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Updating the regulatory settings for distribution networks

Submission to the Electricity Authority

From the Electricity Networks Association

Contents

Updating the Regulatory Settings for Distribution Networks

The Electricity Networks Association (ENA) appreciates the opportunity to make a submission to the Electricity Authority's (Authority) discussion document on Updating the Regulatory Settings for Distribution Networks[1]. We think it is timely to review regulatory arrangements to ensure they are conducive to the efficient connection and utilisation of new technologies to secure, reliable and cost-effective supplies of electricity to New Zealand. In particular, we think it will be important to identify and prioritise workstreams that are critical to enabling a vibrant, low-carbon energy future.

The ENA represents the 27 electricity distribution businesses (EDBs) in New Zealand (see Appendix A) which provide local and regional electricity networks.

EDBs will play a vital role in helping New Zealand become carbon neutral

We recognise the ambitious emission and renewable energy aspirations of the Government and the paramount role that EDBs will play in helping to achieve these.

There is no doubt that flexibility services and, more broadly, distributed energy resources (DER) will deliver benefits to consumers in coming decades, and the electricity sector will adapt to facilitate the low-carbon economy.

In addition to the step up in DER and flexibility services, EDBs are involved heavily in supporting decarbonisation through electrification of process heat. For example, South Island EDBs are collaborating and, with funding from EECA, delivering the first comprehensive inventory of process heat boilers. EDBs are working hand-in-glove with customers to make sure they deliver the infrastructure necessary to electrify their process heat systems.

EDBs are laying the foundation to support a distributed and flexible electricity system

EDBs stand ready to enable and facilitate the uptake of DER and flexibility services. ENA members are taking the fundamental first steps in their preparation for the ramp up of DER, and the introduction of flexibility services. These first steps include developing plans and roadmaps, prioritising, and making least-regrets investments.

EDB preparations for the future electricity system are guided by the Network Transformation Roadmap[2] (NTR) developed by the ENA in 2017. A living document, the NTR provides information, insights, and recommended 'least regrets' actions for EDBs to navigate changes in the way electricity distribution networks will be used in the future.

[1] https://www.ea.govt.nz/assets/dms-assets/28/Updating-the-regulatory-settings-for-distribution-networks.pdf

[2] https://www.ena.org.nz/resources/electrification-of-nzs-energy-needs/

The NTR aims to best position EDBs to effectively and efficiently meet the future distribution service needs of consumers by guiding EDBs to plan and develop their networks and operations in a way that maintains flexibility in a period of disruptive change. ENA recently engaged Dr Allan Miller to produce a progress report[3] against the actions contained in the NTR. This found that EDBs are making good progress in trialling, and beginning to deploy, low voltage (LV) monitoring technologies.

The ENA is keen to work with the Authority and Commerce Commission to continue to progress the delivery of the NTR. Wellington Electricity's EV Connect initiative is a prime opportunity for the sector and the Authority to collaborate to shape decisions in enabling electrification of New Zealand's transportation fleet.

Flexibility services are in their infancy, with their final form unknown

Flexibility services are in early development and, as such, their final form is unclear. At this early stage prescriptive regulation is unhelpful, and could create unanticipated barriers to adoption and innovation. Regulation requires predictions about future form of flexibility services in the context of evolving distribution services, and the pattern and rate of consumer choice of technology. At present, a more permissive regime is necessary. Indeed, Sapere's own analysis for the Authority shows that material benefits are not expected to accrue until after 2035, which gives plenty of time and opportunity for EDBs to learn, adapt and respond to the necessary evolution of the electricity sector and the emergence of flexibility services. We note that even in jurisdictions with high uptake of DER, contributions from flexibility services are nascent and we are not aware of settled business or market models for their widespread deployment.

Another important point is that uptake of DER and flexibility services is unlikely to be uniform. They will create different opportunities and pose different challenges in different locations. Rural South Island EDBs will be at the forefront of enabling the electrification of process heat but are unlikely to be materially impacted by the uptake of EVs in the short term, given demographic profiles.

Urban EDBs will likely be among the first impacted by EV charging load, but will see little short-term impact from electrification of process heat. Meanwhile, high penetration of solar photovoltaic systems (PV) in northern New Zealand will require EDBs to respond to a different set of challenges posed by grid injection and falling minimum demand.

The key point is that EDBs will need to respond to local circumstances. The difference in pace of change across New Zealand will mean EDBs won't need to be at the same stage in their evolution at the same time.

Regulatory settings should recognise the embryonic nature of flexibility services

The ENA's view is that regulatory settings that suit a mature part of the industry (e.g. retailing, use of system agreements) will not necessarily suit flexibility and DER services. Pre-emptive prescriptive regulation of DER and flexibility services is therefore not the answer. It is also necessary to consider the cost of new regulation.

