SUBMISSION AT A GLANCE

– OUR RECOMMENDATIONS

Unison and Centralines recognise the imperative for New Zealand in meeting decarbonisation goals with efficient use of Distributed Energy Resources. We consider it is in our companies' and our consumers' best interests to see the development of efficient, vibrant flexibility markets. We welcome the Authority's review of regulatory settings affecting the efficient deployment and utilisation of DER.

IN THIS SUBMISSION, UNISON AND CENTRALINES:

- Outline the concrete steps we are taking to prepare for widespread uptake of DER, including the importance we see of cost-reflective network pricing and other means of facilitating "value stacking" for owners and traders of DER
- Recommend that the Authority prioritise a workstream to consider whether to make higher capacity EV chargers subject to a minimum standard. We think it is important to ensure New Zealanders avoid investments in higher-capacity EV chargers that lack functionality to contribute to a low-cost flexibility resource, which will likely prove invaluable in a future grid with more intermittent renewables. We see this as the highest priority initiative as electrification of the transport fleet is expected to be the largest source of new electricity demands, with excellent prospects for becoming a low-cost flexibility resource.
- Recommend a standing Electricity Authority work stream to oversee the development of efficient arrangements for EDBs to gain access to smart meter data. Such data will be a critical enabler for LV network hosting capacity and ideally, in the longer-term, real-time network management.
- Note the Commerce Commission has on its work programme a review of Information Disclosure requirements. We recommend this consider:
  - The best way of publishing information on hosting capacity (focussed initially on the HV network to support the development of solar farms which are now economic and, in time, LV hosting, when DER uptake levels trigger the need).
  - New ways of presenting network development information so flexibility traders have visibility of network alternative opportunities
- Recommend a review of governance arrangements for developing and updating standards for the connection of DER, to ensure much more timely application of standards that can be enforced. Part 6 needs review, with more urgent focus on large scale DG connections and the pricing principles, to address rising numbers of grid-scale solar applications
- Note that hot-water load control remains an important, large scale, low-cost flexibility resource. It may be timely to review whether market and regulatory settings are adequate in maintaining and growing this resource.
- Recommend that the Authority urgently consider the desirability of mandatory Information Security Standards for connection of internet-connected DER and the control systems used by flexibility traders. As most DER is likely to be internet-connected it is essential to avoid undue cyber vulnerabilities
- Invite the Authority to gain a more in-depth understanding of the constraints and opportunities facing EDBs in using DER to address network constraints.
- Engage and collaborate with the Commerce Commission on the development of Part 4 Regulation to ensure it enables and incentivises EDBs to undertake activities necessary to support the efficient development of flexibility services.

Ref: 21/054
E 5/14

28 September 2021

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UPDATING THE REGULATORY SETTINGS FOR DISTRIBUTION NETWORKS

Opening comment

This submission represents Unison and Centralines' responses to the Authority's consultation paper on updating the regulatory settings for distribution networks. We think it is timely for the Authority to consider the policy and regulatory arrangements that are required to ensure that New Zealand can efficiently use the potential of distributed energy resources as the economy decarbonises. Renewable electricity is able to support much of New Zealand's low cost abatement opportunities, so we need to ensure that it is as affordable, secure and reliable as possible. As importantly, we also see the potential to avoid the costly mistakes experienced overseas, especially in Australia, where rapid uptake rates of DER caused by subsidy arrangements, have created real security and reliability risks or potential costly investments to relieve constraints caused by high volumes of solar injection (often with poor standards of configuration).

The Climate Change Commission has crystalised the important and necessary steps that New Zealand needs to take in contributing to global efforts to limit the consequences of climate change. As a consumer-owned EDB, Unison's key aspiration is "To Enable Communities To Prosper, By Delivering Customers' Energy Needs Through A Dynamic, Flexible And Sustainable Electricity System." Accordingly, we are in full agreement with the Authority that New Zealand needs to efficiently use DER to maximise the benefits to our consumers of the growing capabilities of new energy, digital and communications technologies.

Unison also recognises that as we build a grid comprised of more intermittent renewable electricity generation, the value of flexibility and responsiveness on the demand-side will only increase. Although the circumstances of the security of supply event on 9 August, 2021 were not necessarily analogous to what may be experienced in a more intermittent, renewable-dominated grid, it did demonstrate that DER (hot water load control) was a very useful tool in averting more adverse consequences of a supply shortfall. The event did demonstrate, however, that:

1. Information on aggregate DER resource capability and availability would be highly valuable to the TSO and (in future) DSOs;

2. Effective communication / dispatch channels are vital through the supply chain to ensure value can be realised through DER; and

3. Platforms and markets will be necessary in creating the opportunities and incentives for DER to participate in different aspects of the supply chain.

