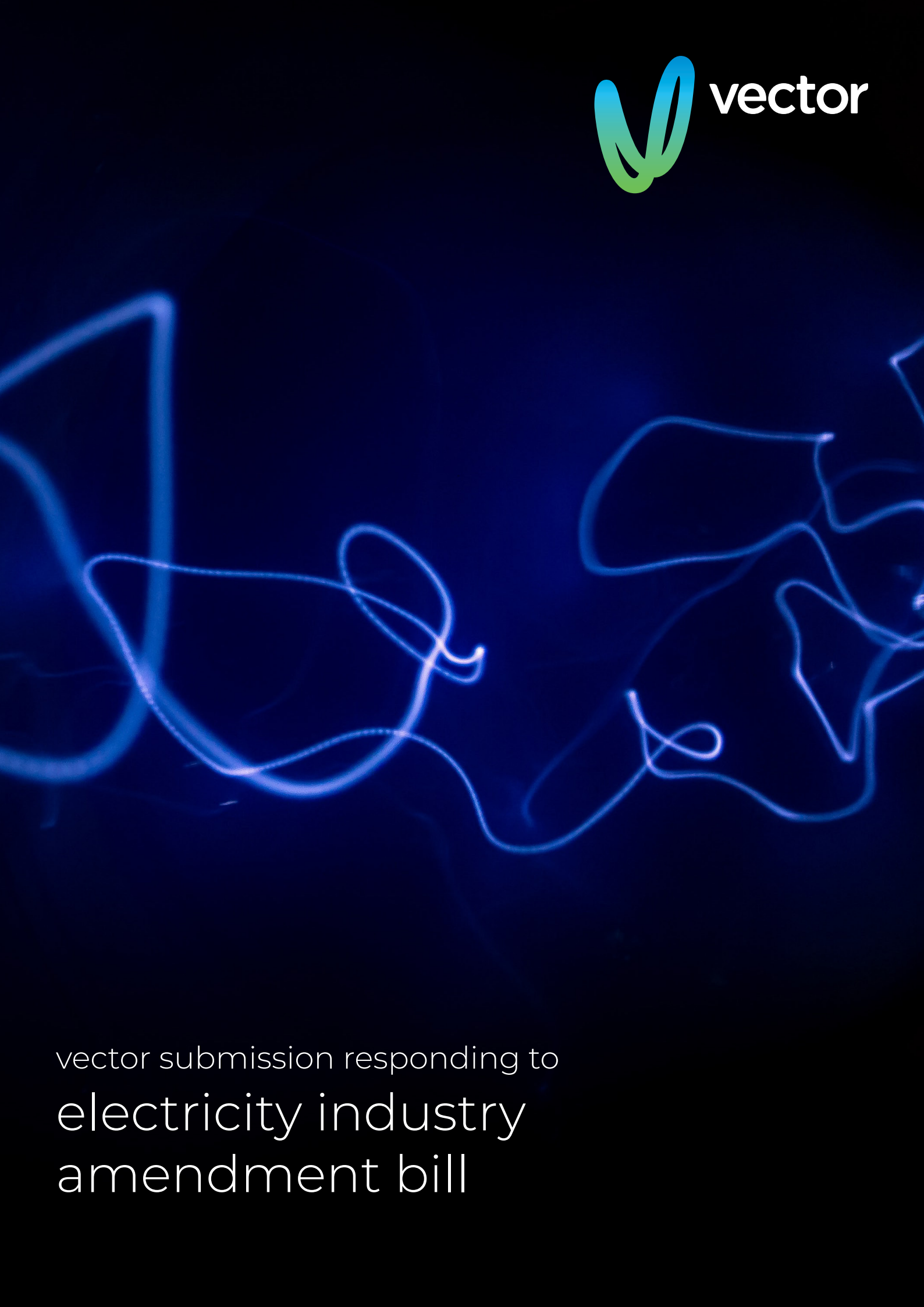

vector submission responding to

electricity industry amendment bill

executive summary

Accelerating digitalisation to maximise whole-systems value, and, ensuring that networks are equipped to continue delivering affordable and reliable electricity supply in the context of decarbonisation, requires our market design to enable, rather than inhibit, the integration of cross cutting technologies. These are technologies which 'blur the traditional boundaries' between regulated segments of the market, delivering value for more than one part of the supply chain. As described by Laura Sandys CBE, Chair of the UK Digitalisation Taskforce, these 'blended assets' have a crucial role supporting the transformation of our electricity system from a commodity based to a service-based model[1].

These solutions include Vector's Utility Battery Energy Storage Systems (BESS), which is described at the beginning of Part 1: *Network involvement with emerging technologies,* as well as digital platforms which are described in section *1.4 The impact of electrification will be concentrated on the network* on pages 7 and 8 in this submission.

Accelerating the integration of such cross-cutting solutions is important because modelling of peak demand out to 2050 shows that new demand (modelled using the Climate Change Commission's pathway) could potentially double network capacity requirements if demand is not managed. However, smart EV charging, dynamically managed through a digital platform such as DERMs, is modelled as reducing this peak growth by as much as 60% - avoiding significant consumer cost.

Driving the integration of this enabling technology requires us to accelerate platforms that will unlock new markets and consumer value – rather than to entrench traditional market silos.

However, the explanatory note in the Bill appears to be targeted towards the opposite by seeking to limit the involvements of monopoly participants in 'emerging markets related to distributed energy resources' and 'technologies which increasingly blur the traditional boundaries of these markets'.

It is not clear what the scope or nature of the future regulatory rules that govern the relationships between networks and emerging technologies will be – however, by transferring provisions out of primary legislation and leaving industry with no visibility of the rules that could emerge in their place, the Electricity Industry Amendment Bill (EIAB) creates uncertainty for networks at a time when greater network investment in these solutions is required urgently.