[3] https://www.ena.org.nz/resources/publications/document/947

The Code as a regulatory instrument is slow to adapt and evolve even with relatively simple changes (e.g. an update to referenced standards took five years to be implemented). This mismatch between the unresponsiveness of the Code and the embryonic and evolving nature of DER and flexible services is further evidence advising against premature regulation by the Authority. That said, there may be areas where standardisation (e.g., inverter standards, communications protocols, cyber-security requirements) is necessary to avoid future problems or incompatibilities.

EDBs are eager to engage with regulators to ensure regulation is evidence-based

We invite the Authority to spend time with ENA members to gain first-hand knowledge and understanding of how EDBs operate and how they are preparing for the future.

The ENA expects that with a greater understanding of EDBs' day-to-day operations, decision-making frameworks, and initiatives to facilitate DER and flexibility services, that the Authority will be able to make informed and evidence-based decisions when considering regulatory interventions.

The ENA and our members are confident that active and open engagement between the Authority and EDBs will help dispel some of the myths identified in the discussion paper, including that EDBs:

- may be reluctant to innovate (p. 60)
- may unduly restrict technologies or network users
- may favour in-house or related party solutions (p. 44)
- seem to consider the use of flexibility services as difficult (p. 45)
- may favour network solutions (p. 44)
- may misallocate costs and revenues.

EDBs are collaborating to deliver effective solutions

EDBs are collaborating to build capability and capacity, increase standardisation, and reduce duplication of effort in support of the industry's evolution. Examples include:

- EDBs collaborating to test the potential for a joint Distribution Network System Operator for the South Island and working with the Energy Efficiency & Conservation Authority (EECA) and Transpower to create a definitive database of South Island industrial boilers and a roadmap for their decarbonisation.
- Five EDBs are working with a metering equipment provider to develop a common set of smart meter data analytics tools to facilitate greater insight into LV network performance.
- The ENA and members partnering with the Electricity Engineers' Association (EEA) to develop, review and recommend standards for DER (EV charging and inverter standards).
- Wellington Electricity's EV Connect project brings together industry and regulators to lay out a detailed roadmap to support EV adoption, and unlock value and customer utility while maintaining network security and equity to all consumers.

- Orion has established the Energy Academy and LUMO364 platform[4] to build industry capacity and human capital by sharing knowledge and specialisation, and to promote co-investing in technology based experiments and open-source sharing of knowledge, progress and outcomes.

Data access is a key barrier to visibility of low voltage networks

The NTR progress report shows that limited progress has been made against the foundational action of obtaining greater visibility of LV networks through access to smart metering data. ENA and EDBs have expended significant effort to arrange this access by working with retailers to develop an amendment to the Default Distribution Agreement (DDA) Data Template. However, this has not been taken up by the Authority. As a result, efforts to obtain access to smart meter data remain piecemeal, uncoordinated and subject to bilateral negotiations between distributors and retailers. We expand on this in our response to question one of this consultation.

Part 6 needs to evolve to be fit for purpose

Part 6 of the Code was introduced when distributed generation (DG) was viewed as a peripheral part of the electricity sector. Times have changed and if DER and flexibility services are to become a central pillar of the industry, Part 6 needs a substantive review, including application processes, timings, fees, and DG pricing principles. Particularly for larger scale DG, the application process does not adequately address the technical complexities of large DG connections on the network, resulting in other network consumers subsidising the costs associated with connections.

The review of the DG pricing principles should seek to ensure they align with the changing operating environment shaped by decarbonisation and the transmission pricing methodology. This will ensure a level playing field regardless of where DG is connected, including the choice of connection to distribution and transmission networks.

EDBs are tightly regulated by the Commerce Commission

Non-exempt EDB's expenditures and service levels are regulated tightly by the Commerce Commission. As highlighted in our recent response[5] to the Commission's open letter, flexibility and adaptability must be better accommodated in the regulatory regime. In the most recent DPP reset, EDBs made the case that if regulators want EDBs to invest in developing new business models and platforms for incorporating flexibility services into their toolkit for alternatives to network investment, then allowances need to be provided for such investments.

[4] https://www.energyacademy.co.nz/

[5] https://www.ena.org.nz/submissions/previously-published-ena-submissions/2021-submissions-2/document/893

The Commerce Commission made changes to nominally equate the capital and operational expenditure in the Incremental Rolling Incentive Scheme (IRIS) mechanisms. These are intended to ensure neutral incentives between operating expenditure (procurement of non-network alternatives) and capital expenditure (investment in capital solutions). But they also constrain operating expenditure allowances to historically based levels, and provide no new allowances for developing non-network solutions. A significant opportunity to provide for new solutions was missed, and DPP3 will remain a limiting factor until 2025.

Even exempt EDBs face regulatory oversight from the Commission through the information disclosure regime. This regime includes independent scrutiny of cost allocation and related-party transactions.

