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Department of Prime Minister and Cabinet
National Security Group

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Tēnā koutou

STRENGTHENING THE RESILIENCE OF AOTEAROA'S CRITICAL INFRASTRUCTURE SYSTEM

1. Unison Networks Limited (**Unison**) is an electricity distribution business (**EDB**) with networks in Hawke's Bay, Taupō and Rotorua, and is one of Aotearoa's larger EDBs. It is owned by the Hawke's Bay Power Consumers' Trust.[1] Centralines Limited is an EDB operating in Central Hawke's Bay (and is one of New Zealand's smallest EDBs), owned by Central Hawke's Bay Consumer Power Trust.

2. The purpose of this submission is to provide high-level feedback on the consultation paper from the Department of Prime Minister and Cabinet (**DPMC**) on strengthening the resilience of Aotearoa's critical infrastructure system.

3. Unison and Centralines are well informed about existing deficiencies in the system following Cyclone Gabrielle's impact in Hawke's Bay, and the Napier floods in 2020. We support a system that provides a 'socially optimal' level of resilience. From our electricity distribution perspective, that should be led and informed by:
   - regional studies modelling the impacts of large-scale system-wide events (1-250 year flooding etc.), commissioned and funded by central government;
   - engaging with consumers to understand what they consider is a reasonable restoration period;
   - understanding what consumers are willing to pay to achieve proposed levels of resilience based on understanding the likely impacts;
   - considering the constraints and options available to respond quickly;
   - proactive and effective facilitation from national and regional civil defence for large-scale system-wide events; and
   - clearly communicated and understood roles, responsibilities, and funding measures for each part of the system (established prior to an event).

4. There are multiple regulatory processes in train that will empower or constrain EDBs to improve the resilience of their assets. With electricity powering a large portion of Aotearoa's critical infrastructure system, resilience of the system is unachievable without adequate policy integration pulling together those workstreams, in coordination with the New Zealand Energy Strategy.

Nāku noa, nā
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[1] It is part of Unison Group, which includes Unison Contracting Services Limited, its contracting arm, Unison Fibre Limited and other subsidiaries which provide goods and services to the electricity industry.

APPENDICES ENCLOSED:

Appendix One: Unison and Centralines' answers to the questions in the DPMC consultation paper;
Appendix Two: extract from Unison and Centralines' submission to MBIE consultation on the Electricity (Hazard from Trees) Regulations 2003; and
Appendix Three: extract from Unison and Centralines' submission to MBIE on proposed amendments to the National Policy Statement and National Environmental Standard on Electricity Transmission.

Appendix One: Answers to the consultation paper's questions

No#	Question	Unison and Centralines' response
Q.1 (page 10)	Does more need to be done to improve the resilience of New Zealand's critical infrastructure system?	Yes. Roles and responsibilities must be planned, funded, resourced, and understood prior to events and organised into each stage: reduction, readiness, response, and recovery. Civil defence do not need to 'lead' the response for every event, for example, an electricity generation shortfall requires first an urgent and technically informed electricity system response. Where interdependent critical infrastructure is involved, and coordinated action beneficial, it is appropriate for civil defence to be the: • **facilitator** of collaboration between providers; • **manager** of shared information; • **source** of guidance; and • **coordinator** of response and recovery to large-scale events requiring integration. For that to be effective, civil defence (whether regional or national) must be adequately informed in advance and prepared to direct, or have previously issued directions, about prioritising the deployment of services for their set outcomes.
Q.2 (page 10)	Have you had direct experience of critical infrastructure failures, and if so, how has this affected you?	Yes. <u>Severe weather event</u> Cyclone Gabrielle recently resulted in **four critical infrastructure failures** which substantially impacted Unison's ability to respond and restore electricity to impacted communities: • **Electricity transmission services**: Unison is a distribution service operating lines that receive power from the national grid. Transpower's Redclyffe substation in Napier was flooded and unable to be restored quickly leaving all of Napier disconnected from power. • **Transport corridors**: limited access to infrastructure for assessment and repair. • **Communications infrastructure**: limited methods for quick information sharing and coordinating the response, decreasing the safety for workers, and slowing down response and repair. • **Flood protection stopbanks**: resulting in damaged infrastructure. There is also the potential for **civil defence coordination** to itself be a barrier to an effective response. There must be national and regional capability to: • obtain, understand, and share the right information promptly to enable critical infrastructure