We have included as Annex One drafting which can deliver more certainty to network businesses to avoid the perverse outcome of cooling the market for new and innovative energy solutions which are critical for affordable electrification and better consumer outcomes. It is imperative that regulations support much needed investments in our emerging flexibility market and avoid eroding investment confidence at this early juncture.

[1] *ReCosting Energy: Powering for the Future. Laura Sandys CBE and Thomas Pownall. https://blob-static.vector.co.nz/blob/vector/media/vector-regulatory-disclosures/annex-1-recosting-energy.pdf;*

1. part 1: network involvement with emerging technologies

1.1 Our electricity market is on the cusp of transformation. This is an opportunity for consumers – but unlocking it requires change from our regulation

Case study: Utility Battery Energy Storage Systems (BESS)

The Utility Battery Energy Storage Systems (BESS) installed in Vector's network are designed to perform multiple functions applicable to the entire electricity system. The BESS installed at zone substations perform peak shaving (supporting long term affordability) and voltage control functions and assist with resolving the sub-transmission network security deficiencies (supporting reliability).

The BESS installed at remote ends of the 11 kV network improve the feeders' reliability and voltage quality. They are also able to supply electricity to customers during outages by forming microgrids – increasing community resilience.

Vector considers BESS within a suite of options when deciding on capital investment solutions to enhance the electricity network's resilience, quality of supply or network capacity expansion. BESS are installed where it is determined to be a more economical solution to address network capacity expansion than traditional primary systems investments, or, to defer investment in primary systems. All currently operational BESS are of modular and scalable construction that can be relocated within the network. The BESS can be repurposed or relocated once the functions they perform at the installed location are no longer needed.

We have a total of six operational BESS with one BESS currently under construction. Our first 1 MW/2.3 MWh BESS at Glen Innes zone substation has now been in service since October 2016 and is being used to reduce peak demand and defer network capacity investment. Our second and third BESS were commissioned at Warkworth South and Snells Beach zone substations in 2018 and have successfully assisted in deferring network capacity expansion investment. The BESS at Kawakawa Bay and at Hobsonville Point were commissioned in February 2020 and November 2020 respectively. The BESS at Kawakawa Bay is installed at the end of a long rural feeder to improve voltage quality and feeder reliability. It also enables a segment of the feeder supplying Kawakawa Bay customers to operate as a microgrid.

These types of solutions are an exciting opportunity to deliver greater affordability, reliability, and resilience to communities. The question Government ought to be asking is: *'How can we ensure that the settings and conditions are in place to* ***accelerate*** *the integration of these solutions?'*, rather than, *'How can we try and squeeze a new technological future into 1990s market design?'*.

Image of BESS

The EIAB and its unprecedented transference of provisions designed for primary legislation to the ambit of market regulation, demonstrates that the drivers of decarbonisation and digitalisation are

already bending our traditional regulatory market design out of shape. In response we ought to look to the future in considering our policy and regulatory architecture – rather than the past – to create a market where innovation and new sources of competition and consumer value are unlocked.

This requires us to regulate for outcomes not process, and to provide the policy guidance and direction to ensure that regulation aligns with the goals of policy. The alternative would result in policy outcomes being thwarted by regulation.

We appreciate the opportunity to present to Select Committee – and we look forward to engaging with government further to seek ways to enable new flexibility markets to flourish, driving competition, affordability, and reliability. This requires us to look ahead with urgency – rather than attempt to preserve the regulatory market design of the past.

1.2 Digitalisation and decarbonisation are drivers which are challenging our siloed market design

1.2.1 Digitalisation can unlock consumer value across the whole supply chain

Accelerated affordable and renewable electrification will require radical coordination through our electricity supply chain. For example, the coordination offered by dynamic management of EV charging can align new demand to the availability of cheaper and renewable generation and to network capacity – without a consumer noticing. Whole system optimisation will be critical for our transition to renewable and affordable electrification, and, it supports the strategic goal which will sit at the heart of our national energy strategy – to strengthen the coordination between supply and demand. Our future electricity system will be more complex, requiring us to balance greater demand with more intermittent renewable supply as well as affordability with new infrastructure costs. Executing this transition affordably and reliably requires coordination through the system like our market has not seen before – and this is enabled by digitalisation.

Digitalisation offers cross-cutting value for the whole electricity system by coordinating the different parts of it. Rather than just drive optimisation for one part of the value stack, in this way it can optimise the whole system. The difference in the value of assets when their impact is understood across the whole system, as compared to when this is assessed for a single part of industry (or market segment) is striking. Our siloed, regulatory market is based on the latter – yet it is the former that shows up in a consumers' electricity bill. For example, under the traditional, levelized cost of energy metric (which only accounts for the capital and running costs of an asset) a residential smart EV charger (which is dynamically managed by a digital platform) is understood as **costing** $12NZD per MWh of energy produced. However, when accounting for the whole systems impacts (which includes displaced generation costs, system balancing and avoided network costs) it is understood as **adding value** of $174NZD per MWh of energy produced. The Whole-Energy System Cost metric (WESC) – which was designed by Frontier Economics for the UK Department of Business Energy and Industrial Strategy (BEIS)[2] to capture wider system impacts when assessing the value of different assets – reveals how far from the true consumer cost and value the signals of our siloed, regulatory market can be (in the case of a residential smart charger this difference is $186NZD per MWh of energy produced).

[2] *https://www.weforum.org/agenda/2021/07/a-new-way-to-cost-the-energy-transition/;*

Understanding the true consumer cost or value of assets requires us to look across the whole electricity system. When we do, it is clear digitally enabled demand-side and distributed solutions add significant value to consumers.

Yet market segmentation risks inhibiting their uptake relative to their consumer value. This is risking:

- restricting networks' ability to invest in digital technologies as they cut across traditional market boundaries (despite networks' natural and unique incentive and regulatory imperative to ensure consumer reliability and affordability);
- distorting market signals that would otherwise drive their uptake by hiding their true value to consumers through market segmentation – which by design, incentivises industry to maximise value in their own part of the supply chain.