Many of the options put forward in the Authority discussion paper represent a fundamental departure from the Commission's current Part 4 regime. While the ENA notes the Authority's intent to share, with the relevant government agency, submissions that fall outside its jurisdiction, the Authority and Commission must ensure that any potential changes to the Part 4 regime arising from this consultation are still subject to the Commission's normal process for enacting changes to Part 4.

In summary, ENA welcomes the Authority's focus on the evolution of New Zealand's electricity sector and the role DER and flexibility services can play. Our members look forward to working with the Authority to shape a distribution sector that delivers to consumers the benefits of DER and flexibility services as technologies mature and their full potential crystallises.

The ENA's responses to the substantive issues in the consultation questions are set out in Appendix A below.

Please don't hesitate to get in touch with ENA if you'd like to discuss our submission. If you require anything further from ENA or its members, contact Keith Hutchinson (keith@electricity.org.nz, 021 0849 9419) in the first instance.

Yours sincerely,

Graeme Peters
Chief Executive
Electricity Networks Association

Appendix A: Response to consultation questions

Consultation Question
Q.1 Have you experienced issues relating to a lack of information or uneven access to information?
It is widely recognised that information flows will be critical in under-pinning the efficient utilisation of DER. Over time, access to real-time data on utilisation of the LV networks will be required to manage performance and reliability of networks, just as it is a critical requirement for the transmission system. That will occur when the widespread deployment of DER and flexibility services become necessary to meet demand on distribution networks. In the interim, regular snapshot data of demand on LV networks is key to understanding network performance and trends, but even this basic data that can be provided by smart meters is not systematically available to EDBs. Some EDBs have been able to clearly demonstrate the benefits of smart meter data. For example, Counties Energy has shown just how useful smart meter data can be, not only for network planning, but also ensuring the safe operation of the network. Using data from smart meters, Counties Energy was able to identify 1000 neutral faults that could have developed into public safety risks and low-voltage faults. The inability of EDBs and flexibility providers to access smart meter data in a timely manner will prove to be a greater barrier to uptake of flexibility services and DER than any other perceived EDB barriers. Agreeing terms for data provision with retailers and MEPs for access to network data is a time-consuming process, and the lack of standardised and publicly available terms adds to this complexity. Without full coverage of the ICPs on the distribution network, which will likely encompass many different retailers' MEPs, the usefulness of data is more limited. Item 4.10 of the consultation paper notes that one of the recommendations of the Electricity Price Review (EPR) was to "…ensure distributors have access to smart meter data on reasonable terms". The Authority website was updated on the August 3 with a table[6] explaining the progress it has made in response to the EPR recommendations. For the recommendation related to smart meter data access for distributors (recommendation E6), the table states that this action is complete, and that "The Data Template provides distributors with access to smart meter consumption data on reasonable terms to develop more efficient distribution prices and plan and manage their network." The ENA does not agree that this EPR action is complete. The Authority's own data on consumer data requests shows that retailers have been unable to meet the extremely generous five-day provision obligation, 20 percent of the time[7]. Illustrating that even where there is a clear Code obligation for the timely exchange of information, the lack of modern systems, APIs and enforcement prevent DER and flexibility providers accessing even basic of information needed to offer services in a timely manner.

[6] https://www.ea.govt.nz/consumers/the-electricity-price-review-epr/

[7] EMI consumer data request year to 30 June 2021

ENA, EDBs and retailers engaged in prolonged discussion and negotiation to arrive at an amended version of the Data Template that resolved these issues, and which was then presented to the Authority for adoption into the Code. However, as noted in item 4.14, the Authority declined to make this amendment and hence the problems remain with data access.

Notwithstanding the above issues, since the Authority declined to amend the Data Template in the Code, EDBs have proactively sought to come to agreements with retailers (and in some cases their agents, the MEPs) regarding access to meter data. ENA understands that many EDBs have proposed to retailers an agreement in the form of the amended Data Template, and these discussions are ongoing. As far as ENA is aware, no access to smart metering data via the Data Template or amended Data Template has yet been arranged by EDBs, and it is unclear whether these attempts will be successful or not. Even if these negotiations are successful, this is clearly a highly inefficient way to resolve what is a sector-wide issue, as is illustrated by appearing prominently in this Authority consultation.

The discussion paper's suggestion that EDBs are holding back LV network information from third parties, such as consumers and prospective flexibility traders, is not correct. Clearly, EDBs cannot make available information that they themselves do not possess. In addition, for such data to be of use to the EDB and to these third parties, it must be combined with other data, such as network topography and network asset capacity information.

As explained above, the current operative form of the Data Template explicitly prohibits EDBs from providing data obtained via the draft template to third parties unless individual retailer permission has been sought and obtained, which in practical application is unworkable. The Authority has already declined to resolve this issue through the adoption of the amended Data Template. If the Authority is seeking to make data widely available to third parties, alternate channels to provision of data other than via networks should be considered (i.e. direct access via controlled API portal).