		providers to urgently respond; and • prepare and implement plans to 'fill the gaps' between the lifeline functions of other critical infrastructure providers including facilitating collaboration between multiple providers and joined initiatives (improving efficiency across the system reducing costs and resourcing).[2] The dependencies of other critical infrastructure on the electricity system are discussed in the paper, see paragraph 23. In the response phase of Cyclone Gabrielle, and in the absence of civil defence being able to provide direction, Unison deployed its internal plans and worked to restore power with welfare as the priority. The following key targets were prioritised: healthcare, security – including deterring crime (i.e., street lighting), significant food and fuel sources, large urban outages and community centres. During the response and recovery to Cyclone Gabrielle, the overwhelmed resourcing and capability at regional civil defence lead Unison to absorb additional functions that were critical to supporting welfare outcomes for impacted communities. This included procuring and providing: • electricians to repair, inspect and certify electrical equipment (service lines and household electrical safety) following the event; and • emergency generators, including delivery and fuel. These functions were outside of its lifeline utility functions as an electricity distributor (under the Electricity Act 1992 distinct from a generator, retailer, or Transpower). Unison absorbed considerable costs to meet this need in good faith. However, these functions fell outside its lifeline utility functions under the CDEM Act and Unison is disappointed that its consumers, and consumer-shareholders may bear the costs. Where roles and responsibilities are ambiguous or misunderstood, the risks are: • the party that is **not** best placed to absorb the risk bears the cost (potentially the consumer or EDB noting price-quality regulation can prevent passing costs through to the customer and includes financial penalties for exceeding set expenditure allowances); • unreasonable risks are borne by parties acting in good faith to meet welfare outcomes (for example, data sharing obligations, Health and Safety at Work Act 2015 risks, other liability risks);

[2] For example, after Cyclone Gabrielle, integrated helicopter LiDAR surveys to assess damage and inform priorities would have benefited the response and recovery.

		• costs are higher than necessary (for example in an emergency procurement situation where prices are inflated and civil defence should have planned appropriately); and • welfare outcomes are compromised and reliant on critical infrastructure providers accepting the above two risks (naturally making them more cautious to those risks in a future event). <u>Pandemic – Covid 19</u> There is a significant workforce (sourced nationally and internationally) behind providing electricity services. As well understood, this experience sheds light on the importance of a resilient **healthcare system** to the resilience of other critical infrastructure. The workforce disruption and supply chain issues experienced have and will continue to impact the quality and costs of service to consumers.
Q.3 (page 10)	How would you expect a resilient critical infrastructure system to perform during adverse events?	To its designed rating which should reflect the 'socially optimal' level of resilience. As clear from the answer to Q.2 above, the resilience of Unison's assets is impacted by the level of other infrastructure it relies on, usually transport and communications. The electricity distribution decisions made about the appropriate standard should be influenced by consumer expectations of reasonable times to respond and prudent asset management. Unison and Centralines consider consultation with its communities is essential to understanding what the right level of resilience is to respond to the scale of the event. We approach our asset management and business continuity decisions with the following in mind: • the increased cost for services for an increased resilience standard; • achieving response timeframes that appropriately meet consumers expectations of an acceptable quality of service (is a lower cost for less resilient infrastructure acceptable if the estimated restoration timeframe for a large event is 48 hours?); • assessing the most 'critical assets' and associated priorities for improving network resilience; • considering impacts on and from other assets there are dependencies on (transport, the national grid); • other prudent options; • increasing community/business reliance on electricity as Aotearoa electrifies; and • adopting cost effective business-as-usual upgrades that improve resilience outcomes.
Q.4 (page 10)	Would you be willing to pay higher prices for a more resilient and reliable critical infrastructure system?	Resilience can be cost-effective to build into new assets, however, asset renewals and targeted replacement for a resilience purpose (that is, the asset does not require replacement otherwise) is expensive. The post-event costs and consequences, however, feeds into the cost-benefit analysis.