As highlighted in the World Economic Forum article on the WESC:

"We are missing a big trick when it comes to how we decarbonise our energy system. We are trying to squeeze a capital-intensive set of renewable technologies into market and value arrangements, all of which are designed around a commodity-based fossil fuel past. Until we recognise that the decarbonised system has very different characteristics, a different cost base and new and varied value streams, we will end up paying for an inefficient, under-optimised, much slower and less fair transformation".

– LAURA SANDYS CBE, CHAIR OF THE UK DIGITALISATION TASKFORCE, NON EXECUTIVE DIRECTOR AT ENERGY SYSTEMS CATAPULT AND DIRECTOR OF CHALLENGING IDEAS THINK TANK

1.2.2 Decarbonisation requires a step change in our electricity infrastructure for continued reliability and affordability

The Climate Change Commission's demonstration pathway includes 46% of New Zealand's light vehicle travel and 36% of the light vehicle fleet being electric by 2035. This is in addition to the imperative to decarbonise industrial process heat. These shifts will increase demand for electricity significantly and quickly.

At the same time, New Zealand will increase its reliance on more intermittent renewable sources of generation, and the integration of exporting technologies which enable bi-directional flows of power (vehicle to grid technologies, and solar and battery solutions). Managing this new demand, volatility and complexity will be critical for affordability and reliability – and in turn, for consumer confidence in a just transition.

Enabling the electricity system growth and change which can deliver this is about executing a step change in our electricity infrastructure. Just as the roll-out of regional Ultra-Fast Broadband (UFB) ensured enabling infrastructure was in place for economy wide digital transformation and resilience, there is an opportunity to drive a step change in enabling infrastructure for the convergence of our transport and electricity sectors. This is by ensuring that the platforms are in place to manage new complexity and demand.

1.3 Responding to these drivers calls for a new market design

"As important as 'how' we regulate, is 'what' we regulate. It is an opportunity – maybe a necessity – to redesign the market to reflect new dynamics and introduce new price, service and innovation pressures that other sectors experience... The current prescriptive regulatory model will not be able to survive in the multi-vector, multi-product world of the future, managing both sides of the meter. It will face enormous pressure to 'catch up' with innovations through derogations, will become increasingly confused if it aims to process regulate the multiple interactions, and find itself behind the curve in identifying bad behaviour"

– REDESIGNING REGULATION, CHALLENGING IDEAS

1.3.1 The transformation of our electricity system for decarbonisation requires us to accelerate the integration of cross-cutting technologies

Accelerating digitalisation to maximise whole-systems value, and, ensuring that networks are equipped to continue delivering affordable and reliable electricity supply in the context of decarbonisation, requires our market design to enable, rather than inhibit, the integration of cross cutting technologies.

The explanatory note in the Bill appears to be targeted towards the opposite by seeking to limit the involvements of monopoly participants in 'emerging markets related to distributed energy resources' and 'technologies which increasingly blur the traditional boundaries of these markets'.

It is not clear what the scope or nature of the future regulatory rules that govern the relationships between networks and emerging technologies will be – however, by transferring provisions out of primary legislation and leaving industry with no visibility of the rules that could emerge in their place, the EIAB creates uncertainty for networks at a time when greater network investment in these solutions is required urgently.

The EIAB as it stands risks discouraging networks from making investments in cross-cutting platforms which could enable:

- More distributed and solar battery systems to connect to the network;
- New flexibility markets and services to emerge where they wouldn't have otherwise; and,
- The truly competitive and disruptive potential of digitalisation to re calibrate our market and drive consumer value.

Restricting market participants' involvement in emerging technologies by applying traditional market boundaries to cross-cutting technologies risks locking in a commodity-based supply chain which would minimise the prospect of competition to incumbents from new data based and digital market actors and services.

Ensuring that new regulation enables the acceleration of technology integration and the emergence of new flexibility markets requires certainty for network businesses that the solutions they invest in today will be able to operate tomorrow.

1.3.2 Artificial market segmentation and regulatory uncertainty will slow down the integration of cross-cutting technologies

The approach of artificial market segmentation was implemented in the 1990s independently of the drivers of digitalisation and decarbonisation and sought to maximise competition in the competitive segments of the supply chain (generation and retail) while holding the monopoly segments (distribution and transmission) to account. Key provisions to operationalise this approach (which is nearly a quarter of a century old) are in Part 3 of the Electricity Industry Act (or, then, the Electricity Industry Reform Act - EIRA). These provisions are now at the centre of the EIAB.

These provisions reflect the goal of optimising value within each segment of the supply chain separately, rather than optimising the system as whole, reflecting a 1990s view of the technological landscape as one dominated by traditional steady state assets. However, in the context of 21st century technologies – which deliver value across the supply chain, rather than in silos – the approach of artificial market segmentation will work against the goals of competition, affordability, and reliability. This will in turn inhibit affordable electrification which is required for decarbonisation. We appreciate the Bill's purpose to "provide more regulatory agility to promote competition in evolving contestable markets" in response to this new technological environment. The nature of this response, however, will be critical.

1.3.3 There is a need for guidelines to ensure that the changes in the Electricity Industry Amendment Bill do not have the distortionary effect of slowing down the integration of emerging technologies and flexibility markets

Our concern with the EIAB as it currently stands is that it delegates to the Electricity Authority (the Authority) the power to determine matters that have historically, for good reason, been the province of primary legislation, and it does so without providing any guidance to the Authority regarding the manner in which that power should be exercised, or the matters to which the Authority should have regard. In the absence of this guidance, the risk is that regulatory path dependency carries forward the historic regulatory approach of artificial market segmentation, and, that uncertainty deters needed investments in cross-cutting solutions – including batteries (such as the BESS described above) and digital platforms (which will be described further).