In some respects, we have time to develop optimal solutions to some potential issues (e.g., solar PV penetration is low and uptake slow) so concerns about network voltage issues and management can be addressed in a more measured fashion. We can also learn from experiences in Australia (e.g., implementation of regulatory and technical measures to provide for dynamic export constraints, where the costs of network investment to relieve constraints is cost-prohibitive). However, with an aggressive objective to decarbonise the transport fleet, there is a much higher priority in ensuring policy and regulatory arrangements are effective in promoting managed EV charging, which seem likely to provide substantial opportunities for low-cost flexibility alongside hot water load control. Indeed, given the materiality of these loads and their inherent ability to contribute to flexibility (being storage loads) there is good reason to believe that building flexibility capability focussed around these two loads will go along way towards ensuring a secure and reliable system[1].

The Authority states that feedback on the paper will help to refine and prioritise issues and options. Unison and Centralines submit that the Authority should use this process to identify and prioritise workstreams, including joint initiatives with other regulators, especially the Commerce Commission, which needs to be in a position to enable non-exempt EDBs to make any necessary investments and changes to practices in the next DPP reset. Accordingly, in the submission we focus on making suggestions about workstreams rather than engage on the relatively ad hoc and narrowly framed issues and options discussed in the consultation paper. We have contributed to the preparation of ENA and EEA's submissions, which cover in some detail responses to the Authority's specific questions.

Finally, as an overarching comment, we think that the title of the Authority's paper is mis-labelled – there are a broader set of issues that are relevant to the efficient deployment and utilisation of DER than just regulatory settings for distributors. For example, standards for consumer-owned inverters are not a "regulatory setting for distributors", (though we are impacted when these are inadequate). Similarly, consideration needs to be given over the longer-term to the market architecture and platforms that would allow DER to realise value from their contributions to different elements of security and reliability. MEPs, retailers, and distributors are all involved in the process of making available smart meter information for network planning and network management purposes in the longer term.[2]

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[1] With appropriate measures in place to address local network power quality issues (harmonics, voltage, etc).

[2] An example of wider thinking on the requirements for an overarching system to efficiently meet consumers' electricity needs can be found here: Energies | Free Full-Text | Applying the Smart Grid Architecture Model for Designing and Validating System-of-Systems in the Power and Energy Domain: A European Perspective (mdpi.com)

How Unison and Centralines see the evolving energy landscape

We take it as a given that:

1. The climate change imperative will see electricity demand growth increase as we decarbonise the transport fleet and convert some industrial process heat requirements from fossil fuels to electricity;

2. To meet the higher electricity demands New Zealand will need to build substantial quantities of new renewable generation. There is significant availability of renewable resources that can be developed at grid scale and potentially distributed at consumers' premises;

3. With higher levels of renewables, such as solar and wind, there will likely be higher levels of intermittency in generation, which will create opportunities for low marginal cost flexibility resources to efficiently balance generation fluctuations. The scale of these opportunities will depend on the overall generation mix and we understand that with New Zealand's hydro resources 70% of generation resources would remain capable of dispatch even at 100% renewables[3];

4. There will be high value in ensuring that there are strong incentives and capability of managing demand-side resources to ensure efficient provision of secure and reliable electricity. Smart EV charging is likely to offer significant potential, but we must also not neglect the significant capability of water-heating load control to manage supply-demand balances[4]; and

5. We recognise that EDBs have an important role to play in making value streams available to DER providers to enable "value stacking." This may partly be through standing pricing arrangements (e.g., tariff structures which create stable opportunities to realise value from DER management such as rewarding off-peak EV charging or peak-time battery discharge) or bespoke localised arrangements to address specific issues such as Aurora's Upper Clutha procurement of resources to manage a looming sub-transmission constraint.

However, there is significant uncertainty about the rates and timing of DER uptake, especially domestic solar-PV and batteries. There are likely to be significant regional variances. The issues that Centralines will face are likely to be different and later than Unison, which will differ again from high-growth networks such as Auckland. We note Transpower's scenarios for DER uptake in *Whakamana i te Mauri Hiko*, but how the shift to cost-reflective retail pricing will impact on incentives to make DER investments is not yet clear.[5] While the future price points of solar and batteries are expected to decline, there is uncertainty about the points at which these are economic compared to grid-scale generation and

[3] MDAG briefing to IPAG, 25 August, 2021.

[4] Storage loads are highly attractive flexibility resources because the costs of time-shifting the "recharging" of those loads are very low or zero.

[5] Government Policy is to gradually remove the Low Fixed Charge Regulations, which would see a rebalancing of residential charges between fixed and variable, so that residential variable charges are closer to the underlying price of electricity, which may impact on the rate of solar uptake (but conversely improve the benefits of purchasing an EV).

network investments, respectively. Efficient retail pricing, underpinned by efficient network and energy prices will be critical to ensuring New Zealand makes efficient investments in energy resources. [6]

How is Unison planning for a different energy future?

The guiding principles for Unison's actions to address the changing electricity landscape are to:

1. take an active watching position on trends (e.g., uptake of DER, Government policy positions, wider international landscape), and

2. to make sure we have developed capabilities with a focus on least regrets options that means we would be ready to address any scenario that develops.