		Unison and Centralines consumer-oriented position is that consumers are best-placed to dictate their expectations of resilience, and the subsequent costs.
Q.5 (page 10)	The work programme's objective is to enhance the resilience of New Zealand's critical infrastructure system to all hazards and threats, with the intent of protecting New Zealand's wellbeing, and supporting sustainable and inclusive economic growth. Do you agree with these objectives? If not, what changes would you propose?	The stated objective appears unnecessarily broad and includes some vague concepts. A simplified objective is recommended: ***The work programme's objective is to provide New Zealanders with an integrated critical infrastructure system that prevents unacceptable outcomes arising from natural and man-made hazards and threats.*** The suggestions seek to improve the objective by addressing that: • 'enhance' could be a low bar, improvement from the status quo may not achieve the 'socially optimal' standard of critical infrastructure; • the outcome of the objective is a resilient system; and • a fit-for-purpose system will adapt to new or changed threats (i.e., additional or changing 'megatrends').[3] 'All hazards and threats' doesn't reflect the reality of unforeseeable threats.[4]
Q.6 (page 10)	Do you agreed with the proposed criteria for assessing reform options? If not, what changes you would propose?	Partially agree. Unison recommends additional key considerations to the criteria B and C: • What are the regulatory barriers to implementing the option (noting Commerce Commission and Electricity Authority regulation of electricity distribution) – this is unrelated to regulatory 'touchpoints' (noted under B) and recognises that regulated businesses are not able to absorb, or permitted to pass on, all costs. • What are the information barriers to implementing the options (privacy and security) – this relies on the ability of the critical infrastructure provider to access and/or share the data.
Q.7 (page 22)	The paper discussed four megatrends: i) climate change, ii) a more complex geopolitical and national security environment, iii) economic fragmentation, and iv) the advent and rapid	Yes. The paper discusses asset and sector-centric regulation, including briefly at pg 38. The current regulatory systems do, or may, create barriers to creating resilience to the four megatrends. <u>Regulatory silos</u> Climate change is a simple example where three regulatory siloes create or have the potential to create barriers to mitigating the identified risks. *MBIE - Tree Regulations* Trees falling on distribution lines creates a significant vulnerability of the electricity system, with EDBs having less ability to protect their assets. The industry has waited for reform for years and

[3] See Q 7 and pg 11 of the paper.
[4] For example, in the case of long asset life infrastructure – reducing impacts of cyber terrorism was not a design feature 80 years ago.

	uptake of new technologies. Do you think these pose significant threats to infrastructure resilience?	MBIE consulted in May on proposals to amend the Electricity (Hazards from Trees) Regulations 2003. **Appendix Two** includes key feedback provided to MBIE in that process. MBIE's learnings and intended next steps will assist. *Commerce Commission – Economic regulation* The Commerce Commission has been clear that it takes a discretionary and subordinate approach to considering s 5Q, the net-zero statutory target of the Climate Change Response Act 2002. This is explained in its decision-making paper on the Review of the Input Methodologies 2023.[5] As a result, the Commission "may" take it into account where it considers relevant. The outcome of that approach is set out in the recently consulted on Draft Input Methodologies (**IM**) Decisions. **The Commission has decided to adopt an increased tolerance for underinvestment in electricity distribution infrastructure**, demonstrated by the:[6] • 'price limit' approach which may impact the ability of large electricity businesses to *"earn sufficient revenue to cover their prudent and efficient costs"*;[7] • lowering the Weighted Average Cost of Capital (**WACC**) percentile and the approach to several WACC methodologies;[8] • failing to address the financeability of businesses (electricity distributors are committed to investment in decarbonisation and resilience but need incentives to invest that outweigh the disincentives – for example, uncertainty about whether they will return their prudent and efficient costs); and • the continuation of financial penalties for exceeding allowances despite work relating to decarbonisation or resilience. The Commission's decisions above illustrate how economic regulation may lead to further underinvestment by failing to provide adequate flexibility to 'shift the balance of expenditure, from

[5] Commerce Commission, *Part 4 Input Methodologies Review 2023 Framework paper*, 13 October 2022, X21.2: https://comcom.govt.nz/__data/assets/pdf_file/0034/294793/Input-methodologies-2023-Decision-Making-Framework-paper-12-October-2022.pdf.
[6] Unison's submission on the Draft IM Decisions, 19 July 2023: https://comcom.govt.nz/__data/assets/pdf_file/0018/323811/Unison-Submission-on-IM-Review-2023-Draft-Decisions-19-July-2023.pdf.
[7] Frontier Economics, *A review of the limit on EDB price increases, prepare for the six largest electricity businesses*, 13 July 2023: https://comcom.govt.nz/__data/assets/pdf_file/0015/323106/27Big-627-EDBs-Frontier-Economics_-A-review-of-the-limit-on-EDB-price-increases-Submission-on-IM-Review-2023-Draft-Decisions-19-July-2023.pdf.
[8] An appropriate WACC intends to fairly compensate for the costs of capital by striking the right balance between the risk of overinvestment, setting it too high, against the risk of underinvestment, setting it too low.