Whilst monopoly regulation seeks to replicate competitive pressures as they were understood in the 1990s, imposing artificial market segmentation in the context of cross-cutting technologies risks having the distortionary effect of inhibiting the competitive and disruptive potential offered by digital transformation. The cost of this risk would be significant – and would be borne by consumers.

Part 3 (EIRA, as it was then) was the product of an extensive policy process, as a consequence of which Parliament determined that the risks to competition from allowing natural monopoly lines companies to operate vertically integrated generation and retail businesses were so substantial that the best approach was to require separation of those elements of the supply chain entirely. EIRA was passed as part of a comprehensive intervention in the structure of the industry, including divestments and structural separation of previously vertically integrated businesses.

Mandating separation has always been a significant intrusion on commercial freedom and private property rights, which is why in the past it has always been a matter for primary legislation. The most significant examples in the utilities sector in New Zealand are EIRA and the operational and then structural separation of Telecom. Both involved primary legislation given the nature of the intervention.

The Electricity Price Review explicitly recognised that this was an intrusive proposal, observing that "regulatory decisions about distributors' involvement in distributed energy services could have significant implications for commercial freedom and investments by distributors and others".[3] The Panel therefore recommended that, if this power was to be conferred on the Authority, it should be made subject to merits appeal to safeguard the rights of market participants.

We agree that merits appeal would be an appropriate safeguard. But moreover, if a power to essentially determine the structure of the industry and the permitted activities of market participants is to be delegated to the Authority then, at a minimum, we would reasonably expect that the legislation clearly articulates:

a. the power that has been granted to the Authority and the purpose for which it must be exercised; and

b. the considerations that the Authority must take into account when exercising that power.

The explanatory note to the Bill explains that the intent is to empower the Authority to make rules to prevent lines companies from distorting competition in adjacent competitive markets. We have included as Annex One drafting which can deliver more certainty to network businesses to avoid the perverse outcome of cooling the market for new and innovative energy solutions which are critical for affordable electrification and better consumer outcomes. Whilst our technological future is uncertain, it is not the job of the regulator to try and predict, and pre-emptively regulate, this future. Rather, we encourage regulation to ensure that the settings and conditions are in place to enable new flexibility markets to flourish. This requires us to accelerate the integration of platforms that enable these new markets – rather than to entrench traditional market silos. It is imperative that regulations remain flexible enough to support the right and much needed investments in this emerging market, rather than eroding investment confidence at this early juncture.

1.4 The impact of electrification will be concentrated on the network – which connects homes and businesses to power

The ability of Networks to adapt to the demands of the future will be critical for our overall transition to a low emissions energy system. Ensuring nationally consistent reliability and affordability in the future requires networks to have confidence to invest in platforms and other cross-cutting technologies that can manage new demand and complexity today.

The impact of EVs, the electrification of process heat, and the greater integration of distributed solar and battery systems will be concentrated on our networks. Like the capillaries of our system, networks are complex and granular, and are critical in ensuring that our electricity system as a whole achieves its mission in connecting New Zealanders to power. This requires localised coordination – which can be optimised through the

[3] *Electricity Price Review, Final Report (21 May 2019) at page 58.*

integration of digital platforms. Just as regional UFB played a crucial role in supporting national consistency across our infrastructure performance for economic growth and resilience, the use of digital and data-based platforms can enable optimisation of our electricity system across New Zealand.

Case Study: Project Tapestry

A Moonshot being championed by X, The Moonshot Factory with Vector and a number of global partners is project Tapestry to create a single, virtualised view of the electricity system[4]:

"The electric grid is an engineering marvel — a vast and complex machine that connects us all and powers the devices that are now essential to our everyday lives. Designed more than a century ago to function like a one-way highway, with electricity flowing from fossil-fuelled power plants to cities and towns, it wasn't built for what the modern world is asking of it.

Increasingly, the grid looks like a multidirectional superhighway. Billions of devices ranging from home solar panels and wind farms, to microgrids and electric vehicles are pushing and pulling energy to and from the grid all the time. Yet no one currently has the tools they need to see, manage, or plan a grid this complex. Information is siloed between dozens of different organizations and no one has a complete picture of how electricity is made, moved, and used. With industries like transportation and heating switching from fossil fuels to electricity, the demands on our grid are only increasing and becoming even more challenging to orchestrate"[5].

Tapestry will increase the visibility of the network enabling EDBs to optimise the management of bi-directional flows of power and will provide increased visibility of available network capacity supporting the integration of more distributed generation and micro-grids. This will enable the entrance of new generators into our market and increase network visibility – which was a priority in the Authority's recent consultation document "Updating the Regulatory Settings for Distribution Networks" – in which the Authority recognised "Distributors need greater visibility of their low-voltage networks to manage reliability and make efficient investment decisions. Third parties also need information on hosting capacity to make informed business decisions and compete on a level playing field". Perversely, the EIAB could actually deter the integration of solutions which would enable this.

Image of virtualised network: Project Tapestry

[4] *Government Welcomes Collaboration between Vector and X. Press Release. 28 September 2021. https://www.beehive.govt.nz/release/government-welcomes-collaboration-between-vector-and-x;*

[5] *https://x.company/projects/tapestry/;*

Case Study: Distributed Energy Resource Management System (DERMS)

Another example is the DERMS platform, developed by Vector and mPrest since 2017. The first stage was successfully introduced onto our network in 2018 and we have been continuing to build and refine it since. DERMS is a highly intelligent software system, able to connect distributed energy assets like solar panels and storage battery connections to our traditional infrastructure and management systems. Over the past year, more than 400 customer and network connected resources (rooftop solar, EV chargers, batteries) have been integrated with the network using the DERMS platform to provide visibility and ability to manage the complex interactions between the network and distributed energy assets. As the number of network connected resources grows, DERMS is capable of providing an unmatched level of security and reliability to our energy management, including predictions around loading on critical infrastructure assets such as power transformers, user-defined allowable limits on loadings, and automated load reduction plans utilising available DER assets to maintain load below the defined limit. DERMS also supports improved response to unexpected events, including extreme weather. We are confident we can scale up the DER connections into DERMS as they continue to grow, and consequently we expect this system to be a key enabler for a future-ready network.