We want to avoid hype and unnecessary or premature investments, particularly when technologies and business models are evolving so quickly. We also remain steadfastly focussed on ensuring that we do not take our eye off our core function which is the efficient and effective long-term management of our networks, accompanied by cost-reflective prices.

For example, with the Climate Change Commission's report identifying a desired path for EV uptake, we have modelled different scenarios of EV uptake on our networks to assess potential network constraints. This has identified that on Unison's networks by 2030 there is very modest impact on distribution transformer loadings, and this is before any incentives are applied to encourage off-peak charging. While there is more modelling to do, our analysis has indicatively revealed that in the medium term, the value that Unison can make available for flexibility value stacking through avoided network upgrades is likely to be very modest.[7]

Given uncertainty about the rate and extent of DER deployment and relative economics, we are avoiding making costly decisions that take a singular view of the future. Instead, we are making enabling investments in capability with a focus on least regrets options. For example, we are:

1. deploying low voltage monitoring technologies on a targeted basis to understand the performance of the low voltage network,
2. collecting information on the low voltage network (e.g., ensuring accurate phase information),
3. reviewing low voltage network design philosophy and standards,

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[6] We note media that indicates that Lodestone intends to spend $300m on 229MW of grid-scale solar ($1,310/kWp), whereas installed costs of domestic solar appear closer to $2,000/kWp. The average investment in networks is around $5,000-$6,000 per ICP whereas a residential-scale battery costs $15,000. Getting the right price signals to end-consumers is very important to ensure from a total system perspective the overall investment in the electricity system is optimal.

[7] What this has highlighted to us is that Sapere's macro-estimate of the value of efficient use of DER, using high-level assumptions about the benefits of avoiding new lines needs to be treated with caution. Sapere's high-level estimate implicitly makes assumptions about current capacity of networks that are not necessarily universally valid. We see the value of Sapere's work as indicating that there is potentially a sizeable prize from efficient use of DER. Benefits are modelled to accrue largely after 2030, when DER technologies are expected to be cheaper and more pervasive. We think it would be useful for further economic modelling work to develop insights at a micro level on the situations and conditions where use of flexibility resources is most efficient.

4. reviewing network connection standards and enforcement methods to ensure we avoid connection of poor quality equipment that will have an adverse effect on power quality,
5. seeking to obtain smart meter data to improve network planning information for the low voltage network,
6. developing future strategies for hot-water load control capabilities, including assessing the merits of new technologies for control and how this resource can be best maintained and utilised in different markets,
7. partnering with technology providers to incorporate more sensoring and monitoring technologies to assist in providing more real-time information on the condition and utilisation of assets,
8. seeking to identify opportunities to trial non-network alternatives (e.g., demand management),
9. considering how we can effectively communicate about future network constraints to flexibility traders; and
10. understanding the DSO capabilities, we would need to develop or procure to enable flexibility services to substitute for network services. We are currently in the process of reviewing our "DSO Readiness Roadmap", first prepared in 2019.

With recent emergence of grid-scale solar as economically attractive and a number of projects in the pipeline, Unison and Centralines have also identified that it would be useful to provide information on network hosting capacity so that investors can more readily evaluate opportunities to build solar farms adjacent to existing network infrastructure. We are also initiating a project to assess hosting capacity on our low voltage networks, but this is likely to be a less pressing issue for public disclosure given currently low rates of DER uptake. We are already required to identify and publish information on network congestion.

In addition to the steps listed above, Unison is also focussed on implementing more cost-reflective residential price structures. While we have been delayed in implementing mandatory residential time-of-use structures due to retailer system issues, this is planned from April 2022, along with the first phase of low fixed charge reform. We see the latter as the most critical aspect underpinning cost-reflective network (and retail) pricing. Centralines has been focussed on improving pricing structures for irrigation customers as this is the most pressing pricing issue facing Centralines.

We see network pricing reform as creating an enabler for retailers to develop value propositions that encourage non-time sensitive loads to be shifted away from peak times (e.g., EV charging). Concurrently we are monitoring various trials of EV charging approaches (e.g., Wellington Electricity's managed EV pricing approach) and engaging with charger manufacturers and other charging service providers to understand the technology capabilities and business models being considered to develop smart charging capabilities. Although we noted earlier that we do not forecast material levels of constraints on our networks in the medium term, we are also conscious that consumers are making long-term investment decisions that we would want to influence now to ensure capability exists to support flexibility requirements in the future (e.g., ensuring the functionality of higher capacity residential EV chargers provides for managed charging). A consumer investing thousands of dollars in a higher capacity charger will not be appreciative if we change the requirements in future rendering their investments stranded or unable to participate.

Unison has also made seeding investments in fast chargers in each of its regions and on a select number of state highways as a contribution to New Zealand's "electric highways" to remove elements of range anxiety. We no longer consider that we have a direct role to play in provision of additional public EV charging infrastructure as providers, such as ChargeNet, continue their rollouts.

