020
Romania	Large-scale	9,150,000	Possibly 5%	Expected 80% by Dec 2020
Sweden	Large-scale	5,200,000	100%	
United States	Varies by state – some subsidised	151,700,000	63%	Expected 90% by Dec 2021

Note: “Economic” roll-out means meters deployed only where cost-effective. “Large-scale” roll-out means deployed regardless of cost.

Source: Electricity Authority