

## Topic 4: The future impact of emerging technologies in the energy sector

Submission by John Irving, Consulting Engineer 10 July 2015

### Overall Comments

The Commerce Commission's Topic 4 Discussion Paper correctly identifies most of the issues to be addressed in regulation of the NZ power industry so as to encourage the greater use of emerging technologies. NZ is not an early adopter of new technologies, and this largely due to resistance to change in their business models by the Line Companies (LCs) and Gentrailers. On the other hand there is a world-wide a paradigm-change in the power sector is taking place and inevitably it will also develop in the NZ power market<sup>1</sup>. Thus it is better for the NZ economy if power sector incumbents are incentivised to adapt sooner rather than latter and when they will be abruptly forced to deal with stranded investments made with the approval of outdated regulation.

It is also evident that technologically driven changes in the energy/power sector will have benefits in (a) supporting Gov'ts initiatives to meet new Climate Change targets, (b) attracting private sector investment (i.e. by consumers for PV systems and batteries) into the energy market; (c) reducing the need for imported fossil fuels for transport - by supporting the greater use of electric vehicles and concurrent development of V2G technologies<sup>2</sup>; and (d) increasing competition to help drive down electricity charges.

### Qualifications of Submitter

I am a licensed distributed generator and owner of a 2.5kW PV home solar panel system along with a plug-in-hybrid-electric-vehicle (PHEV) Mitsubishi Outlander SUV. Because there are no time-of-day pricing options available in the electricity retail market, I generally charge my PHEV vehicle on sunny days when there is a surplus of PV solar capacity that would otherwise be fed back to the grid (to Contact Energy at 17c/kWh). On the basis of one year's performance I expect that in about 9 years I will be able to cover the cost of my 2.5kW PV system (\$8000 – in fact, a sunk cost which I would recoup anyway when I sell my home) plus the incremental cost (\$15000) for the EV componentry in my PHEV SUV. I would like to see other consumers have this opportunity to contribute to NZ Carbon Emission targets, while also insuring themselves against regularly increasing electricity and network charges by the NZ oligarchy of power market incumbents.

I am a former Director of Transpower and currently a Consulting Engineer regularly employed by the World Bank and ADB to support their power development projects. I work mostly in developing countries where, in contrast to NZ, the rate of increase in the use of DSM/renewable applications is substantial. I have observed that that NZ is well behind many OECD countries in promoting the take-up of consumer owned DG technologies. It appears that the NZ regulatory system has been far too obliging to incumbent power sector lobbies, despite the growing public concerns of the abnormally

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<sup>1</sup> <http://www.theenergycollective.com/slontoh/431336/utility-future-paradigm-shift-meet-more-distributed-consumer-focused-energy-system-21>

<sup>2</sup> <http://www.edison.com/home/innovation/electric-transportation/vehicle-to-grid-technology.html>

high NZ consumer power prices. Recent examples of how progressive regulators actively support DG/DSM is given in the footnotes below<sup>3</sup>.

### Asset Valuations

NZ distributors base their regulatory price applications on an asset valuation methodology that does not reflect the potential value distribution network in supporting the wider development of distributed generation. As a consequence LCs are in no hurry to facilitate the development DG which they see as devaluing their asset base. This problem could be solved within the existing regulatory methodology simply by recognising DSM/DG activities and accordingly crediting LCs with “negawatts” in the ODV calculation as applicable<sup>4</sup>.

Trust owned LCs are unlikely to sell their businesses in the short term. Accordingly even if a minor regulatory change resulted in the devaluation of their assets, LCs will still be operationally profitable and able to pay their shareholders the usual dividend. Every other sector of the NZ economy values its assets as a function of forecast sales, so I see no reason why the power distribution monopolies are treated differently. Privately owned LCs are well aware of the risks that international trends may disrupt their business models and, as demonstrated by Vector’s alliance with Tesla, they have already taken steps to adapt to the emerging paradigm of sector change.

### Regulatory Support for Private Financing in the Power Market

If allowed to occur, significant consumer investments in PV, batteries, DSM should result in a lower avoided cost of supply to both retailers and LCs. Accordingly existing suppliers should be able to use their (mostly) publically owned generation assets more effectively and enable them to delay making unnecessary future investments.