EDBs can and do provide congestion data at greater levels of aggregation. For example, Top Energy has recently published notices on congestion in its network[8].

EDBs also provide information on congestion in response to applications for connection. EDBs encourage potential applicants to engage with them prior to submitting applications.

ENA strongly submits that until there is a clear technical, regulatory and commercial roadmap in place, access to smart meter data will be an enduring barrier to the efficient connection and utilisation of DER.

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

EDBs operational and investments decisions above the LV network (i.e. the HV network) are driven by detailed network studies and data sourced from EDBs' SCADA and telemetry systems. This data is rich in detail and at a granular timescale.

SCADA and telemetry systems for the monitoring of LV networks are uneconomic to install on a whole-of-grid basis. There is however a fleet of 1.9 million[9] devices on the LV network that can

[8] https://topenergy.co.nz/assets/Export-Congestion.pdf

[9] EMI metering snapshot 31 July AMI (HHR certified)

capture the information needed to make informed investment and operational decision for New Zealand. EDBs are currently unable to access this vital information from these smart (AMI) meters until commercial agreements are obtained with MEPs. It remains to be seen whether satisfactory commercial terms can be agreed, and the timeframes to reach agreement.

Broadly speaking, the more granular the information on power quality, and the more types of power quality information that is available to EDBs, the better they understand their LV networks, and the more efficient and effective any interventions. In addition, the real-time 'operational' information from smart meters (e.g. last gasp, first breath, energisation status) would unlock significant consumer benefits in the form of more efficient and effective responses to network faults.

The smart meter data that is vital to ensuring that EDBs can enable flexibility services to achieve their full potential are:

- kWh
- kVa
- Voltage (max, min, average)
- Power Factor
- Total Harmonic Distortion
- Energisation status
- Last gasp

To ensure that EDBs are fully equipped to maximise the potential for smart meter data, and to inform investment and operational decisions, EDBs are collaborating to develop common data platforms. This will reduce duplication of effort between EDBs and lay the foundations to establish future industry standards.

In addition to smart meter data, EDBs also need visibility of the type and scale of DER installed capacity behind the meter, including output of PV, batteries and maximum capacity of EV chargers. This information goes to the fundamental nature of each connection. It must be robust and readily available to both EDBs and flexibility services providers.

In order to assess the use case for non-smart meter LV monitoring options, the ENA commissioned Sapere to produce a technical primer[10] and business case[11] for deployment of LV monitoring technologies on New Zealand distribution networks. While these reports were focused on the deployment of LV monitoring technologies excluding smart meters, some of the fundamental findings apply universally. In particular, there are significant benefits to EDBs being able to establish a 'baseline' view of their LV networks prior to the widescale deployment of new technologies (especially EV charging and solar PV). This enables a far more effective response in terms of network planning, upgrading and use of non-network alternatives, than is the case when the baseline status of the network is not well understood.

In summary, there is a 'ticking clock' on realising some of the benefits access to smart metering data can provide, and the sector should work with urgency to have suitable arrangements in place prior to the mass adoption of the new technologies mentioned above.

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

[10] https://www.ena.org.nz/resources/publications/document/805

[11] https://www.ena.org.nz/resources/publications/document/806

The Authority should immediately review the ability of retailers to use profiled AMI data for reconciliation purposes, and consider a transition to mandatory use of half-hourly data. The collection of single monthly datapoint severely constrains the data available to EDBs for network planning and billing purposes.

Modern data exchange protocols combined with an efficient centralised API (for a predefined metering dataset including kWh, kVA, voltage and frequency) with appropriated access control would be an ideal solution for improved and secure access to information. This would comply with any future consumer data rights obligations while resolving an issue that has been a source of endless frustration for the industry since the installation of the first smart meter 20 years ago.

The Registry is the central repository for data on connection type, metering infrastructure and DG. This data set should be expanded to include information about other types of DER, including batteries and EV changing infrastructure installed at each ICP.

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

ENA members have advised that they have not experienced any widespread or systemic issues arising from the *operation* of DER. Generally, the few issues that arose were highly localised to the immediate section of the distribution network to which the DER is connected. These issues can be resolved between the EDB and DER owner.

The level of DER penetration in New Zealand remains low and there have been no widespread issues identified from incorrectly installed DER. Nevertheless, in the absence of smart meter data, there may be localised issues that are not yet manifesting in adverse power-quality, but would become problematic at higher levels of penetration.

Experience from the international jurisdictions shows that, with current technologies, power quality issues will not manifest in New Zealand for many years, and be ably managed by EDBs as they sporadically occur.