Overall, we consider that the actions we are taking to prepare for the potential for higher penetration of DER is the most prudent course of action to take given the present context. We would have a very different position if we were facing circumstances such as those in Australia where there are high rates of DER uptake which are necessitating active steps to manage network congestion.

Comments on specific sections of the Consultation Paper

Section 4: Hosting capacity and access to data

In terms of scale of issue, Unison's position is that information and efficient data flows are fundamental to unlocking the future potential of DER. Unison's view is that Part 10 represents a substantial "regulatory failure" in not establishing EDBs as key stakeholders with clear interests in the functionality and data that can be provided by appropriately specified smart meters.

EDBs have access to data at the high voltage level through their own systems and can use this to inform network development plans, HV hosting capacity and manage their networks. However, there is little to no visibility of low voltage networks and access to smart meter data for planning purposes has been piecemeal for those EDBs who do not own the smart meters on their networks. In the first instance, access to regular disaggregated information from smart meters will be important for distributors in being able to pin-point localised issues and trends at a granular level. In the longer term, to unlock flexibility opportunities at the low voltage level there will need to be access to real time information on the state of low voltage networks.

In order to safely and efficiently operate networks and accommodate the connection and operation of DER, EDBs require information about the varying demand placed on its network by users (consumption/load data), and about the quality of the network service (power quality data). This information can be provided by smart meters when correctly specified, configured and integrated with communications and information management systems. However, the retailer-centric, market model settled upon by the Authority for AMI under Part 10 has resulted in this information not being available to EDBs as follows;

1. Retailers specified AMI requirements to meet their reconciliation needs only and contracted MEPs to provide this specific service.

2. MEPs are focussed on delivery of these retailer services and not motivated to incorporate requirements of distributors as key stakeholders. Accordingly, there is no solution for provision of data relating to 'quality' needed by EDB's that do not own meters.

3. Consumption data has been deemed to be Private Information (PI), and to ensure its proper management in accordance with the Privacy Act, data requests must be managed by the retailer as the consumer's designated agent. Although belatedly the Authority included in the DDA standardised terms for access to consumption data for distributors, there is industry consensus that

these terms are unworkable as they restrict data use in a manner that once obtained, data cannot be effectively used for its intended purpose of network management.

This situation means that to obtain network information in the form of usage and quality data which should all be available from smart meters, EDBs must commercially negotiate for quality data from MEPs. EDBs must separately agree bilateral terms with retailers to obtain data about demand users place on the network, noting that retailers are wary of the risks and liabilities associated with PI as well as having no commercial incentive, but rather a disincentive due to perceived risks of data being used for competitive purposes.

We are currently in the process of negotiating with MEPs and retailers to gain access to smart meter data on a regular basis. It is unclear at this point whether we will be able to reach a satisfactory commercial arrangement with retailers/MEPs for data access. Because the Code did not provide for EDBs to be a party to the original arrangements between retailers and MEPs for metering services, this means that we are now a price and service-taker with respect to smart meter data access and meter functionality. It is possible that data access will be cost-prohibitive to Unison, especially recognising that under DPP regulation, this would be new expenditure for Unison and deemed an "inefficiency" that Unison must bear costs of. While discussions continue to progress, we note initially we are seeing significant variances in prices being proposed by the MEPs, some of which would be prohibitive, so we are now considering other options.

Over the longer-term, it is not clear to us yet whether smart meter data would be the source of real-time information on network congestion as we are not parties (under the Code) to arrangements for meter services, and therefore are not in a position to influence the functionality or communications attributes of the smart meters. It may be necessary for us to ultimately install other devices to gain real-time operational information closer to customers.

Unison and Centralines' recommendation is that the Authority establish a workstream that initially actively monitors the developing arrangements for distributors' access to smart meter data. In the event that bilateral negotiations between distributors and retailers/MEPs prove ineffective at gaining access to smart meter data, Unison does not have a view on what an efficient alternative solution would be. A comprehensive process would need to be followed by the Authority to identify the options to enable EDBs timely, efficient access to data. Fundamental reform of Part 10 may be required.

Over the medium term, once access to data has been secured, the Authority could then turn its mind to overseeing how that data is turned into standardised information on network hosting capacity. In the longer term the Authority could be involved in overseeing the potential development of arrangements for smart meters to provide real-time operational data.

We agree with the Authority that hosting capacity will need to be available to support efficient DER uptake on an equal access basis. We think it will be useful to map out the types of information that will be required and when. In the short-term hosting capacity information to support grid-scale solar investment evaluations is likely to be most useful. The costs of putting together this information are not provided for under DPP3 revenue allowances, so cost recovery for this service would need to be considered. We note hosting capacity information on low voltage networks cannot be made available until EDBs have access to comprehensive smart meter data and may not be necessary until we see much higher rates of rooftop solar.

