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Submissions
Electricity Authority
Email: distribution.feedback@ea.govt.nz

Consultation Paper – Updating the Regulatory Settings for Distribution Networks

Thank you for the opportunity to provide feedback to the Electricity Authority on its discussion paper.

We understand that the Authority is seeking interested parties' views on the Authority's proposal to update the regulatory settings for distribution networks. This is a particularly important topic as New Zealand moves towards electrification in order to meet its net zero carbon objectives.

The discussion paper calls on Electricity Distribution Businesses (Distributors, or EDBs) to provide their views on:

- whether the right issues have been identified, based on work undertaken during previous projects; and
- whether there are other options than those identified to address the issues raised.

About Marlborough Lines.

Marlborough Lines Limited (MLL) is a consumer owned EDB connecting over 26,000 consumers throughout the Marlborough region. As a consumer owned EDB, our primary focus is our consumers – maintaining a safe and reliable electricity supply while at the same time earning an appropriate return on MLL's investments.[1]

For many years MLL has managed demand on its network by operating hot water (and many years ago, irrigation) load control. Having the ability to manage a significant load on its network has resulted in the avoidance of significant network capacity upgrade investments.

MLL has experience with a range of distributed generators (solar, wind and hydro), small to large (>1MVA) scale, and is now observing an increase in the numbers of electric vehicles in homes and businesses. MLL is also seeing that batteries are also becoming more commonplace with small scale distributed solar generation installations.

If it had the ability to, MLL believes that it would be the natural party to manage any future distributed energy resources (DER). DER will add load to the network, and if not managed well, may result in power quality, reliability, and/or safety issues for MLL and those consumers connected to the network.

This submission.

MLL broadly agrees with the following issues raised in the discussion paper:

a) Accelerated electrification may lead to network capacity constraints;

[1] Under the Energy Companies Act 1992, MLL is required to operate as a successful business.

b) Accelerated adoption of DER may lead to local network capacity constraints, and/or hosting capacity constraints;
c) Accurate and readily available consumer DER and low voltage (LV) data will be of utmost importance; and
d) Consumers may see higher costs if DER is not effectively and efficiently managed.

MLL does not agree with some of the issues identified in, and/or some of the options put forward to address issues in the discussion paper. Where this is the case this has been included in the direct responses to questions on the following pages.

MLL is concerned by some of the language used in the discussion paper, particularly where assumptions appear to have been made with no supporting evidence included, for example:

- 2.11 "Avoiding or deferring network upgrades through DER can decrease the costs of distribution, lowering the end bill to consumers" and "DER can also improve security as it can decrease reliance on the centralised system";
- 6.9 "Many distributors seem to consider the use of flexibility services as difficult and that traditional resources are adequate for network management"; and
- 8.17 "Although these distributors have incentives to keep local consumers happy, they may be reluctant to innovate".

MLL believes it is important to recognise that not all EDBs are the same, and any changes to regulations must carefully consider how they might impact one EDB to the next. Any decisions on DER management should consider EDBs' context, including for example:

- ownership models and subsequently different objectives;
- experiences with DER to date;
- penetration rates and types of DER;
- network constraints;
- resourcing and capability (i.e. some EDBs are more advanced in DER than others, as the discussion paper notes); and
- network characteristics, for example overhead vs underground, rural vs non-rural consumers, geographic, climatic, topographic variabilities, population densities, vegetation types and growth rates, smart meter penetration, and so on.

MLL believes that with appropriate access to LV data, that as an EDB it would be the natural party to manage DER, ultimately for the benefit of consumers. MLL also believes that it would have the capability to manage DER in the future. MLL and other EDBs have demonstrated successful management of network peak demands for many years now through hot water load control.

Further information is included in the following pages, where MLL has responded directly to the questions posed by the Authority in the discussion paper. If further information is required on any of our responses, please feel free to contact me.

Thank you again for the opportunity to provide feedback.

Yours sincerely

Scott Wilkinson
Commercial Manager

Q.1 Have you experienced issues relating to a lack of information or uneven access to information?