However, the *connection* of large scale DER is beginning to pose significant challenges for some EDBs, and it would be sensible to review elements of Part 6 of the Code to ensure these are still fit for purpose – something the Authority raises under question 6 of this consultation.

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?

Yes, the Electrical (Safety) Regulations (ESR) require review. The Ministry of Business, Innovation and Employment (MBIE) is undertaking a review of the Regulations. The ENA, members and the EEA have made submissions to this review. That process should be allowed to run its course.

The ENA defers to the views of the EEA.

We note that in a consultation on the update to the ESRs, MBIE stated that it was working on developing a new process for updating the regulations that would be quicker, more straightforward, and more flexible. While there was little further detail provided in the consultation, ENA expressed its support for this and offered assistance.

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?

The ENA welcomes a fulsome review of Part 6.

Part 6 is clearly focused on small scale DG solutions, not megawatt scale connections. Since its inception the number of applications for large scale DG connections has increased substantially. The time, resources, planning, and modelling detail required to appropriately assess applications of this scale are not aligned with fees and timings attached to the existing Part 6 application process.

Briefly, the issues that members have reported to ENA associated with the connection of DER under Part 6 are:

- EDBs are obliged to assess and respond to requests for connection in timeframes mandated by Part 6. For larger and more complex DER connections, which are rapidly becoming more frequent, this can pose a significant burden on EDB engineering and network design resources. Part 6 provides no ability to stagger or queue these connection requests. So, in cases where requests overlap, EDB specialist resources face unachievable timeframes and are unable to recover from applicants the costs of resources needed to service applications.
- Related to the point above, sometimes connection applications received in succession (but still within the EDB connection assessment period) can relate to the same section of network – this is sometimes a feature of the 'race for capacity' that we are increasingly seeing related to grid-scale solar. In these cases, it can be challenging for the EDB to allocate this capacity to the potential connectees in a fair and equitable way, and still comply with the timescales provided in Part 6. Consideration should be given to developing a separate process in Part 6 for these interrelated connection applications. It is not always economic to expand capacity to serve higher connected PV than the existing network can support.
- The costs incurred by EDBs to assess and design connections for DER of this type can be significant, particularly when this must be completed within timescales imposed by Part 6. In almost all cases these costs greatly exceed what can be recovered by the EDB from the connectee under Part 6, and therefore these connections are subsidised to a large degree by other EDB customers. With this in mind, the cost caps applied in Part 6 for large-scale DER connections should be revisited.

A specific application for processing large-scale DG applications is necessary. This must remove the cap on application fees for applications above 1 MW and increase the timeframe for the response to an application.

The Part 6 connection process should also be amended to require that DER information be recorded in the registry at the time of the installation, including Energy Storages Systems (ESS) and batteries. This would require the development of a connection process for ESS and EVs and their inclusion in definitions of DG.

Finally, the DG pricing principles are no longer fit for purpose. If DER and flexibility services are to form a core part of New Zealand's energy system, the incremental cost cap should be reconsidered, particularly in light of first-mover advantage/disadvantage scenarios.

Q.7 Is there a case to be made for minimum mandatory equipment standards for DER equipment, specifically inverter connected DER?
Yes, standards are critical. However, consideration must be given to ensuring that regulation can keep pace with changing technologies. Recent experience with inverter standards has demonstrated that the inclusion of specific standards (e.g. AS/NZS 4777) in the Code can lead to misalignment between the Code and national standards. It will be especially important to ensure that changes in standards that may be driven by the issues experienced in Australia, where there is high PV uptake, are able to be reflected immediately in New Zealand requirements, backed by effective enforcement mechanisms.
Q.8 What standards should be considered to help address reliability and connectivity issues?
The Code provision relating to inverter standards should be amended to incorporate the power quality response modes set out in the relevant standard (AS/NZS 4777).
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?
An ENA review in mid-2020 (Appendix C) concluded that there are no material differences in EDB connection and operation standards with respect to DG installers. The mandating of standards would provide little in the way of additional standardisation and may introduce risk by disrupting existing effective processes. As noted above, the definitions of DG in Part 6 need to be reviewed to ensure EVs, ESS and demand response are adequately captured.
Q.10 What flexibility services are you pursuing?
ENA members are taking action to pursue flexibility services, where appropriate, to support the reliable and safe operation of their networks. This includes procurement that seeks flexibility services as non-network solutions, and use of energy storage systems to support network stability.
Q.11 Are flexibility services being pursued through a competitive process?
The premise of chapter 6 of the discussion paper is that EDBs are not actively pursuing non-network solutions. The chapter assumes that EDBs prefer in house investments or to use subsidiary firms without a competitive procurement. There is no evidence to support these assumptions. ENA submits that EDBs are using competitive procurement practices. Aurora completed an exhaustive public procurement process which resulted in it purchasing flexibility services from a third-party provider. Also, the Commerce Commission's Part 4 regulation includes the IRIS. This symmetrical incentive scheme ensures that non-exempt EDBs are agnostic between capital expenditure and operational expenditure.

