Role of ESCOs to Increase the Uptake of DSM/DG and DS in NZ

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The December 2007 strategy paper by the EECA provides a thorough analysis of the problems that beset the proposals to expand the DSM market; and in particular, to increase the number of solar hot water systems installed mainly by local plumbers that are generally not geared up to increase capacity to expand their operations. However that paper has overlooked the significant barriers to the large scale uptake of solar energy for hot water systems in New Zealand that could otherwise be performed by Energy Service Companies (or ESCO's as they are known overseas[1]) which are capable of providing a superior service to consumers by minimizing the risks of financing, installation and ongoing maintenance of all forms of DSM facilities.

Following the Government's recent decision not to significantly change the rules for LCs (Line Companies) to own distributed generation, this paper argues that LCs should instead be encouraged to form ESCOs as unregulated businesses to develop and expand the demand side of the power market in competition with electricity retailers.

Coincidently some of the issues faced by ESCOs in NZ are also discussed in the MED September 2006 paper "Facilitating Distributed Generation (DG)" - in the context of discussing the barriers to entry that are established by incumbent NZ power and gas supply network monopolies. DG/DSM investments demonstrably reduce network losses (currently simply passed on as a cost to electricity consumers) and defer network investment (in accordance with the thrust of existing CPI-X regulation). However there currently exist an unintended regulatory disincentive that precludes NZ's largely public trust owned network monopolies from supporting Government initiatives through the evolution of ESCOs without the use of grants and other incentives.

Thus this response addresses the wider context of promoting the greater uptake of both DSM and DG in NZ drawing attention to the perverse barriers to investment by private operators that are in-effect enforced by NZ regulatory agencies - ironically in the national interest of promoting greater economy and efficiency of energy supply systems. This response proposes a way forward by facilitating a paradigm shift in the way NZ network companies should be transformed to help meet the Government objectives for making best advantage of DSM and DG facilities without disrupting their other electricity and gas service obligations[2].

Adverse Affect of Regulation on DSM development

In the absence of established ESCOs in NZ, the organizations currently best placed to offer such services are the incumbent NZ gas and/or electric network companies (NCs) – but only if they were incentivised to do so. NCs in NZ are generally well staffed with adequate technical[3] and

[1] See: http://energyefficiency.jrc.cec.eu.int/ESCO/esco.htm

[2] An example of a detailed policy proposal can be found at the following website: http://www.indeco.com/www.nsf/788895c29ec2338d85256a3300690fcc/5135273d3da1f3f085256e900049c9e7/$FILE/directive_dsm_Enbridge211103.pdf

[3] NCs often recruit plumbers who can be readily trained to undertake cable and gas installation and repair duties. The same skilled tradesmen can be readily trained to work on pressurized hot water plumbing installations – or more importantly, train monitor and inspect the work of tradesmen the NCs may wish to use as subcontractors.

financial expertise to provide ESCO services and have a direct interest in ensuring consumer satisfaction. However even if NCs could be encouraged to establish their own ESCOs as unregulated businesses developing profitable DSM expansion programs, the methodology used to determine their regulated revenues on the associated network asset base should not be designed to discourage them from doing so (as it is now).

To determine a revenue base for NZ NCs, the Commerce Commission uses the concept of Optimized Deprival Value (ODV[4]) methodology to assess the efficacy of gas and electric network assets. Unfortunately the current methodology is based on the traditional concept of network companies essentially being one-way energy service providers taking power from centralised generation/substation facilities and distributing it locally. The methodology thus ensures that the more successful the take-up of solar water systems in any particular area of an LC network, the less the NC assets will be used to deliver power or gas [that has otherwise been displaced by solar energy], and therefore the lower the assessed ODV of the network asset under consideration by the regulator in the tariff base. Making things even worse, the Commerce Commission's price control thresholds directly link allowed returns to so called "base quantity" volumes of energy received into an electricity NC's network. This creates an obvious disincentive to reduce loads

Furthermore under the existing retail charging structure, any consumer who installs a DSM facility such as a solar water heater will find that, after it is put into service the proportion of his (variable) energy costs to (fixed) line costs will significantly increase. Despite his investment in lower cost energy for his hot water use he will frustrated to see that his average energy charge for the rest of his power increases from typically about 15c/kWh to upwards of 25-30 c/kWh.

Related Issues for Implementing DG and DS projects

Although the related problems of implementing DG (as well as Distributed Energy Storage (DS)) are not the subject of the EECA paper, the issue about how to allocate the national economic benefits of a " kW or kWh saved" are much the same as for DSM as DG/DS. DG/DS can of course cover many applications – including solar photovoltaic generation systems; but also DG supplied by combined heat and power generation and/or renewables. While DS is simply a variation of DG, it's role will be increasingly important in NZ to enable increased uptake of renewables. An expanding DS market, coupled with the increased use of the internet, will expand the capacity of storage facilities to retain power generated intermittently for use when it is needed.