		(largely government-funded) recovery, towards resilience to increase equity' (as discussed in paragraph 30 of the paper). *Resource Management Act 1991* • *National Policy Statements*: MBIE has recently consulted on the National Policy Statement for Electricity Transmission and whether higher voltage distribution infrastructure should be protected like the national grid. This is vital to ensuring **adequate protections of critical distribution assets** with increasing risks caused by more frequent severe weather events, as discussed in **Appendix Three**. MBIE's learnings and next steps will assist. • *Council consenting – reverse sensitivity*: substations are critical distribution assets that are designed and constructed carefully, and at considerable cost (depending on hosting capacity and security, $5 to $10 million). Unison is experiencing issues with council planning or consenting subdivision developments with (or with potential) reverse sensitivity effects on substations. Subdivisions often require infill to raise ground levels. A design component of substations to increase resilience to flooding is raising the platform. Raising the ground level, without adequate avoidance or mitigation of potential hydrological effects, increases the flooding risk. This compromises the standard of resilience the asset was built to.
Q.8 (page 22)	Are there additional megatrends that are also important that we haven't mentioned? If so, please provide details.	Workforce – of an adequate size and skill. Particularly with an aging population, vulnerability to healthcare crises, and the difficulty of attracting and retaining international recruits when other markets can offer greater incentives (salaries, paths to citizenship etc). Unsurprisingly, the renewal of infrastructure, combined with the increased demand for new infrastructure (including decarbonisation work), in addition to focussed resilience improvements requires growth and retention. Unison submitted to the Productivity Commission in April 2023 on Improving Economic Resilience (see link in footnote).[9]
Q.9 (page 26)	Do you think we have described the financial implications of enhancing resilience accurately? If not, what have we missed?	Paragraph 68(a) to (c) are strongly supported. Unison and Centralines consider **an urgent priority is 'lifting the floor' on civil defence coordination and appropriate identification of roles, responsibilities and funding**. Promoting 'energy wellbeing' requires that the socially optimal level of resilience reflects people will have different tolerance levels of electricity system (and distribution) resilience vs costs. Urban vs. rural expectations often differ (yet regulatory requirements relating to quality of service do not reflect

[9] https://www.productivity.govt.nz/assets/Submission-Documents/resilience/Sub-032-Unison.pdf.

		that reality). Centralines has a very small consumer base and large area, which creates affordability challenges. The paper discusses directed government funding. It is difficult to see how the costs of improved resilience of assets can be funded by consumers in this situation. Unless the government directs funds, small rural communities need agency over the level of resilience that will provide for their energy wellbeing; and how to best mitigate the adverse impacts of events.
Q.10 (page 32)	If you are a critical infrastructure owner or operator, what additional information do you think would best support you to improve your resilience?	One component of this is more advanced information sharing to support a resilient electricity system. This will enable EDBs to obtain more information on upcoming demand to understand and respond to likely constraints and vulnerabilities, in particular: • regional studies modelling the impacts of large-scale system-wide events (1-250 year floods etc.), commissioned and funded by central government; • proactive engagement between councils and critical infrastructure providers on planning intentions, scale, and likely constraints (while that may flow from the Natural and Built Environment and Spatial Planning Acts – shorter term solutions are needed, see examples at the end of Q7 above); • location and capacity of alternate energy sources (generation, battery storage etc.); • information from Electricity Engineers' Association Resilience Management Maturity Assessment Tool (**RMMAT**) *"developed to cover the principles of emergency management preparedness and to provide a practical self-assessment tool…"*;[10] • EV vehicle information (registration and general location of EVs to understand where load is materialising); • smart EV chargers (that utilise capacity in the network rather than adding significant load at peak times), flexibility services will support demand-side management of the electricity system, but pragmatic short-term solutions will assist); and • understanding the levels of resilience of other critical infrastructure assets, communication, transport, and flood protection stopbanks to assess vulnerabilities of and plan responses for critical electricity distribution assets.
Q.11 (page 32)	What do you think the government should do to enable greater information sharing with and between critical infrastructure	To facilitate proactivity and integration, Unison and Centralines support government funding and management of shared: • information sharing platforms (i.e., regional studies, hazards, threats, dependencies); • guidance frameworks;