MLL hasn't yet requested consumption data from electricity retailers under the DDA. There are several reasons for this, including:

a) The data agreement (Appendix C of the DDA) process is cumbersome, and takes considerable time to enter into and manage data agreements with a significant number of retailers trading on MLL's network;
b) Smart meter penetration is approximately 72% on MLL's network, with a significant number of legacy meters in place which would not provide useful data;
c) Consumption data doesn't necessarily reveal what particular DER is present at any given consumers installation (e.g. electric vehicle charger type, and size);

As the discussion paper points out, access to real time or even half hourly data is expensive. Any increase in costs for obtaining data would ultimately be passed on to consumers, so, access to data should be as non-complex as possible.

Having access to historic consumption data is useful for undertaking engineering analysis and modelling. Real-time data will become crucial in future to allow for active management of LV networks particularly, if issues arise.

Further comment on the access to consumers' consumption data is included below.

Q.2 What information do you need to make more informed investment and operation decisions?

Better access to LV monitoring and power quality data (i.e., at the ICP level). Power quality information may include, voltage (max and mins), current (max and mins), V&I harmonic THD, power factor, neutral loop impedance, balance, flicker and loss of supply as examples. This data is essential to know and understand MLL's networks hosting capacity and any localised constraints (or issues). Having more readily available access to consumption data, on an ongoing basis, would allow MLL to make better informed network planning decisions. Potentially, future network capacity upgrades investments could be avoided as the discussion paper references.

Without simple access to ongoing low voltage monitoring data, it will be difficult for MLL to determine the sources of any impacts on its network. Low voltage monitoring, from smart meters, data should be made readily available to EDBs. If not, EDBs may need to consider installing LV monitoring at distribution transformers which would involve significant and unnecessary cost.

Other EDBs, as the discussion paper notes, have invested in their own meters at consumers' installations in order to obtain data. This investment could potentially be avoided if EDBs were made available the data from those installations through the existing meters.

Q.3 What options do you think should be considered to help improve access to information?

Information about ICPs is currently held in the Electricity Registry. This information is accessed and updated by industry participants. The Registry Exchange Hub facilitates the exchange of other information (Electricity Information Exchange Protocols) between participants.

In MLL's view, the Registry (including the Registry Exchange Hub) works particularly well. MLL believes that a centralised data source similar to the Registry could exist whereby consumers data was stored and managed, and permitted users were able to log in and source data as and when required.

Structure of consumption data:
The option of having multiple ICPs per installation should also be considered. Having ICPs per meter register (as opposed to an ICP per installation as currently defined in the Code) could allow the easier aggregation of export (injection) data and provide consumers greater choice. For example, if a consumer had distributed generation installed, which was aligned to an export meter register, then, the consumer could choose which electricity retailer it sold that energy to. For energy consumed (extracted) by the consumer, a separate ICP could exist for that meter register(s) and the consumer could choose which electricity retailer they contracted to for that.

Consumption data ownership:
Another option to consider is the position of Metering Equipment Providers (MEPs) as "owners" of consumers electricity data. Currently only electricity retailers have a relationship with MEPs. Does the current data ownership and access structure work – is this is the consumers best interest, or does it allow EDBs to most effectively manage their networks?

MEPs as a participant are "owners" of consumer data the way the market is structured. They are contracted to provide consumers' data to electricity retailers only, but other participants, like EDBs, could also utilise that data for the ultimate benefit of consumers (i.e., increased access to appropriate data would better allow EDBs to monitor and manage their network efficiently and effectively, for example, power quality issues through low voltage monitoring).

MLL would strongly support a review of the consumption data ownership model. Instead of MEPs having exclusivity to consumers' consumption data which is then monetised by being on sold to electricity retailers,, could a single entity (a standalone entity under the Electricity Authority) be the host of all MEP's data, and allow those participants that want to access data the ability to get it through payment of an annual levy?

Q.4 Have networks experienced issues from the connection or operation of DER?

MLL is concerned that if management of DER is opened up to flexibility traders, that this will add further complexity to an already complex industry structure. Flexibility traders would have competing interests with EDBs – flexibility traders would look to monetise DER energy, while EDBs could use DER to manage their existing network and avoid future costs (through potentially avoiding capacity upgrades, for example). Additionally, there could be further complexity as EDBs may have multiple additional parties to engage with (and then ongoing management of those engagements). Consumers who already struggle to understand[2] New Zealand's electricity industry will be potentially faced with another participant to engage with.