We note the Authority's comment at para: "flexibility traders face an uneven playing field where distributors do have congestion data and they do not." (para 4.17). We note that EDBs currently prepare and disclose Asset Management Plans which contain information on network development plans which identify future constraints and the potential costs of solutions. We suggest that as part of the Commerce Commission's Information Disclosure Review, this aspect of the disclosures is reviewed to evaluate options to provide more standardised information at a sufficient level of detail to enable potential flexibility traders or DER providers to offer potential solutions. Public disclosure of hosting capacity should also be considered as part of this review.

Section 5: Electricity Supply Standards

Unison regards minimum standards for the connection of DER as fundamental to effectively functioning flexibility markets. It is clear from the actions being taken in Australia to address rising levels of solar export constraints that clear, mandatory, enforceable up-front standards for the connection of DER can play a critical role in ensuring the electricity system remains secure and reliable. While we recognise that standards can carry the risk of locking in solutions, this needs to be balanced against the risks that diversity of DER supply characteristics means that it becomes extremely difficult to manage those resources, if at all.

The key issues that Unison and Centralines submits that the Authority should urgently consider are as follows:

1. Whether minimum standards for higher capacity EV charges should be mandated. It is not clear to us that the current voluntary standard for EV chargers would be adequate in building a low-cost flexibility resource. As noted earlier in this submission, the transport decarbonisation drive will see large scale uptake of EVs. Because of the nature of the storage load and flexibility in timeframes for charging there appears to be significant scope to not only avoid network upgrades by avoiding peak-time charging, but also to build a flexibility resource that can contribute to system stability (such as currently provided by hot-water load control).

   We note the Authority's statement at para 5.56 "Intervention could also include starting to lay foundations for standards to be mandated in the future if they are needed. For example, signalling to EV owners that they may be required to have smart chargers if the network becomes congested in future". If a consumer is investing thousands of dollars to install a high capacity charger now, it would be unreasonable to retrospectively require that consumer to replace it with a smart charger with particular control functionalities. It would seem more prudent to establish minimum standards now, particularly if the incremental costs of smart capability are modest.

   Unison and Centralines submit that the Authority should establish a workstream that considers the most appropriate market and regulatory approach that creates an optimal EV charging resource. Our concern is that if we do not act with urgency in establishing appropriate mechanisms, then every EV charger investment by a consumer may represent a missed opportunity to build resource flexibility, especially as consumers may be incentivised to purchase chargers that are cheap and lack functional capabilities necessary to participate in flexibility

markets.

Given the relatively predictable uptake of EVs, New Zealand has time to develop a fit for purpose framework through stakeholder engagement, trials, learning from other jurisdictions, standards development, and contract development, platform architecture and market development supported by appropriate regulation. A planned, but flexible approach to developing an integrated framework is needed. A first step could be mandating EV chargers have some ability to communicate via the internet and to allow the user to enable control of the rate of charging. Development of contracts, architecture, roles and markets (as raised in sections 6 and 7 of the Consultation Paper) will be of little value if EV charging points have been installed in a way that means they cannot be flexible DER. These aspects of the ecosystem can follow in logical steps in response to continuingly evolving technology and business models

Mandatory minimum standards for functionality and communications protocols may be in the overall public interest, but other factors such as mass-education campaigns, data collection in the register and other factors identified in Wellington Electricity's EV Connect research should be considered. Wellington Electricity's EV Connect study was an excellent start to developing a roadmap for a set of efficient arrangements for EV charging, which we think the Authority needs to continue to develop as the industry regulator.

2. We were somewhat surprised that the consultation paper does not discuss establishing minimum information security standards and protocols for the connection of controllable DER and for participants in flexibility markets to adhere to. If DER is to become an essential part of delivering secure and reliable supplies, those devices and control systems must reach the highest standards of protection from malicious cyber actors. While contracts with flexibility traders are likely to require particular standards are met, with penalties for failures to perform, there may be benefit in mandating a common set of information security standards to ensure national consistency.

   While EDB's control systems are separate from the internet, it seems very likely that most DER will be internet-connected, which increases the magnitude of risk to the grid substantially. Given the known, significant threat posed by cyber criminals, we think it should be high priority for the Authority or appropriate agency to review information security standards and protocols to ensure devices and systems are not rolled out that would present a future vulnerability. Beyond standards, it would also be appropriate to consider whether:

   a. Market participants that have the scale to potentially impact on security of supply should be required to meet a particular level of Information Security maturity? For example, suppose a flexibility trader with 200MW of battery storage lost control to a malicious actor. That 200 MW could turn from being a generator at the system peak to a 200MW additional load;

   b. There should be obligations on DER manufacturers/providers that are internet connected/controllable to face ongoing obligations to ensure their devices do not become a threat to security of supply? For example, suppose a particular brand of inverter became a

dominant market model. From a security of supply perspective, New Zealand would want to ensure that those inverters are patched on a timely basis if any vulnerabilities materialised.

Overall, we submit that a workstream should be established that develops an optimum framework for the timely development and updating of standards. As the non-timely progress in incorporating AS/NZS 4777.2 2015 into the Electricity Safety Regulations demonstrates, current processes are not satisfactory.