[10] https://www.eea.co.nz/tools/products/details.aspx?SECT=publications&ITEM=3049.

	owners and operators?	• training resources; • planning resources; • templates; and • learnings from events. This will enable more robust and cost-effective planning, and easily communicated, consistent, and replicable decision-making processes relevant to circumstances. Critical infrastructure providers are subject to significant legal requirements to protect their information from cyber-security risks. DPMC will be conscious of the risks in collated information and cyber security. It would not be cost-effective to require individual providers to pay for, resource, and maintain integrated systems. It may be pragmatic to set the level of collated information at a higher-level to increase understanding and enable the right questions to be asked between providers. It is appropriate for the cost to be borne by government given the cross-sectorial and national benefits of shared information – and common level of security required.
Q12 (page 39)	Would you support the government being able to set, and enforce, minimum resilience standards across the entire infrastructure system? If so:	Yes, if set relative to consumer needs. A higher priority than minimum resilience standards is the need to identify roles and the responsibilities of regional (or, where necessary, national) civil defence and each provider. Nationally consistent, well understood and communicated roles will substantially improve the resilience of the critical infrastructure system. For Unison, who operate in three regions, consistency will provide certainty and promote more efficient and effective resilience preparation and action. While accountability is necessary to achieve better systems and processes, existing regulatory requirements must be looked at first to see if the need is met. A socially optimal level of resilience correlates to minimum regulatory costs to achieve the outcome.
	a) *what type of standard would you support (eg. requirement to adhere to a specific process or satisfy a set of principles)?*	The International Organization for Standardization (**ISO**) is an independent, non-governmental international organization with a membership of 168 national standards bodies: ISO - About us. An ISO style standardised approach comprises of a set of 'shall' statements defining the requirements. Organisations demonstrate how they comply with those requirements for certification. This promotes integration through common requirements (and consistency), appropriate/right-sized investment, and accountability. Unison is proud of its ISO55001 asset management certification (and certification to ISO9001 - Quality and 45001 – H&S in respect of some subsidiary entities). Unison particularly supports the use an ISO approach or similar, as these standards have common clauses that promote

		consistency. There are a series of resilience related documents from which guidance could be sought (ISO22000 series).
	b) do you have a view on how potential minimum resilience standards could best complement existing approaches to risk management?	Minimum resilience standards will only be fit-for-purpose if they reflect the nuanced decision-making required, including the consumer's risk tolerance based on cost and impact. In some circumstances, the socially optimal level of resilience will support accepting the damage may occur at a particular standard (i.e. 1 in a 100 or 150 year flood) and the prudent response is having critical stock, resourcing and arrangements in place to restore service within a set timeframe. As discussed in response to question 7, the regulatory barriers must first be remedied (well-timed, given several ongoing workstreams). It would be disappointing for DPMC's system-wide intentions to be undermined by decisions made through those regulatory workstreams.
Q.13 (page 39)	Would you support the government investing in a model to assess the significance of a critical infrastructure asset is, and using that as the basis for imposing more stringent resilience requirements? If so:	Yes, and it must be government funded. The consumer is not best placed to absorb the cost of this type of government action. As above, ISO standards may provide consistency and accountability – compliance can be demonstrated without certification, if providers choose to pragmatically reduce costs.
	a) what options would you like the government to consider for delivering on this objective?	The model customised to provide a standard aligned to the consumers' expectations (that is reflective of cost vs quality).
	b) what criteria would you use to determine a critical infrastructure asset's importance?	Unison and Centralines' learnings from recent events are that, for distribution infrastructure, broad categories relate to the asset's: 1. significance to the distribution network; 2. significance to public health and safety; 3. role in supporting public services; 4. role in powering other critical infrastructure; 5. role in supporting the economy; 6. other consequences of disruption; and 7. service level agreements. There are several electricity industry tools to support appropriate criteria, including from the Electricity Engineers' Association.