EDBs currently rely on water-heating load control for their primary requirements around flexibility services. In future, flexibility in EV charging, and potentially from small scale battery discharge, is likely to provide significant new options for EDBs to manage any future network constraints, especially on low voltage networks.

Until real-time data is available on capacity utilisation on low voltage networks, flexibility services are unlikely to be a practical resolution to near-term capacity issues at the LV level (which are not yet evident because EV loads are only just beginning to connect).

Moreover, at present the deployment of batteries and other DER solutions are unable to match the economics of more traditional network upgrades. For example, a 100 to 200 kVA distribution transformer upgrade would cost around $20,000 (i.e. $200/kVA), whereas a 7kW Tesla Powerwall is currently quoted at $15,000 ($2,140/kW). Given these economics, we wouldn't expect to see battery solutions being widely deployed to avoid distribution transformers upgrade, which are the primary pinch points for LV networks capacity.

It is also relevant to note that network pricing is expected to play a key role in encouraging efficient use of networks. Peak-time prices will encourage discretionary loads to be removed from the peaks (e.g. EV charging) and to the extent that consumers have invested in home battery storage (e.g. as a complement to solar) there will be strong incentives to use stored electricity to reduce or avoid peak-time use from the grid. Our members already report that some retailers are developing EV charging plans off the back of network time-of-use plans. Accordingly, it will not always be the case that flexibility services will need to be procured directly, but may be obtained through standing price incentives that encourage optimal use of networks.

Q.12 What options should be considered to incentivise non-network solutions?

International experience in the UK and Australia has demonstrated the value in properly funded and coordinated trials. These trials enable networks and flexibility service providers to test technologies and business models, which in their embryonic stages may not achieve the net benefits expected under the Commerce Commission's expenditure oversight regime. The establishment of an innovation funding pool modelled on the ARENA[12] co-funding model would incentivise innovative non-network solutions by tipping the cost/benefit equation in its favour.

For non-exempt EDBs, a limited innovation allowance is provided by the Commerce Commission. This funding is hard to access and has stringent conditions attached. A combination of these factors resulted in extremely limited uptake of the funding. Many EDBs have opted to seek alternate funding sources (e.g. Callahan Innovation) for innovation and non-network solutions, rather than access the limited, heavily-caveated funding from the innovation allowance.

There appears to be an assumption that EDBs would not use new technologies to avoid traditional network investments, including non-network solutions. It is important to recognise that EDBs have made numerous investments in non-traditional solutions to network capacity issues or otherwise innovative approaches to network issues, including fast transfer schemes, self-healing networks, automated switching, dynamic ratings, etc. There is no reason to believe that once flexibility solutions are proven, that these would not be added to networks' toolkits. As noted elsewhere in this submission, before non-network solutions can become viable, especially on low-voltage networks, real-time monitoring data is required. It is a critical enabler.

[12] https://arena.gov.au/funding/

Q.13 What options would encourage competitive procurement processes for flexibility services?
The Commerce Commission's Information Disclosure regime requires that all significant related-party transactions are disclosed and audited for probity. The Commission has undertaken numerous reviews of these related-party transactions. These uncovered no evidence of EDBs being anti-competitive. There is also no evidence to suggest that EDBs are undertaking procurement processes that preclude flexibility services. There is, however, ample evidence that competitive procurement processes are being used actively by EDBs. These are highlighted in both the Discussion Paper and the Commerce Commission's review into EDB's asset management reporting. Therefore, no regulatory intervention is required. The limited uptake of flexibility services to date illustrates that, while these services are on the downward cost curve, they have yet to reach parity with traditional technology solutions.
Q.14 Have you experienced difficulties with negotiating operating agreements for flexibility services?
Approaches to EDBs by proponents of flexibility services and DER projects occur on an ad-hoc basis. While the frequency of these approaches is increasing, they are often speculative and do not progress past initial discussions. That said, ENA members have not experienced difficulties with negotiating operating agreements for flexibility services.
Q.15 Are the transaction costs of developing contracts a barrier to entering the market for flexibility services?
The cost of contract development is not a material barrier to flexibility services.
Q.16 Would an operating agreement help lower transaction costs and level negotiating positions?
As flexibility services are in their infancy, designing a standard operating agreement would be extremely difficult, costly and time consuming. Drafting operational agreements for flexibility services at this stage would require the Authority to predict which of the multitude of technologies will achieve prevalence and widespread uptake. The DDA process has shown that, even for a mature service, the time and resources that go into the establishment of regulated operating agreements is significant. The risk profile of flexibility services is very different to that of the traditional retail service covered by DDA.

Q.17 What kind of operating agreement would address the issues described in this chapter?