These solutions are important because modelling of peak demand out to 2050 shows that new demand (modelled along the Climate Change Commission's pathway) could potentially double network capacity requirements if demand is not optimised. However, smart EV charging, dynamically managed through a digital platform such as DERMs, is modelled as reducing this peak growth by as much as 60% - avoiding significant consumer cost.

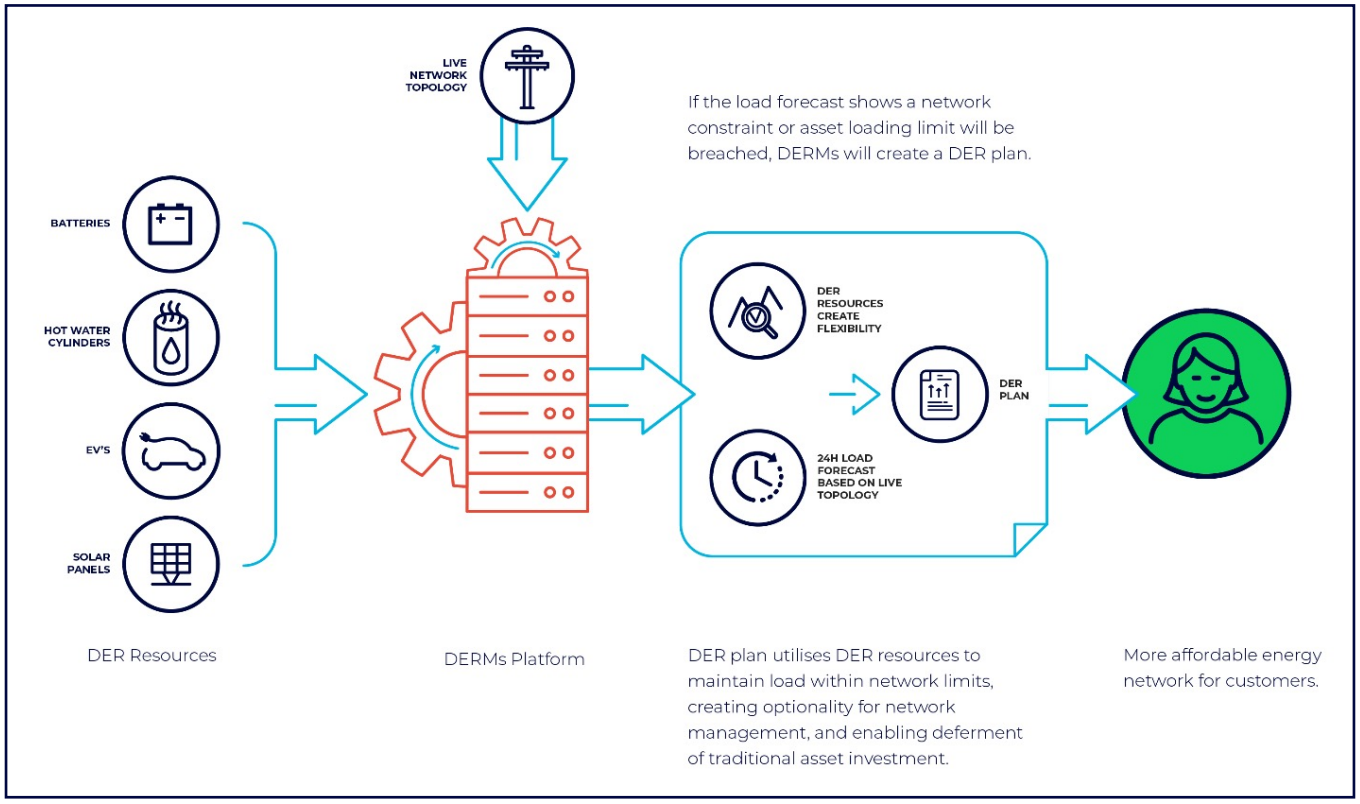

Diagram of DERMs: Vector AMP 2021-2031

Managing the new demand and greater complexity that comes with this transition - affordably and reliably - necessitates the network integration of new technologies. This includes the use of digital platforms that can coordinate the times that EVs are drawing power from the network (dynamic rather that static load shifting) avoiding capacity breaches and increasing utilisation.

This was recognised by the Climate Change Commission in their draft advice:

"the coordination of EV charging times is a potential challenge for some local lines' networks. There is the risk that people coming home and plugging in the EVs after work at the same time may lead to greater evening peak demand, putting local lines under pressure and pushing up network costs."

This was also reflected in their final recommendation that the uptake of EVs is accelerated by:

"Enhancing the roll out of EV charging infrastructure to ensure greater coverage, including at marae, multiple points of access, mandatory smart charging, and fast charging".

Case study: learnings from overseas jurisdictions – Australia and Germany

The value of dynamic optimisation enabled by digital platforms is not just limited to EV charging but can also enable the integration of more solar/battery systems and can maximise the consumer and system value that is gained from them. By managing the times that a solar panel is exporting electricity to the grid, dynamic optimisation can avoid the need to defer the integration of solar battery systems into the network until an upgrade is made, or, to constrain the solar system's output on the grid to avoid exceeding voltage limits.

Conversely, an absence of this smart coordination and management can reduce system reliability and power quality. This has been shown in jurisdictions like Germany and Australia whereby the approach of 'more distributed but not integrated' DER has resulted in curtailment of solar and reduced reliability.