Q.14 (page 43)	Do you think there is a need for the government to have greater powers to provide direction or intervene in the management of significant national security threats against a critical infrastructure? If so:	Unison and Centralines' experience in Cyclone Gabrielle was that NEMA was sufficiently empowered to assist as needed. There is a gap, however, in the provision of central government or civil defence guidance on request.
	a) what type of powers should the government consider?	-
	b) what protections would you like to see around the use of such powers to ensure that they were only used as a last resort, where necessary?	The electricity system is a complex and technical beast. Each part of the chain is distinct (generation – transmission – distribution). Unison and Centralines would be concerned if their autonomy were minimised in this technically complex and circumstance dependent area, given the potential for decisions to compromise welfare and assets. The focus should be on clear roles, and consistent, well communicated expected outcomes. Certain events, such as isolated electricity system events, are more efficiently dealt with by the sector – reflecting technical complexity and capability.
Q.15 (page 46)	Do you think that there is a need for a government agency or agencies to have clear responsibility for the resilience of New Zealand's critical infrastructure system? If so:	
	a) do you consider that new regulatory functions should be the responsibility of separate agencies, or a single agency?	As outlined under question 7, **regulatory silos are a barrier** to DPMC's work programme objective. This is a transformative period for the electricity system, with high stakes for decarbonisation and resilience. EDBs are facing multiple overlapping government and regulatory policy and processes. Many have the potential to undermine others. **A resilient critical infrastructure system is unachievable without adequate policy integration pulling together those workstreams, in coordination with the upcoming New Zealand Energy Strategy.**
	b) do you consider that an existing entity should	-

	assume these functions or that they should be vested in a new entity?	
	c) how do you see the role of a potential system regulator relative to sectoral regulators?	It is not clear what benefit a potential system regulator would provide to EDBs beyond the current regulatory environment.
Q.16 (page 46)	Do you think that there is a need for compliance and enforcement mechanisms (eg. mandatory reporting, penalties or offences) to ensure that critical infrastructure operators are meeting potential minimum standards? If so:	Critical infrastructure providers that are otherwise regulated already have onerous and costly reporting requirements, penalties, and offences. Additional regulatory burden is only justifiable if the outcomes are not achievable without it. The ISO approach above reflects an emphasis on accountability through a consistent, robust, and transparent approach. Where providers fail, government response can be collaborative and targeted to solve the problem, rather than merely punish a failure.
	a) do you consider that legal obligations should be applied to the entity, to the entity's directors/executive leadership, or a mix of the two?	As above.

Appendix Two: Extract from Unison and Centralines submission to MBIE on Consultation on the review of the Electricity (Hazards from Trees) Regulations 2003 dated 5 May 2023

Question One:

Resilient and affordable electricity into the 2030s, 2040s and 2050s requires action now

The issues stated are fit-for-purpose but do not include the critical context for the review. Securing supply into an electric future requires protecting all three components of the electricity system: generation, transmission, and distribution. Proactive management to reduce the impact of vegetation in 2030, 2040 and 2050 secures supply as communities and businesses decarbonise and electrify.

The following issues should be considered as part of the Review:

- Resilience requires protecting 'redundancy' in all parts of the electricity system (that is, alternative ways to convey electricity from one point to another):
    - High voltage 11kV and greater sub-transmission and distribution infrastructure that conveys electricity received from Transpower or embedded generators into people's homes (on Unison and Centralines' current networks voltages start at 33kV move down to 11kV, then to 400V and down to 230V – the household voltage level).
    - Low voltage networks (400V to 230V) will increasingly become two-way, with solar and batteries generating electricity to be distributed among households and businesses – infrastructure must be resilient to both distribute electricity down and up the chain (and protect the two-way flow).
- Climate change is already increasing the frequency and impact of severe weather events. Reactive solutions will not secure electricity supply for communities that may otherwise suffer the loss of critical infrastructure. Where other critical services are lost (access, communications, potable water, wastewater) the role of electricity is increased as a safeguard to health, wellbeing, and economic outcomes in the wake of an emergency. Cyclone Gabrielle's impact on Hawke's Bay made clear the criticality of electricity to community resilience. Restoring electricity became a primary welfare objective for civil defence.
- Affordability is an increasing issue for consumers and there is increasing pressure on the electricity system to quickly grow to support Aotearoa's path to net zero. Inefficient costs need to be avoided, not just re-allocated or shared.