We also strongly concur with the ENA's recommendation that Part 6 of the Code be reviewed, especially the process for dealing with large scale applications and pricing principles. The simple "incremental cost" rule is unlikely to generate efficient outcomes in situations where "first mover disadvantage" issues arise.

Section 6: Market settings for equal access

Section six focusses on potential issues that may be created if EDBs are ineffective in procuring flexibility resources to avoid or defer network investments, over-reach in locking up flexibility resources for network management purposes when they could be used for other market services, or otherwise take actions that favour their own DER resources.

As a general observation, we note that the issues raised are at a theoretical level, and do not acknowledge practical issues, constraints and drivers that impact on EDB's incentives to harness flexibility services. Our overarching response is that, as an industry we need to learn how to walk before we can run. As noted elsewhere in this submission there are precursor developments that need to occur before flexibility markets get off the ground substantively. In short, we don't think it would be reasonable for the Authority to take the view that the lack of flexibility services represents an inherent unwillingness of EDBs to use such services. Later in this submission we address the current limitations of the DPP3 arrangements in supporting EDBs to make enabling investments in building capability and platforms for use of flexibility services (DPP3 essentially treats such activities as an inefficiency).

The reality of the current situation is that there are only 37,000 solar systems, diffusely distributed around New Zealand, far fewer battery installations, limited visibility of low voltage networks (which EDBs are proactively addressing through various means), relatively few EVs and even fewer higher capacity residential chargers (compared to 1.8 kW three-pin plug-based chargers) and we already are well served by hot-water load control capability, even if it is relatively coarse in its application and there are opportunities to enhance its use.

Additionally, at the low voltage level if there is a need to expand network capacity, a distribution transformer upgrade from 100kVa to 200kVa would cost around $20,000, whereas a distributed battery of 5-7 kW costs $15,000 installed. So comparative economics would suggest network solutions are often very cheap compared with some DER resources. This has been reinforced by Sapere's analysis which suggests that it will not be until after 2030 that the benefits of DER-based flexibility services will start to substantively accrue. We think it is therefore unsurprising that under current conditions there are not widespread flexibility solutions to network capacity issues.

From Unison and Centralines' perspective, we fully expect that in time, as EV penetration rises, with larger EV batteries, flexibility services will become very valuable. We anticipate that larger capacity chargers will drive the potential for increases in peak demands and it will be necessary and cheapest to

manage those peaks with flexibility resources, including through management of the EV chargers themselves. Given the substantial network replacement programme that we have over the next decade, to the extent that we can avoid capacity upgrades through third-party provision of flexibility services this would be highly attractive to Unison, but we will need to build the capability to procure and call on those services when required through some form of DSO, with high levels of network visibility. From our perspective, a competitive and vibrant market for flexibility resources would be highly attractive and we would not want to take steps that deter flexibility traders from offering services to Unison or Centralines, or create undue barriers.

Unison and Centralines would also note that we do not consider that we are technology averse in using a non-traditional solution to a network constraint. EDBs universally see the value of hot-water load control as an efficient non-network solution and are well-versed in deployment of new technologies to address issues. Examples include:

1. Fast-transfer schemes to address contingent events rather than upgrade substation capacity;

2. Dynamic line ratings using analytics to defer or avoid network line and cable upgrades;

3. Real-time condition monitoring of critical network assets; and

4. Self-healing networks.

However, we do consider that trials (both commercially and technically) would be invaluable in supporting the development of flexibility services. For non-exempt EDBs, there is no ability to recover the costs of trials (under DPP regulation they are deemed an inefficiency, that the EDB must bear costs of) and in our experience the DPP3 innovation incentive allowance is small and not worth incurring the administrative burden. Below we make some suggestions on areas where Part 4 regulation of EDBs needs to evolve to support the integration of flexibility services as part of EDBs solution toolkit.

Overall, we look forward to reviewing non-EDB's submissions on market access issues to understand the real-world experience of flexibility providers/traders as this will assist us as we consider the steps we need to take to effectively procure flexibility services.

Section 7: Operating Agreements

The Authority raises as a possible issue that transaction costs associated with negotiating flexibility services and/or unequal bargaining power will limit market attractiveness for flexibility traders. As with our closing comment on section 6, we look forward to reviewing submissions from potential flexibility providers on the value of standardised arrangements and the priority they would see with this aspect. Given all the other issues that would need to be addressed in developing flexibility arrangements, intuitively it would seem that this would be a lower priority issue to address. It is also unclear how an effective set of standardised terms would be developed given the nascent nature of flexibility services.

From Unison and Centralines' perspective, we recognise that flexibility services will likely be capable of providing our consumer-owners with material benefits. We are incentivised to see these services develop, and in that respect, we do not see how procurement of a flexibility service would differ from

procurement of any other service. If we took an unreasonable and unrealistic position in negotiating with flexibility traders then the market will not develop.