While LCs sometimes obfuscate the issues by suggesting that new technologies are uneconomic<sup>5</sup> there appears to be no reason why they should continue to block consumers from investing their own money on distributed generation. Spurious arguments that a build-up of PV solar power may force other consumers to pay the higher cost of network services, clearly don’t not recognise the need for a paradigm change in LC business model.

The current regulatory regime is supporting investments by LCs that will have a significant influence on maintaining the inefficient structure and economic performance of the NZ power market. Most importantly to effect change there needs to be recognition that distribution networks can facilitate

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<sup>3</sup> <http://www.utilitydive.com/news/how-california-plans-to-integrate-distributed-resources-into-its-iso-market/401123/> and <http://www.ontarioenergyboard.ca/OEB/Industry/Regulatory+Proceedings/Policy+Initiatives+and+Consultations/Distributed+Generation+-+Rates+and+Connection>

<sup>4</sup> <http://cleantechnica.com/2011/03/18/equal-pay-for-negawatts-and-megawatts-thanks-to-ferc/>

<sup>5</sup> In an informal survey of a recent EA conference an well-known observer reported: “I have just come back from an Electricity Engineers Association Conference. There were several papers on solar power and several other speakers discussed it. Virtually everyone agreed that grid connected solar power was seriously uneconomic. They also agreed that battery backup was also seriously uneconomic and a price reduction of 90% was, at the very least, needed. When asked about dangerous man-made global warming half of the audience said they didn't believe in it.”

an optimal balance of generation from all generation sources and consumers without compromising reliability.

### Strategy for Regulatory Changes

The NZ regulatory emphasis for LCs is to design a “price-quality path” to maintain reliability while also putting downward pressure on consumer prices. This objective was laudable at a time when LCs were accused of gold plating their networks; and apparently it has been successful making LCs in work assets harder over the last 20 years. Reportedly however the lines industry in NZ claims that it now entering the next major investment cycle with many of the existing lines and substation assets requiring replacement.

Most industry experts now recognise the costs of distributed PV solar power are at a level competitive with bulk power generation<sup>6</sup>. There is considerable attention is being paid to the development of distributed storage given its potential to reduce the need to build distribution networks to cater for peak demand. Energy storage developments offer a path forward that increases the efficiency and the reliability of the electric grid. It opens up valuable opportunities for peak load shaving thorough time shifting the peak load supply to off peak periods and temporarily storing this energy for use during periods of peak demand. Energy storage promises to help smooth out variability introduced by renewable energy generation and has an important role in helping to maintain frequency (and also voltage) within a tight quality tolerance<sup>7</sup>.

Accordingly there must be a change in regulatory policy to also enable LCs to take advantage of the technological changes that are being introduced in countries more focussed on environmental, resource optimisation and economic issues. For example LC technical line losses should not continue to be passed through to consumers with no incentive for LCs to take steps to reduce them. In some cases (e.g. The Lines Company in Te Kuiti) losses are an extraordinary 12%! Losses on such rural networks could be considerably reduced if those rural LCs were incentivised to encourage their rural consumers to install small DG systems (e.g. PV cells, wind, biomass and microhydro) and offer DSM opportunities.

### In Conclusion

The Commerce Commission’s methodology for promoting “economic efficiency” must give due attention to recognising the capability of distributed renewable generation/ energy storage/ DSM to maximise the utilization of existing LC assets. LC networks should be seen as facilities that can also provide the provide interconnect-ability of energy systems to enhance both reliability and competition in the generation and retail market. In particular the current methodology of the ODV computation must be revised to ensure that LCs are incentivised not to frustrate both DG and fuel switching (e.g. electricity use to solar hot water) even though customers are willing to invest their own funds in the sector.

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<sup>6</sup> <http://www.irena.org/menu/index.aspx?mnu=Subcat&PriMenuID=36&CatID=141&SubcatID=494>

<sup>7</sup> Read more: <http://greeneconomypost.com/fifteen-grid-scale-energy-storage-solutions-watch-15924.htm#ixzz3fSIId38gu>