Driven by policies for renewable generation, Germany saw major growth in DER penetration but insufficiently considered how to integrate DER with the existing power system. In addition to technical challenges, a lack of coordination in planning and deploying DER resulted in increased costs for all customers and did not enable the system to capitalise on the full value of DER[6].

Similarly, the Australian Renewable Energy Association (ARENA) considers that challenges in DER technology integration in Australia have resulted from a lack of coordination and visibility. The networks' capacity to support exports from consumer DERs is rapidly being exhausted, with customers increasingly facing growing limitations to the amount of energy they can export to the grid. These are salient lessons for New Zealand and experiences we must avoid for our own energy transition.

[6] *The Integrated Grid: Realizing the Full Value of Central and Distribited Energy Resources. Electric Power Research Institute. Pg 12. https://www.energy.gov/sites/prod/files/2015/03/f20/EPRI%20Integrated%20Grid021014.pdf;*

The New Zealand Climate Change Commission – in its draft advice – recommended that the Government:

"Assess whether electricity distributors are equipped, resourced and incentivised to innovate and support the adoption on their networks of new technologies, platforms and business models, including the successful integration of EVs."

As we noted, the extent to which networks are 'equipped, resourced and incentivised' to do this stems directly from regulation which funds network businesses through the Commerce Commission's price quality regulation, and, which determines the relationships that networks can have with these cross-cutting technologies through market regulation.

Responding to the Climate Change Commission's recommendation requires these rules – which have been set out in Part 3 of the Electricity Industry Act – to evolve towards the acceleration of technology integration.

1.5 There is significant consumer value to be gained through greater network integration of emerging technologies

These technologies include digital and distributed assets (connected capacity) which spread demand and increase resilience, and, data-based solutions which deepen industry's understanding of demand, enabling a more efficient response of industry to meet it.

For example, the New Energy Platform (NEP) being developed by Vector Technology Services and Amazon Web Services (AWS) in Strategic Alliance, will transform metering data into insights which can deliver value across the supply chain. Initially, the NEP will leverage the breadth and depth of AWS services to rapidly collect and analyse data from more than 1.6 million IoT-connected Vector advanced meters deployed across New Zealand and Australia. The insights collected by the NEP will help Vector enable energy and utility companies to develop tailored product and pricing solutions for their customers based on their energy consumption habits.

As Minister Woods recently noted at an industry event on Digitalisation, this is about shifting from a 'bucket of commodity' to 'an eyedropper' in terms of the way that electricity is used (including volume and optimised time of use)[7]. This is enabled by energy efficiency as well as precision around time-of-use through network integration of digital and data-based solutions – which in turn support the shift of our electricity supply chain from a commodity based, to a service based, model.

Digital and data-based platforms used by networks to manage new demand and complexity would deliver the following value to consumers:

- Efficient pricing for individual consumers who participate in demand management schemes - which will be possible because of distribution network load management;
- lower bills for all electricity consumers which are achieved by increasing the utilisation of the network through load shifting – as well as by avoiding cost through the system; and

[7] *Recording of digitalisation event with Hon Dr Megan Woods. 20 October 2021. https://vimeo.com/636710619;*

- greater consumer choice and control as dynamic optimisation values demand as equal to supply.

Greater consumer choice and control enabled by digitalisation

As has been highlighted by the EPR there is an urgent need to 'strengthen the consumer voice' in the decision making of our electricity sector – and we support the establishment of a consumer advocacy council through the EIAB to further this goal.

The need to 'strengthen the consumer voice' in our electricity sector's decision making is particularly true for smaller consumers who struggle to make their voice heard and influence the electricity sector. The EPR Panel attributed this in part to the complexity of the industry but it also reflects a lack of consumer market power.

Digitalisation will be instrumental in enabling consumer participation in the market not least through unlocking demand-side value and thereby the market power of consumers. Enabling more distributed generation and rewarding consumers for actions and assets which optimise the whole system via smart digital platforms promises to transform consumers from price takers to price makers. An example of digitalisation increasing consumer power is Sharesies. By leveraging a digital platform and simple innovative pricing model, Sharesies has widened access to the NZ and US stock exchange, increasing the participation of consumers and growing the market for investing in shares.

Digital platforms in the energy sector can unlock new consumer products, enabling new markets and demand management services. These services can add value across the electricity supply chain – including pricing products for retailers, as well as EV charging services for generator-retailers – such as a 100% renewable charging. Strengthening the market power of consumers is fundamentally about valuing demand as equal to supply – which digitalisation enables.

The total value of these solutions to consumers is further demonstrated by work undertaken by Concept Consulting and Retyna *Shifting gear: How NZ can accelerate the uptake of low emissions vehicles*[8] which has highlighted that the most consumer value that can be accrued from digital platforms comes from their deployment by networks – rather than any other market participant:

"While we note that theoretically the best outcomes can be achieved independently of which party owns the signalling infrastructure, we note ***that arrangements that maximise the ability of networks to use the signalling infrastructure are likely to deliver the greatest benefit".*** *This is because:*

- *A significantly greater proportion of the benefits are likely to be from managing distribution capacity issues*
- *There will need to be much more geographically granular control to realise these distribution benefits, whereas most benefits from generation control can be achieved from sending signals on a whole-of-island basis"...*

[8] *Shifting gear How New Zealand can accelerate the uptake of low emission vehicles Report 2: Consumer electricity supply arrangements. 5 October 2021. https://www.concept.co.nz/uploads/1/2/8/3/128396759/ev_study_rept_2_v2.0.pdf;*

Smart charging can enable EV uptake to occur with little or no increase in peak demand: A $1.7bn additional prize on top of the CCC's estimated $18bn economic benefits from transitioning from ICE vehicles to EVs. Further, with the potential for EVs to inject power back into the grid (so-called 'vehicle-to-grid' or 'V2G') there is even the opportunity for EVs to offset some of the peak demands of other appliances that are currently driving the $439/yr of peak-driven electricity supply costs for households."

