Get smart and spread power load

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Bryan Leyland says the technology is already available to lower prices

THE latest foray of the Parliamentary Commissioner for the Environment demonstrates, once again, her lack of understanding of the electricity business.

"Smart metering" and "demand side management" are buzzwords for the load management technology pioneered in New Zealand in the early 1920s that made New Zealand a world leader in managing peak demands on power systems. She seems to be unaware that our existing load control technology can do nearly everything "smart metering" could do at a tiny fraction of the cost.

Lloyd Mandeno, a pioneering New Zealand engineer, invented storage water heaters and load management in the 1920s. This allowed his newly commissioned hydropower station to provide hot water to its consumers without overloading the station during peak demand.

The technology was extremely simple — a two-way switch above the stove labelled "stove" and "water heater". If the stove was on, the water heater was off. A simple solution for a simple problem.

When the State Hydroelectric Department was formed in the 1930s, it sold electricity to power boards for £5/kW of maximum demand. There was no charge for energy. For an all-hydroelectric system, this was an accurate reflection of costs.

This encouraged most of the electric power boards to install control systems that switched water heaters off during periods of peak demand. It was compulsory to have a "ripple relay" controlling every water heater.

This system brought enormous savings to consumers by reducing the New Zealand peak demand by 15 per cent.

Sadly, with the advent of the electricity market, it is no longer compulsory to have a ripple relay controlling every water heater and the lines companies that control the signalling system tend to regard Transpower's peak demand charges as something to be passed on to the consumer.

For reasons associated with the flawed electricity "market" retailers have little inducement to shed water heating load when the spot price is high.

As a result, the wonderful system power boards built up over the years is run down and underused in all regions except the upper South Island.

If we turned the clock back and our Government passed a law making it compulsory to have ripple control on water heaters, domestic heat pumps, commercial air-conditioning and large freezers, peak demand could be reduced by at least 500MW without most consumers noticing and

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without them having to take any action. A 500MW power station will cost about $1 billion, so the saving to the consumers would be large.

A rejuvenated ripple control system could easily and cheaply control maximum demand, and reduce load when the power prices were high. Using recently developed control technology (that was developed here and is exported to Australia), it could rapidly switch off water heaters and other similar loads in the event of a loss of the Cook Strait cable or a large generating set.

Over the last few weeks, prices in the North Island have been high during peak periods in the morning and the evening. In general, these high prices are caused by a lack of "spinning reserve" — power stations that are kept idling so that they can pick up load rapidly in the event of a system problem.

This comes at a high cost. Using ripple control technology, at least 300MW of "spinning reserve" could be made available at virtually no cost. Had this been done — and the technology has been available and installed in many houses for more than five years — most of the price spikes would have been avoided and consumers would have saved millions.

So why has this not happened? Retailers and others believe that they can make money if they can control customers' load by selling the ability to control load. Hence they have frustrated efforts to implement a mandated system that would bring much larger benefits to the consumer and the nation. The "market" has short-changed the consumer.

If ripple control technology was used as it should be, it would provide even more than the benefits claimed for the more expensive "smart metering" technology. The only thing it would not do is provide remote meter reading.

But this is easily and cheaply done by what is called "drive-by" meter reading that also has other advantages.

With modern ripple control technology, consumers could have a multi-rate meter that switched rates and controlled appliances according to system demand and electricity price. It would indicate to the consumer whether the price was normal, high or very high and alert the consumer if the system was in serious trouble so the consumer could switch off as much load as possible to help avert a blackout. A truly "smart" system at a bargain price.

All we need to implement this is a Government that understands the problem and is prepared to maximise consumer benefits rather than maintaining the fiction of a competitive electricity market.

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