Electric vehicles and batteries in homes.
MLL has not yet experienced issues from EVs. With a relatively low penetration rate (approximately 160 hybrid or fully electric vehicles[3]) in Marlborough, and available network capacity, this is not a present concern. However, accelerated uptake of EVs is likely to result in over loading on some local LV networks in future years, if predicted uptake rates materialise.

[2] Consumer surveys undertaken by MLL indicate that consumers generally have a poor understanding of the electricity industry and the structure of its participants.
[3] Based on the Ministry of Transport's electric vehicle fleet data, accessed in August 2021.

Similarly, discharging of energy from EV batteries into the network may result in issues. MLL believes that if it had knowledge of EV chargers (locations, type and scale), and the ability to manage this DER (extracted from and injected into the network), then issues may be avoided. MLL would fully support a mandatory DER registry to get ahead of this potential influx of EV chargers.

Distributed generation.
MLL has a relatively high penetration rate (approximately 2.6%) of small scale distributed solar generation. At present, issues are immaterial, however, MLL has seen (through our LV monitoring trials) evidence of high current harmonic levels in two residential streets containing several PV installations. This is being investigated further. Access to real time DER and metering data would better help MLL manage the safe and reliable operation of our LV networks by alerting to these issues and their source in a timely manner.

In recent years, larger scale distributed generation has connected to MLL's network including:

- Energy3's Weld Cone Wind Farm: 3 x 250kW wind turbines, connected in 2010.
- Energy3's Lulworth Wind Farm: 4 x 250kW wind turbines, connected in 2011.
- Dominion Salt Wind Turbine (connected to their distribution network): 660kW, connected in 2014.
- Kea Energy 1.85MW (permitted up to) Solar Distributed Generation, connected in 2021.

The issues that MLL has experienced with these connections have been separated out below under "Costs" and "Technical" sub-headings.

Costs:
Part 6 of the Electricity Industry Participation Code (the Code) includes prescribed fees (Schedule 6.5). MLL's experience with managing the process set out in Part 6 (particularly Part 2 for connections >10kW), is that the costs incurred in managing the application process and meeting the obligations of the Distributor far exceed the maximum prescribed fee.

In the case of the Kea Energy Limited solar distributed generation connection, MLL's costs in managing the application and fulfilling its obligations as a Distributor under Part 6, were several orders of magnitude higher than the prescribed maximum fee. Similarly, MLL engaged an external consultant to observe and inspect the testing as the distributed generation was being commissioned/connected to MLL's network. Again, the costs involved in observing and inspecting the testing were several orders of magnitude higher than the maximum fee MLL was able to invoice the distributed generator.

Technical:
The main issues MLL has experienced with our larger scale distributed generation has been around reactive power flows. With inverter-based generation approximately 40km along a radial rural 11kV feeder, there is a heavy reliance on Volt-Var control to ensure greater active power generation. The net result is poor power factor across the feeder and an inefficient network, which only carries reactive power. With sufficient penetration will we see issues at the GXP which need remedying? We are unsure.

Recently MLL experienced an issue with a distributed generation connection where the Volt-Var control loop failed on the distributed generator's equipment. This led to high voltage on the 11kV network, fortunately just below the trip threshold. MLL was not informed of this issue and instead only detected it through manual surveillance of our SCADA.

Distributed generation connections are creating additional complexity and work for MLL. MLL is receiving more and more enquiries and applications for distributed generation (small and large).

In MLL's experience, the connection of this distributed generation is resulting in disbenefits to the network and consumers generally, through increased complexity in power flows, and additional costs to MLL for example. MLL is not aware of any benefits to the network, or consumers, through the connection of the larger scale distributed generation. To date it seems that the only beneficiaries of connected distributed generation is the distributed generator themselves.

Q.5 Do the Electrical (Safety) Regulations require review? If so, what changes do you think are needed (a) in the near term and (b) in the longer term?

Safe and reliable operation of our distribution network is paramount to MLL. Complying with outdated standards specified in the ESR's and code is concerning in this rapidly changing environment. A more streamlined method of approving updated standards is required to keep up.

We understand that MBIE has either commenced, or intends to commence, a review of the Electrical Safety Regulations 2010. In MLL's view, the regulations should be reviewed with priority.

Q.6 Does Part 6 remain fit for purpose? If not, what changes do you think are needed (a) in the near term and (b) in the longer term?