In the longer term, we have no doubt that some matters will become contentious. As we noted in our comments on section five, it will be essential that significant flexibility providers who use the internet to control DER adhere to the highest standards of information security. Associated with this will be the need to establish efficient liability arrangements in the event of a failure and ensuring that sufficient financial capability or insurance exists to cover damages from any service failure.

Section 8: Do EDBs have the capacity and capability to meet the requirements of a new energy future?

Unison and Centralines are unable to comment on how other EDBs are preparing, but we are comfortable that we have the capacity and capability to meet the challenges of a more complex energy environment. In Centralines' case, through the Management Services Arrangement with Unison it accesses Unison's specialist expertise that it would be unable to afford to maintain in its own right. This includes specialist expertise in:

- Asset Management, through the capability that Unison has built in gaining ISO55001 certification;
- Network Development, through robust load forecasting and the development/implementation of non-network solutions;
- Information Security Management, which will become even more critical in a more digital environment with the connection of managed DER;
- Network Operations through Unison's Advanced Distribution Management System and 24/7 operational control;
- Knowledge management through Unison's comprehensive suite of policies, standards, and procedures.

We would expect that other EDBs with more limited resources and budgets would access similar expertise through outsource agreements and collaborate with other EDBs to achieve necessary service levels or capability (e.g., we understand the eleven South Island EDBs are collaborating on development of a DSO roadmap and capability development). DER uptake in smaller EDBs with high levels of rural population are also likely to see slower rates, so it may well be most prudent for those EDBs to adopt a slower path towards building capability to utilise DER for network purposes. In our view, the EA should recognise that not all EDBs need to move at the same pace.

As there is an understandable reluctance on communities to give up ownership of their local EDBs and any forced consolidation is unlikely to be politically attractive, we think any focus on the relatively small scale of some EDBs should be on managing the impacts on the rest of the market. For example, standardising the DDA has reduced the transaction costs for retailers of gaining agreement with EDBs to trade on their networks (though it seems ironic that the EA declined to codify an agreed industry position around data access, which would have reduced transactions costs). There may be other opportunities

for standardisation to lower transaction costs, such as through the ENA's initiative to assess EDB's DG application processes for consistency, which will create an opportunity to standardise processes for the wider benefit of national DER providers. The ENA plays an active role in supporting collaboration between Members and these processes could be extended further.

One area we strongly counsel against is the potential extension of DPP regulation to currently exempt consumer-owned EDBs. It is entirely unclear what problem extending such regulation to exempt EDBs would solve with respect to the development of flexibility markets. Economic regulation is intended to address the problem that an unregulated monopoly may charge its consumers an excessive amount and/or deliver an inefficient level of quality. But these problems are also addressed when consumers are the owners – you can't "rip yourself off" and there is no incentive on such businesses to deliver a poor quality service to their owners. The Central Hawke's Bay Consumers Power Trust has recently changed its Trust Deed to gain exempt status because it found that DPP/CPP regulation works extremely poorly for smaller EDBs, creating perverse outcomes in terms of undue swings in prices, inability to recognise lumpy capital expenditures within DPP allowances and otherwise costly compliance costs that have had to be borne by Centralines' 9000 consumers.

Even restricting any Part 4 extension to the reliability regime would likely create consumer-disbenefits as the Commission's approaches do not readily apply in small networks which tend to be more vulnerable to natural fluctuations in reliability performance. Even if the Commission were to find fault with network management, because the consequence is pecuniary penalties it is the consumers that would ultimately fund the penalties through lower dividends. This would be counter-productive. Overall, we submit that the application of economic regulation to consumer-owned EDBs is unrelated to the integration of flexibility services in EDB's toolkits. If there are issues to be addressed, then other regulatory tools would be better suited to address issues directly.

Other recommendations:

Ensure Part 4 Regulation supports EDB's capability development to enable procurement of flexibility services; ensure appropriate regulatory treatment of procurement of flexibility

The Authority notes that, where relevant, it will make recommendations to other regulatory agencies to ensure that there is efficient utilisation of DER. Unison and Centralines submit that there needs to be very clear alignment between the Commission's regulation under Part 4 and any outcomes from the Authority's initiatives. In particular, we note that DPP Regulation of EDBs is focussed purely on the provision of the conveyance service. Key elements of the DPP3 reset were:

- Operating expenditure allowances that were backwards looking and provide only for new expenditures relating to growth in customer numbers or delivered energy;

- Capital expenditures that reflect EDBs' 2019 AMPs. Only to the extent that EDBs had identified capital expenditure programmes associated with new energy requirements would these be reflected in current revenue allowances – this is uneven across EDBs and only allows for capex, not opex;

- A token allowance for innovation expenditure, with restrictive and costly application processes. Unison initially considered making an application for one of its innovation projects, but the ultimately decided not to apply due to the administrative cost to benefit ratio being unattractive;

- Incremental rolling incentive schemes that are intended to ensure neutral incentives to invest in capital or operating expenditure, but it is unproven that these incentives are in fact equal. The mechanisms are so complex that it is doubtful that they create the intended incentives. It is also unclear under what conditions the intended neutrality is actually achieved; and

- No new allowances for any expenditures associated with enabling platforms, data access etc needed to develop flexibility services.