In NZ the slow uptake of DSM/DG/DS is largely due to the barriers by Electricity Retailers (understandably because their generator owners fear increased competition); but also and not-so-understandably, barriers by the Line Companies (LCs) that are not only disincentivised by

[4] http://www.comcom.govt.nz//IndustryRegulation/Electricity/ElectricityLinesBusinesses/ContentFiles/Documents/Commerce%20Commission%20ODV%20Handbook%20(30%20August%202004)0.pdf
para 2.27.and:
http://www.comcom.govt.nz//IndustryRegulation/Electricity/ElectricityLinesBusinesses/ContentFiles/Documents/ODV%20Handbook%20Companion%20Report%20(31%20August%202004).pdf

regulation (as explained above); but with few exceptions[5] also suffer from the lack of initiative to invest outside of the comforts of their regulated lines business. Most LCs however resist the entry of private DSM/DG operators in DSM/DG (possibly in competition with their own wishful planning), by flagging red herrings such as safety and complex metering issues; and by applying unfair backup charges, sale and purchase agreements etc. No NZ LC has transparent standard distribution connection policies that will encourage small retail or medium sized commercial customers to connect wind, PV, biomass or energy storage systems to the grid.

Unfortunately at the present stage of power sector reform LCs are still allowed to persist with the view that they will be able develop their own (generally larger scale) DGs, which they believe they can operate more profitably than NZ Gencos (that have much more experience in the commercial operation of modern generation plant). On the other hand similar publicly owned LC monopolies in Australia, UK and Ontario have moved on from such antiquated thinking and are much more involved in supporting their own national programs for implementing DSM/DG programs[6]. If NZ LCs were required put their minds to the new situation, they would in fact discover that it is more profitable to manage an "intelligent" network distribution systems[7] charging fees to coordinate the operations of other investors in DG/DSM plant

Use of Negawatt Contributions to amend ODV Guidelines.

As indicated above the main disincentives for LCs to encourage DG/DSM development is the Commerce Commission's methodology of computing the ODV of NC assets. This has largely been developed in consultation with NCs with little input by other stakeholders. As such it reflects the traditional views of the radial functionality of network distribution s systems.

To overcome the inherent problems with exiting ODV methodology and reward LCs properly the commonly used concept of "shadow energy" or "shadow power" could be used as a measure of the "Negawatt" value[8] of any DSM/DG contribution in valuing the asset base. A simple amendment to the current ODV Guidelines could be implemented very quickly without otherwise changing the overall regulatory structure that has developed over the last few years. The change would be made to ensure effective Negawatt contributions be added to actual power carried on LC networks thereby ensuring their assets are not undervalued in providing backup to DSM/DG facilities. (e.g. if consumers in a given area install solar hot water systems that typically saved 10 MWh in a year, then the associated LC should be able to claim that its line enabled the equivalent value of negawatthours to be generated more efficiently by other sources).

The application of a negwatt contribution would enable LCs to claim a higher ODV value of lines associated with connected DSM/DG facilities without having to make any significant change in the regulatory system. It would also allow LCs to optimize the increased capability of their networks more efficiently without incurring additional investment within the CPI-X regime.

[5] Several LCs (notably Orion and Vector) reportedly have what seem to be fair and reasonable DG connection packages, especially for DG under 1MW.
[6] See: http://www.indeco.com/www.nsf/papers/regframeworkdsm; http://www.efa.com.au/dsmdocs.html; http://www.dti.gov.uk/energy/energy-sources/renewables/Publications/Distributed%20Generation/page24117.html
[7] http://en.wikipedia.org/wiki/Advanced_Distribution_Automation
[8] See: http://www.rmi.org/images/other/Energy/E90-20_NegawattRevolution.pdf#search=%22negawatt%20incentives%22

Bearing in mind the adage that "a kW saved is more valuable than a kW made" the pricing of DSM generated shadow power/energy should therefore be higher than the price of the gas or electric energy it displaces. This more enlightened approach to valuing NC regulated assets is also likely to incentivize LCs to offer unregulated ESCO services (in competition/or cooperation with local plumbers) to increase their profitability further by sharing the benefit of the lower energy charges with consumer, billing them for the ESCO service in their normal monthly bills.

Proposed Paradigm Change for NZ Network Companies

The development of the future "intelligent" electricity systems should be a key Government strategy for expanding DSM, DG, DS facilities to 2030. Beyond the successful implementation of solar hot water systems new applications like plug-in or all-electric cars are already on the horizon[9]. Intelligent systems will allow consumers to respond according to market prices and even buy power at night time rates and sell power back into the system at peak rates. This will of course require incumbent NZ LCs to revolutionize their way of doing business: either by incentivising them to do so; or changing their licenses to require them to operate their generally publicly owned network monopolies to facilitate greater inter-connectability of their localized energy supply and delivery systems.

Rather than allow LCs to persevere with the fruitless debate whether they should be permitted to invest in distributed generation (in unfair competition with their customers), it would be better for the Government to require LCs to increase the capability of their networks to realize the wider goals of sustainability offering transparent and open access to a diverse sources of DG/DSM and DS applications. A model for policy change can be quickly developed for both gas and electricity distribution networks based on successful approaches overseas adapted to suit NZ situation. Given the right incentives NCs will soon recognize that their networks are sufficiently extensive to be able to support energy efficiency solar heating and insulation programs, provide time-of-day and net-metering to increase competition among existing energy retailers and to develop a market for short-term electricity storage to increase the evacuation of renewable energy.

[9] See http://www.calcars.org/economist-plugfuture-june06.pdf