For this technology to add the most value in increasing efficiency and reliability they must be integrated as part of a networks' own operations – rather than that of an arms' length entity as is prescribed by the current regulatory approach as it applies to connected generation and retail.

1.5.1 Many of the perceived risks to competition which Part 3 provisions sought to mitigate are already addressed by other, existing regulations – and are eclipsed by the drivers of decarbonisation and digitalisation

The EPR made the recommendation to 'give the Electricity Authority more powers to regulate network access', on the basis of the risk of "cross-subsidisation" (this is reflected in the EIAB as the risk that monopoly businesses may 'self-deal').

However, the Panel also noted in its report that "we are unaware of any proven cross subsidisation". This is unsurprising as cross-subsidisation is prevented by cost allocation rules under Part 4 of the Commerce Act, supported by disclosure obligations and information gathering powers – which make the investment decisions of EDBs highly transparent. This is supported by a 2018 Commerce Commission investigation into EDB investment in emerging technologies – including storage, solar PV, wind, EVs and home automation systems. This three-month process included consultation and submissions analysis, comprehensive information requests of EDBs, interviews, and analysis of EDBs' public asset management plans (AMPs). The key finding of this process was that 3% of total EDB expenditure had gone towards 'e-tech' - a catch all phrase describing network batteries, smart grid assets, meters or home automation systems, distributed generation and batteries, EV chargers, and larger scale distributed generation. Far from revealing investment which could threaten the market for emerging technologies, 3% is, if anything, concerningly low given the need for networks to manage the new demand and complexity which will emerge rapidly because of our decarbonisation pathway.

This catch all understanding of 'e-tech' also fails to distinguish between network scale solutions – (such as network batteries and smart grid assets – which have been described in this submission) and behind the meter, or consumer, assets (such as EV chargers and home automation systems). This distinction is important to ensure that regulation of network involvement with behind the meter assets (such as EV chargers) does not also constrain the integration of solutions that are needed to unlock value from them i.e., digital platforms that enable them to be dynamically managed. The consumer value of a smart phone, for instance, would be limited without broadband. Vector does not seek to own EV chargers – but, along with networks across New Zealand, we are committed to ensuring that the infrastructure is in place that can avoid cost for our consumer owners. We have no long-term visibility over the way in which the regulator will understand and regulate for these different types of technologies in the future. This could also deter investment in solutions that ought to be integrated as part of BAU asset management to manage new demand as affordably as possible – such as network batteries.

We note the Commerce Commission's recent open letter consultation on regulatory priorities for energy networks and airports which found "some [industry submissions] mentioned the issue of EDB provision of contestable services but it didn't come across as a large issue from many of the submissions compared to the past". This may be because it is becoming apparent that network involvement in emerging cross-cutting technologies enables whole-of market value and is a necessary step to achieving affordable and renewable electrification across the supply chain.

1.6 Network involvement with emerging flexibility services and connected capacity would deliver whole of market value

1.6.1 Whole-of-market benefits which would be gained today from network involvement with cross-cutting technologies such as hot water load control:

- **A more resilient system as demonstrated by the role of hot water load control during August 9th grid emergency.** The ability for networks to shed load using hot water load control (HWLC) – rather than consumer outages – greatly reduced the impact of the grid emergency that occurred on August 9th when a lack of generation, record demand and insufficient reserves resulted in a failure of the system to balance itself. As demand increases further, as we rely on more intermittent renewable supply and as our system includes a greater number and breadth of assets and actions – there is a need to increase the tools available to both coordinate across the supply chain for greater system security and stability, and, to respond in the best interests of consumers if the system does become imbalanced (that is, without resorting to widespread consumer outages).
- **Greater utilisation of connected capacity in reserve markets.** All 29 EDBs in New Zealand own and operate ripple control plant and some participate in the reserves market with HWLC (based on research undertaken by EECA in 2020). Overall, HWLC's share of the total available supply in the reserves market is thought to be small (~10%). However, network involvement does have a comparatively low cost for delivery and therefore provides price competition in that market.

  No entities outside of networks have pursued HWLC resource to participate in the reserves market - largely because revenues from reserves alone wouldn't make it commercially viable. However, as demonstrated by the 9 August grid emergency event, networks have additional, non-commercial incentives to be involved with HWLC. As noted by EECA in its September 2020 report, "EDBs continue to invest in ripple control for the benefit of their consumers, not because of direct business incentives. In fact, if they were to abandon ripple control and allow peak loads to rise, EDBs could upgrade their networks and increase their revenues. Consumers should receive reduced rates in return for ripple control, however, not all retailers structure their tariffs to align with consumers' consumption patterns and few retailers appear to actively promote the benefits of ripple control". This is unsurprising given the structural separation of distribution from retail removed the incentive for retailers to manage demand. Discouraging networks from involvement in HWLC is only likely to decrease activity in this part of the reserves market further – and exacerbate the coordination failure already created by artificial market segmentation.

1.6.2 Whole-of market benefits in the future from network involvement with emerging technologies include:

- **The provision of platforms which are accessible to third parties, growing new flexibility markets, services, and solutions.** This can enable innovation and widen market access to greater types and numbers of actors. For example, other third parties will be able to build new applications on the digital and data-based platforms that are being developed through Vector Technology Services and which will be made available to other networks across New Zealand.
- **The provision of dynamic load management which can coordinate demand with the availability of renewable supply, supporting our generation market in its transition to 100% renewables and enabling gentailers to offer consumers new services such as 100% renewable charging.**
- **The provision of data and dynamic management capacity so that retailers can offer consumers innovative pricing solutions.**

2. part 2: service levels

2.1 There is a need to avoid duplicating quality and information requirements for distributors

The Bill proposes to confer dual regulatory responsibility on both the Electricity Authority and Commerce Commission (The Commission) for distribution quality standards. This reverses the delineation of responsibility that was established in the 2010 Act.