The practical effect of the DPP arrangements is that non-exempt EDBs are not presently incentivised or compensated for making the enabling investments in systems and capability to procure flexibility services, nor to invest in trials and tests of different flexibility service arrangements and models. Reopener arrangements to address changing circumstances are limited.

Under the DPP3 arrangements, if Unison were to incur operating expenditures to facilitate the development of flexibility services provided by third parties this would be treated as an inefficiency, and a cost to be borne by Unison and its consumers. There is also uncertainty about how we would be compensated for purchasing flexibility services as this would likely be treated as opex. At the moment, we can include in our asset management plan provision for capital investments in network solutions, which would then be compensated with a revenue allowance. But if we were to anticipate that future constraints would be most efficiently addressed with a flexibility solution, no revenue allowance would be forthcoming to cover the procurement cost because opex allowances are backwards-looking. This is not necessarily an issue for DPP3, as our 2019 AMP did not anticipate flexibility services would be used during the DPP3 period, but may become an issue for DPP4 and beyond.

It will be essential for the Authority and Commission to work collaboratively to ensure that any new or amended Code arrangements are reflected appropriately in regulatory allowances for EDBs under Part 4. It will also be critical for the Authority to engage with the Commission's IM Review to ensure that at the DPP4 reset, the Commission is in a position to incorporate the requirements for EDB's to integrate flexibility services within network management.

In our comments about how we are approaching the new energy environment, we listed above a number of actions that Unison is undertaking to prepare for a new electricity future with higher levels of DER. It should be noted that we undertake such activities because it is the right thing to do for our consumer-owners, not because the Part 4 environment incentivises or compensates Unison for these activities. We submit that this is not a sustainable approach.

Hot-water load control remains a valuable flexibility resource

While it may be tempting to focus on new sources of flexibility such as EV charging and residential batteries, hot water load control will remain a large scale, low-cost flexibility resource. It is currently

quite coarse in its configuration, but technology opportunities exist to enable more granular control and to consider arrangements for how it could be used in a wider set of markets more effectively.

Ownership of hot water relays is for the most part aligned with meter ownership. We are concerned that retailers and MEPs are not incentivised to ensure effective maintenance and integrity of these systems and the associated information needed to provide visibility of them. Consequently, for the most part this valuable resource appears to be steadily degrading.

- There is no quantification of Hot Water DER load and no visibility of its availability in real time. Each distributor is making its own decisions regarding the use of HW DER flexibility which is used for transmission cost management, distribution constraint management, provision of reserves, or not at all. These may on their own be efficient decisions in the face of issues faced by each distributor, however as there is no visibility of this resource there may be opportunities to use it more efficiently in the wider electricity system.

- The consequences of this lack of visibility and associated inefficient outcomes were starkly highlighted by the recent Grid Emergency where resulting outages to consumers could in all likelihood have been avoided had available HW DER been coordinated and efficiently used.

- Despite significant savings for residential consumers for installing controllable hot water, new residences on our network are rarely configured with controlled hot water, leading to higher costs for these home-owners over the long-term. Retailers' drive for the cheapest meter configuration seems to trump the interests of end-consumers in lower cost electricity.

Given that hot-water load control is already a nationally significant flexibility resource, we think that the Authority should consider a workstream to review current arrangements to ensure its value can be retained and maximised. Unison's working hypothesis is that had all hot-water load control been used effectively on 9 August, 2021 New Zealand would likely have avoided any disruption to consumers. Given the tight outlook for the supply-demand balance over the next few years, there may be a significant short-term security of supply benefit that could arise from such review.

Closing comment

We hope you find the comments in this submission useful in identifying the issues that need to be prioritised in the Authority's work programme. It will be important that there is a shared understanding between the Authority and industry on how flexibility markets are to develop. We would be happy to elaborate on any of the matters discussed in this submission.

In reading the consultation paper we were concerned that the Authority has gained an impression that EDBs are not taking active steps to support the development of flexibility services and incorporate them into their toolkits to address network capacity issues. The assertions of how EDBs might behave seemed to be based more on textbook theories.

We found quite a difference in the conversations at the Authority's workshop with EDBs and thought this format was useful in assisting Authority staff to understand the practical issues and steps we are taking

to facilitate efficient use of DER, as well as a better impression of the issues we are facing in gaining access to smart meter data. We think it would be helpful for the Authority to gain a much more detailed understanding of how network businesses operate, including how we make asset investment decisions and the factors that impact on the solutions that we deploy. We would be happy to participate in further workshops with the Authority or host Authority staff to assist in developing understanding of distribution networks. We think this will be important in ensuring the Authority has a well-formed understanding of the issues involved in EDBs utilising flexibility services.

Kind regards,

Nathan Strong
GENERAL MANAGER COMMERCIAL