Fall distance zone trees cause the most outages from vegetation

Unison's SAIDI and SAIFI data can be broken down to show how many trees fall on its electricity lines and cause outages. Figure 1 below includes normalised network performance data and the breakdown of vegetation caused outages in the 2022/23 financial year of: 87% caused by Fall Distance Zone trees (FDZ) vs 13% Other vegetation. Other vegetation is made up of Growth Limit Zone (GLZ), hazard warning notice zone, and outside of fall distance zone (usually bark). The key issue for MBIE is how to reduce outages from fall distance zone trees. Regarding cost, over $100,000 of damage to Unison's network from one span of trees is not rare.

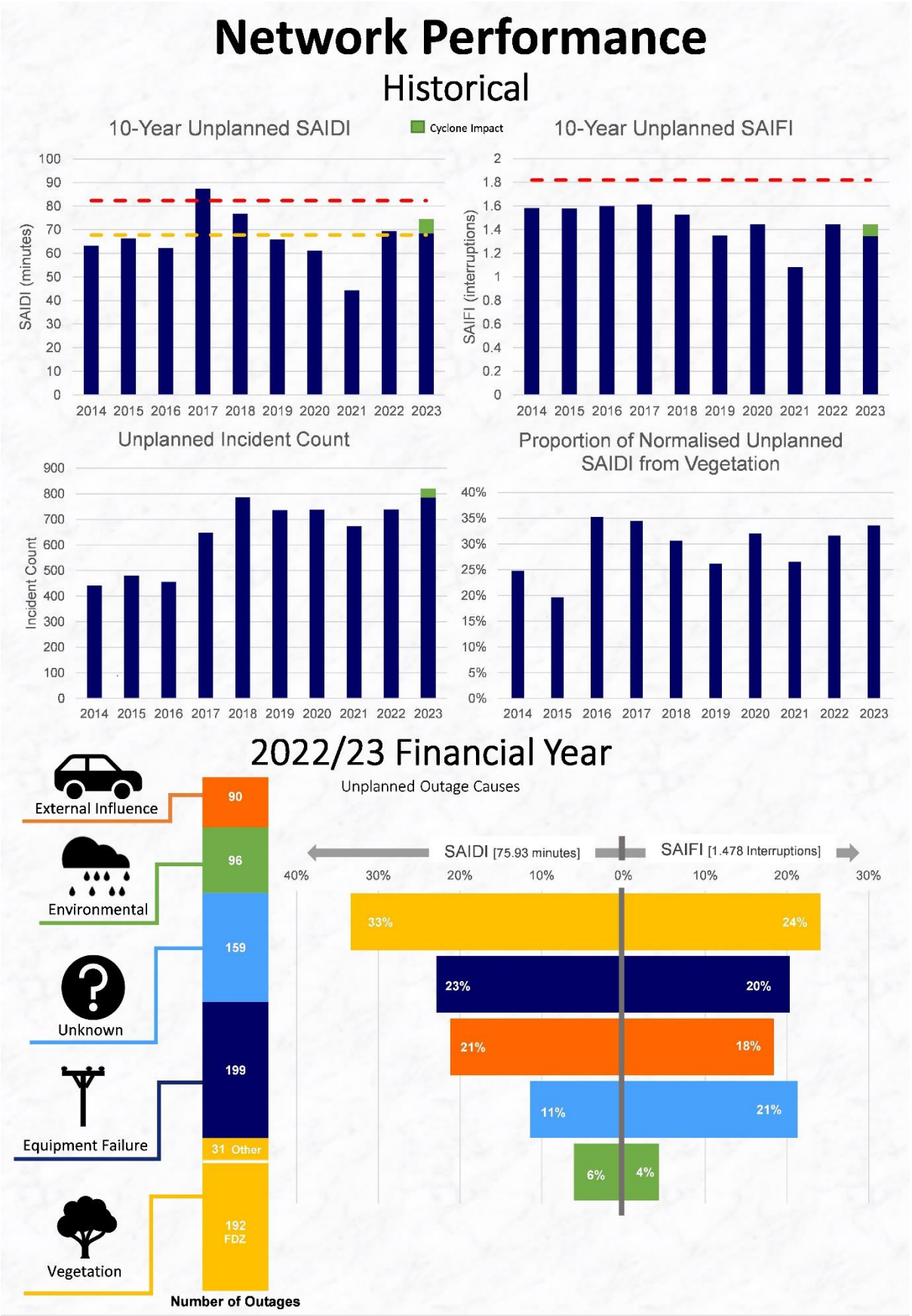

Figure 1: Unison network performance – normalised unplanned outage impacts and causes