Bespoke operating agreements are appropriate given the current immaturity of flexibility service offerings and the risk profile.

Operating agreements will need to be adaptable given the wide range of services and technologies that fall under the flexibility services umbrella.

There may be some benefits in guidance being developed for operational agreements for common types of flexibility services. However, the cost involved in development of this guidance may outweigh the benefits.

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

EDBs are actively preparing their networks to deliver New Zealand's energy transformation. Given the early stages of the transition, EDBs are focused on planning, analysis and least-regrets investment, with a particular focus on improving knowledge and visibility of low voltage networks, albeit hamstrung by lack of funding made available under DPP3 for the non-exempt EDBs.

Each individual EDB's future plans are set out in detail in their Asset Management Plans (AMP). The ENA understands the Commerce Commission is undertaking a study of AMPs to understand how EDBs are currently preparing for future demands and opportunities placed on the electricity system by decarbonisation. These are tailored to the circumstances of each network, common components include data and digitisation roadmaps, and LV roadmaps incorporating monitoring, modelling and studies.

The ENA notes the paper's reference from the International Energy Agency (IEA) report's reference to the sector's capacity to harness efficiencies associated with economies of scale. It is out of context and neglects to cover the report's key conclusions:

"However, no official empirical analysis has been undertaken on economies of scale in New Zealand's distribution businesses, and there is little evidence that small firms are less innovative or perform less well than large ones."

The IEA also concluded *"In addition, a programme of sponsored amalgamations is likely to be highly contentious" and "likely to be strongly resisted and potentially counterproductive at this time".*

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

Distributors work together in the ENA to address key challenges, including smart technology, resource planning reform, customer and community engagement, and pricing reform.

As EDBs plan New Zealand's energy future, they are actively collaborating to enable the potential of DER and flexibility services to be fully realised. These collaborations include:

- South Island DSO and process heat initiatives
- collaboration with a MEPs to develop common data analytics tools

- partnering with EEA to develop standards for DER (i.e. charging standards)
- Wellington Electricity and EECA leading the sector's EV response
- upper South Island load management group
- Energy Academy and LUMO364 platform[13]
- South Island EDB joint study into new operating models.

Other areas where EDB collaboration results in positive outcomes for consumers include:

- storm and emergency response e.g. South Island Mutual Aid agreement
- efficiencies through shared services
- joint Technical Standards
- cyber-security
- control systems security
- information exchange
- safety forums
- collective network operations group (CNOG).

Q.20 Could more coordination between distributors improve the efficiency of distribution?
Supported by ENA, EDBs are working together to improve the efficiency of distribution and lay the foundations for New Zealand to become a low-carbon economy. They will continue to seek collaboration opportunities within the sector, consumers and other stakeholders to ensure they can continue to deliver a safe, reliable, resilient, and efficient distribution networks and service.

[13] https://www.energyacademy.co.nz/

Appendix B: ENA Members

The Electricity Networks Association makes this submission along with the explicit support of its members, listed below.

Alpine Energy

Aurora Energy

Buller Electricity

Centralines

Counties Energy

Eastland Network

Electra

EA Networks

Horizon Energy Distribution

Mainpower NZ

Marlborough Lines

Nelson Electricity

Network Tasman

Network Waitaki

Northpower

Orion New Zealand

Powerco

PowerNet

Scanpower

The Lines Company

Top Energy

Unison Networks

Vector

Waipa Networks

WEL Networks

Wellington Electricity

Westpower

Appendix C: Review of EDB's Connection Policies

Distributed Generation
Review of EDB's Connection Policies
Full Report

June 2020

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Contents

1. Executive Summary - Most Follow Latest Codes and Standards

NWCL was engaged by ENA to review the consistency of the technical requirements of Distributed Generation (DG) connection policies across Electricity Distribution Businesses (EDBs).

The review concluded that:

- The technical requirements were easy to find and understand;
- EDBs that account for 77% of ICPs in NZ completely follow the latest:
    - Electricity Industry Participation Codes, specifically Part 6 (the codes) and
    - Reflect the latest joint Australian and NZ Standards for Small Scale Distributed Generation (AS/NZS4777.1:2016 and AS/NZS4777.2:2015) (the AS/ NZ standards);
- It is likely that any installation which followed the latest standards would meet the technical requirements of any EDB in New Zealand;
- The overall process would benefit from having the Electrical (Safety) Regulations 2010 (ESRs), updated to reflect the latest Aus/NZ standards (the change would then need to be gazetted into law to be legally effective);
- Once the ESRs are updated there may be merit in development of a policy template for EDB's to use (Vector's policy may be a good starting point).

2. Latest Codes and Standards

It was noted that NZ specific technical standards have only recently been developed and these have only recently been reflected in the codes.