Our response to Question 4 partially addresses this question. Further to that response, MLL believes that Part 6 of the Code requires a review, with focus on the following:

- Part 1, Part 1A and Part 2 of Schedule 6.1;
- Schedule 6.4 Pricing Principles; and
- Schedule 6.5 Prescribed Maximum Fees.

Schedule 6.1 broadly defines distributed generation connections as less than or greater than 10kW in size. In MLL's experience processing Part 2 applications >10kW, there is significant difference in an application that is 15kW in size, vs for example the Kea Energy Limited Wairau Valley solar installation at 1.85MW in size. MLL has also recently received a much larger application over 10MW in size. MLL doesn't believe it is appropriate that the same application process applies for a distributed generation connection of 11kW and anything up to and exceeding 10MW in size.

Having an additional Part (3?) to Schedule 6.1 should be given consideration. The threshold for Part 3 might be somewhat arbitrary, but perhaps 1MW might be appropriate given that this is the threshold that the System Operator is concerned with (or at least they need to be notified about).

The timeframes as set out in Schedule 6.1 (particularly Part 2) are difficult to meet. EDBs do not resource specifically for DG applications >10kW, which are not considered to be "business as usual". Applications, particularly larger scale ones (i.e., anything >10kW), do not come in routinely, and often come in without much warning. Managing applications, particularly larger ones, are time consuming as there is significant work for the EDB to do to meet the requirements of Schedule 6.1.

With an increase in DG applications (both small and larger scale), the timings for Initial and Final Applications under Part 2 should be considered in MLL's view to allow more time for EDBs to respond, and to resource the application process adequately.

The Testing section of Part 6 Schedule 6.1 Part 2 is very light in detail and requirements. In the case of a solar farm, many scenarios of generation (ramp up and ramp down etc from intermittent

cloud cover, and different network load conditions for example) need to be allowed for. MLL believes that the testing requirements under Part 6 need to be revisited, including reconsidering the prescribed maximum fee for testing. Naturally the distributed generator is wanting to connect as soon as possible (the sooner they are connected, the sooner they start generating revenue), and MLL as the EDB does not want to be a barrier to this but must be careful to ensure that any connection does jeopardise the safe and reliable operation of our network.

It is currently unclear under Schedule 6.1 whether the distributor can initiate the negotiation of a connection contract (in place of the regulated terms) or whether it is the distributed generator only who can initiate this.

With respect to Schedule 6.4 Pricing Principles, and the ruling that connection charges cannot exceed incremental costs. If incremental costs are zero, which is the case for some connections where the connection to the network is relatively straightforward, then Distributors cannot pass any costs onto distributed generators once connected. This seems fundamentally wrong – why should a load consumer who is allocated say 500kVA of capacity pay the Distributor for that, but, a distributed generator who uses 500kVA of capacity (for generation) not pay for that? Both connections are utilising the electricity network, which has associated maintenance costs, for their benefit ultimately, but one party effectively pays to use the network while the other does not. This does not seem equitable, nor in the best interests of consumers in general. This is especially relevant to intermittent and unreliable generation such as wind or solar as they do not allow us to offset load with any degree of certainty.

Schedule 6.5 prescribed maximum fees should be reviewed and updated such that Distributors are not capped in the amount of their costs that they can recover from the distributed generator. Costs incurred beyond those allowed under Schedule 6.5 are ultimately borne by the consumers connected to the network, not the distributed generator.

To summarise our responses to this question and whether Part 6 is "fit for purpose", MLL would like to see evidence how the Authority's statutory objective is being met by distributed generators: *to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.*

Q.7 Is there a case to be made for minimum mandatory equipment standards for DER equipment, specifically inverter connected DER?

Simplifying and standardising DER equipment will likely reduce complexity for and across Distributors and may potentially reduce network issues and costs. Distributors could mandate this themselves but doing so independently would be inefficient and a coordinated and industry approach would be better for all participants.

EV charging is a good example. The SNZ PAS 6011:2021 standard on domestic EV chargers provides good insight and answers to common questions. However, with it being voluntary will the market take it on board and use it? Cheaper chargers without key functionality will always appeal to a portion of the population. From an EDB perspective it is encouraging to see reference to the OCCP standard for control and suggesting they talk with us first. To date we have had no discussions with consumers about this, although we note that it has only recently been published.