Duplicating regulatory responsibilities is, as a general rule, undesirable as it:

- unnecessarily increases regulatory costs; and
- risks introducing incoherent or conflicting regulatory obligations.

The delineation of responsibilities established in the 2010 Act was intended to avoid these disadvantages. The Act conferred responsibility for distribution quality standards on the Commerce Commission on the basis that quality standards are intrinsically linked to prices, and therefore were properly the province of the Commission under Part 4 of the Act.

Any increase in regulatory costs – both through industry levies which fund our market's regulatory activities, as well as compliance costs, are ultimately borne by consumers in their electricity bills. It is important than increases in consumer cost are driven by a consumer benefit. When it comes to duplicating the regulatory functions of the Authority and Commerce Commission, this is not the case.

As the explanatory note to the Bill observes, under the 2010 Act, the Authority retained responsibility in relation to transmission quality standards. However, that was for a specific reason: to preserve the Authority's role in setting the benchmark transmission agreement and the grid reliability standards under the Code. The split between distribution and transmission in relation to the Authority's role therefore reflected a deliberate choice.

We would expect that any proposal to introduce dual responsibilities for distribution quality standards would be justified by a clearly articulated problem definition. The explanatory note to the Bill doesn't offer a persuasive reason to depart from the position established in 2010.

2.2 The regulation of quality standards must account for local factors which impact quality – as well as price. This is achieved through the complex but clear and well understood methodologies implemented by the Commerce Commission

2.2.1 Standardising service levels will not standardise network performance

The explanatory note to the Bill also refers to the Authority's efforts to introduce standardisation of the terms on which distribution services are provided. The Authority has largely achieved this – to the extent it makes sense to do so – via the Default Distribution Agreements implemented earlier this year.

The remaining scope for individual discretion under those agreements relate to matters that are not suitable for standardisation; for example differences in operating practices between EDBs. The explanatory note to the Bill implies that standardisation of quality standards is the Authority's goal. Our goal is to drive nationally consistent reliability and affordability outcomes for New Zealand consumers. Whilst the two may seem interchangeable they are not. Nationally consistent infrastructure performance requires the integration of platforms which can coordinate new complexity on the network – which

must happen at a local level accounting for the needs of communities and the localised impact of new demand and complexity. Conversely, **it is impossible to standardise network performance through standardised service levels,** as factors which necessarily vary from network to network – such as environment, network population, overhead vs underground assets – remain.

In addition, distribution agreements determine the distributor's obligations to retailers but not to consumers (because distributors provide lines services to retailers rather than to consumers directly). Quality regulation via distribution agreements is therefore, at best, an indirect method of securing consumer welfare.

Consequently, the better way to regulate distribution quality (and indeed the only plausible method given the diversity of the sector), is through targeted quality standards for each distributor, complemented by the electricity-specific consumer protections set out in the Consumer Guarantees Act. This is because of the varying network topographies and community needs across New Zealand's 29 EDBs. Quality standards are currently designed to account for these regionally specific factors, including the level of funding that is also provided through the price-quality framework, and, networks' historic performance and scope for enhancement. As we noted in Part 1 of this submission, widening the scope of the Authority's ability to regulate network involvement in cross-cutting technologies could have the perverse outcome of deterring network investment in solutions that would drive nationally consistent quality outcomes. Partnering this with a provision that would enable the Authority to standardise quality standards at the same time is poorly considered.

2.2.2 The Commission is the appropriate regulator for distribution quality

This is because:

- different groups of consumers will have different expectations in terms of distribution quality standards, and the price the community is prepared to pay for an improvement in network performance. These consumer preferences differ from one distributor to the next depending on a range of factors. The Commission is better placed to make those assessments given its role in setting price-quality paths and its experience engaging with consumers on their preferences and interests; and
- service quality cannot be separated from expenditure. When the Commission sets quality standards, it does so as part of approving the expenditure required to achieve those standards. The Authority is not responsible for approving expenditure for distributors, and so there is a risk that the Authority will set quality standards that are not reasonably achievable within the expenditure allowed by the Commission. While s 54V of the Commerce Act allows the Authority to request that the Commission reconsider a price-quality determination, there is no obligation on the Authority to do so, and the process of reconsideration is not straightforward.

When read alongside the proposed amendments to s 54V of the Commerce Act, the Bill effectively makes the Authority the primary regulator of distribution quality standards. The amended section 54V would require the Authority only to "advise" the Commission after it has amended the Code in a manner that affects the Commission's functions. In contrast, the Commission is required to "take into account" the Authority's decisions in relation to distribution quality standards. This goes further than making the Authority and

the Commission dual regulators of distribution quality; it effectively makes the Authority the principal regulator of distribution quality, a role which the Commission is better suited to given its institutional competencies and experience. This is not what the Final Report of Electricity Price Review contemplated. The Panel noted the concern that regulated default agreements could require distributors to bear unfunded costs but that the risk could be managed by "requiring the Electricity Authority to consult the Commerce Commission before regulating access to distribution networks".[9] The Bill does not include this important safeguard.

2.3 Nothing relevant has changed since the promulgation of the Electricity Industry Act 2010, which put quality/service clearly in the Commerce Commission's remit

The explanatory note to the Bill refers to the Court of Appeal's decision in Vector v Electricity Authority. The suggestion is that case demonstrated a deficiency in the existing law which this Bill seeks to remedy. It did not. That decision did not introduce a new constraint on the Authority, nor did it unduly circumscribe the Authority's role. To the contrary, the Court simply reaffirmed the existing delineation of responsibilities under the 2010 Act. Nothing has changed since the passage of the 2010 Act that would suggest this delineation needs to be revisited.

[9] *Electricity Price Review: Final Report (21 May 2019), page 59.*