Therefore, assessing the consistency of technical requirements was against a baseline of the latest requirements of codes and technical standards applicable to DG in New Zealand. Specifically:

- How they implement the latest (2016) technical assessment process in the codes (As detailed in Part 1 and 1A of Part 6); and
- How their technical standards relate to the latest Aus/NZ standards.

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3. EDB DG Policy Summary

Table 1 below summarises how well the EDBs reflect the latest codes and Aus/NZ standards. In general, EDBs accounting for the vast majority of ICPs have been faster to update their processes to reflect the latest codes and Aus/NZ standards.

It is worth noting that some of the delay in updating may be due to an expectation that the ESRs would be updated to reflect the new Aus/NZ standards soon. When the ESR's are updated the codes and the EDB processes could be simplified by removing the need for a separate process for non-compliant inverters. This is expanded upon below.

Table 1 - Approach to Codes and Standards

Approach to Codes and Standards	Count	Comment
Completely follows codes and standards	12	EDBs accounting for approximately 77% of ICPs in NZ
Some slight ambguity on code process	2	
Some slight ambguity on standards	2	
Some slight ambguity on code process and standards	3	
Not updated for latest standards	3	
Not updated for latest standards and code	5	
Total	**27**	

Further detail on each EDB approach to technical standards and codes is detailed in the separately provided spreadsheet. This includes a summary sheet and a separate details sheet. See the instructions sheet for how to select EDB's based on their standards and reveal or hide details, and the header explanation sheet.

4. History - MBIE Green Grid Initiative to Standardise SSDG Process

Since 2014 MBIE have been funding various Green Grid initiatives, including the development of updated joint Australian/New Zealand standards for installation (AS/NZS4777.1:2016) and inverters (AS/NZS4777.2:2015) for SSDG. These Aus/New Zealand standards replace the Australian-only standards (AS4777.1-2005 (Installation), AS4777.2-2005 (Inverters), and AS4777.3-2005 (Protection)[1]). They incorporated NZ specific requirements for voltage, frequency, harmonics and protection.

In 2016 these new standards were recognised in the codes. Part 6 incorporates reference to the new Aus/NZ standards as a recognised means of meeting the criteria for a simplified connection application process under Part 1A.

There was an expectation among Green Grid participants that the new standards should be gazzetted into NZ law (as an update to the ESRs as noted above). Vector makes explicit

[1] AS4777.3 protection was incorporated within AS/NZS4777.2.

reference to this expectation in their policy for SSDG (ESN4009, paragraph 3.1, updated 28 November 2016).

The expectation appears to have been that once the new Aus/NZ standards had legal standing there would be no need for a separate process (Part 1 under EIPC Part 6 rules) for non-compliant applications. However, the standards have still not been gazetted and timing is still uncertain.

5. Going Forward - Push for Updating ESRs then Develop DG Policy Template

It is clear from the survey that some EDBs have been slow to update their DG policies to fully, and clearly, reflect the new Aus/NZ standards and the updated code processes.

However, the best way forward will depend on the time table for gazetting the Aus/NZ standards. Options might include:

- Waiting till the standards are gazetted (ESRs updated), and the codes updated, so EDBs have clarity on how to approach updating their DG policies;
- Trying to develop a standard approach which is robust against whether the standards are gazetted or not, as per Vector's approach for example; or
- Pushing MBIE to get clarity on their approach to gazetting of the standards before deciding which approach to adopt.

5.1. Developing a Template for EDB DG Policies

ENA WG3 may also wish to consider development of a template for EDB DG policies to assist the smaller EDB's in updating their policy documents. If so they may wish to consider an approach that is robust against any further delays in gazetting the standards. The Vector DG policy document would form a good starting point for such a template as it is simple, clear, and robust.

5.2. Latest Standard Supports Electric Vehicle Development

One key difference between the old AS standard and the new joint Aus/NZ standard is the maximum export per phase limit of 5kW. One distributor pointed out that a secondary benefit of adopting the new standard for SSDGs would be to make it easier to plan for future electric vehicle charging development requirements. Their network analysis suggests and optimal design to support electric vehicle charging is likely to include a maximum peak draw of about 5kW also. So designing distribution grid upgrades to support the new SSDG standard is also likely to future proof the network for electric vehicle charging requirements.

5.3. Need for Separate Technical Requirements Above Standards?

A second issue to consider in adopting the new Aus/NZ standards is whether additional requirements for protection, voltage, frequency and harmonics, will be needed, on top of the new standards. Some of the EDB's that have not yet updated their technical requirements to reflect the standards include their own local requirements for voltage, frequency, protection and harmonics. It is not clear, from my initial review, whether all of these local requirements would be fully met by the latest Aus/NZ standards. Before deciding how to incorporate the

new Aus/NZ standards each EDB will need to consider whether it may still need some technical requirements above the Aus/NZ standard.

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