Vehicle to Building (V2B) or Vehicle to Grid (V2G) scenarios are a possibility now and the potential to unknowingly generate into the grid is a real concern to EDBs. Visibility, via DER registry, and or mandatory standards for EV chargers on EDB networks could help prevent these situations.

Q.9 Is there a case to look at connection and operation standards under Part 6 with a view to mandating aspects of these standards?

There possibly is a case here. If this was to occur, this should be a coordinated approach by industry (as opposed to one entity or participant group). MLL believes that the experiences it has with distributed generation would be valuable to provide input.

A better initial approach would be to encourage an industry representative group such as EEA or ENA to produce standard guidelines (with industry consultation) that we could each then adopt. This would provide confidence to the EDB we are complying with the code and relevant standards while making it easier for nationwide companies to interact with the different EDBs.

Q.10 What flexibility services are you pursuing?

MLL is actively considering flexibility services options at present and closely observing any developments in this space.

Q.18 What are distributors doing to ensure their network can efficiently and effectively manage the transformation of networks?

MLL will leave this to other EDBs (and the ENA) to comment on what they are doing, but MLL to efficiently and effectively manage the transformation of networks is currently:

- Undertaking low voltage monitoring studies (at significant cost to MLL) to better understand any localised (at discrete LV sections of the network) impacts from DER such as small scaled distributed solar generation and hosting capacity.
- Giving consideration to non-network solutions in areas of the network where capacity constraints may occur in future.
- Waiting for regulators to introduce standards that will help transformation of networks.
- Discussing the impacts of DER with other networks, including providing a presentation recently to other EDBs about MLL's recent experience with Part 6 of the Code in connecting Kea Energy's 1.85MW solar farm.
- Participating in key working groups coordinated by the ENA, including the Smart Technology Working Group for example.
- Closely following industry developments and work involving DER.
- Contacting consumers (particularly commercial and industrial consumers) to understand their future growth plans, and to determine if there are any significant non-renewable fuel energy sources, for example coal boilers, that may be substituted by increased energy delivered through MLL's network.
- Continually reviewing and adjusting our pricing to mitigate the impacts of DER. For example, shifting the balance of pricing to fixed vs variable in order to reduce the impact of lost revenue from small scale distributed solar generation. This also includes giving current consideration to the introduction of controllable EV prices which will encourage consumers to allow MLL access to and management of EV load to mitigate any potential impacts on the network (similar to existing hot water load control).
- Updating our connection and operation standards for distributed generation as lessons are learned through managing applications and connecting distributed generation under Part 6 of the Code.
- Requesting purchasers of EVs at local vehicle dealerships voluntarily complete a form to pass to MLL detailing the EV purchased, and at home charging infrastructure so that MLL can obtain information about the location and types of EV chargers at installations connected to its network;

- Engaging consultants (at significant cost) with experience and technical expertise in distributed generation to assist with complex technical considerations involved in reviewing distributed generation applications and connecting distributed generation to MLL's network.

Further to the above points, for over a decade now, MLL has worked with other EDBs through its membership in the Upper South Island load management group. This group was formed to work together to manage upper South Island peak demand through coordinated load shedding.

Despite upcoming changes to the TPM, including removal of the RCPD charging component, MLL and the group's intentions are to continue to work collaboratively to manage peak demand on the upper South Island grid, with the primary objective or avoiding the need for grid investments which will ultimately be to the benefit of MLL (and other EBDs') consumers.

Q.19 How are distributors currently working together to achieve better outcomes for consumers?

As outlined in Q.18, EDBs are working collaboratively on a number of matters with the objective of better outcomes for consumers.
As has been noted elsewhere in this submission, MLL is a consumer owned EDB, and as such, is incentivised to provide better outcomes for its consumers. MLL is somewhat limited in its ability to affect outcomes, for example:

- prices it sets and makes available are not necessarily passed through by electricity retailers (whom consumers are contracted to) in the same way;
- currently a lack of access to useful data which would allow for better assessment of any adverse impacts on the network from DER; and
- inability to recover actual costs incurred in processing applications under Part 6 of the Code, resulting ultimately in additional costs being passed on to consumers.

Q.20 Could more coordination between distributors improve the efficiency of distribution?

This question almost implies that distribution is currently inefficient. Coordination efforts are ongoing, as outlined in the response to Q 18.