Protect the public and works owners' employees better

Addressing risks to people and property "caused through electricity" (s 169(1)(2)), relates to all people, including the significant health and safety risks works owners must manage addressing vegetation risks. New Tree Regulations should improve the balance between:

- property rights and obligations;
- works owners' rights to maintain security of the electricity supply (as a public work);
- the party in control of creating or leaving the risk;
- the party in control of managing or removing the risk;
- protecting the safety of all people and property including under the Health and Safety at Work Act 2015; and
- cost and administrative efficiencies.

Fall distance zone trees are the greatest vegetation risk

On Unison's network, effective regulation of trees within the fall distance zone of its electricity lines has the potential to improve security of supply. Of the 224 vegetation incidents in 2022/23 recorded in Figure 1 above, 192 incidents were caused by trees in the fall distance zone (as opposed to 31 in the GLZ).

The table below records the number of ICPs (individual connection points i.e., households and businesses) that were affected by outages caused by trees falling on Unison and Centralines' networks, including total figures of 50,527 ICPs in 2021/22 and 65,226 ICPs in 2022/2023.

FY	Total Fault Count	FDZ Count	SAIDI Impact	ICPs Affected
2018/19	162	128	28.40174	25941
2019/20	180	145	39.267464	32088
2020/21	154	113	12.256588	18883
2021/22	244	208	46.845488	50527
2022/23	261	225	28.346441	65226

Figure 2: Unison & Centralines combined vegetation fault data – FY19-FY23

Climate Change is increasing the frequency and impact from vegetation

The role high winds and heavy rain plays in increasing the vegetation related outages is illustrated in Figure 3 below:

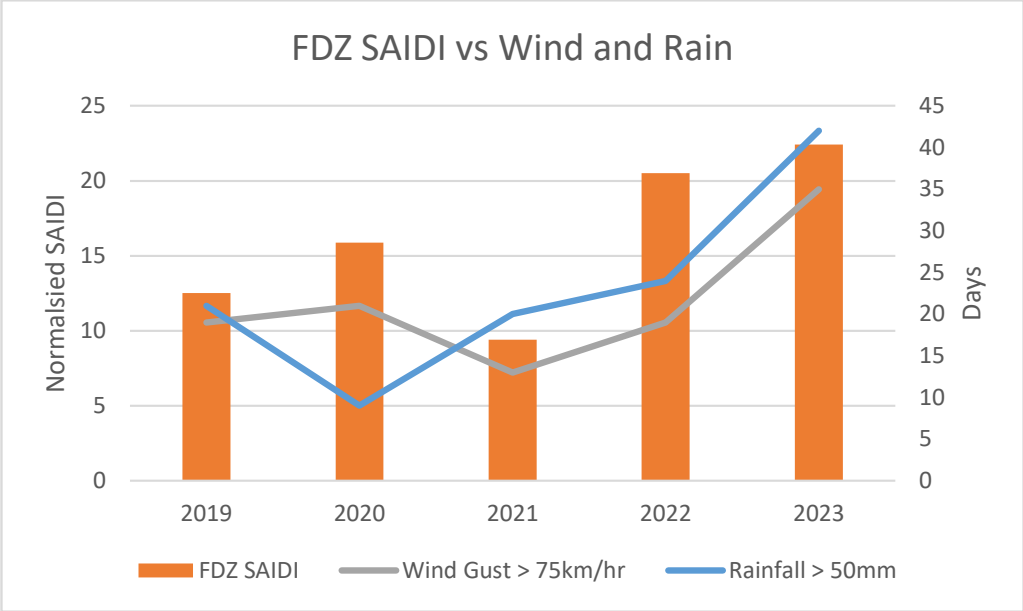

Figure 3: Unison SAIDI caused by fall distance zone trees 2019-2023 showing wind and rain

With climate change increasing the frequency and intensity of weather events, greater impacts on networks and customers from vegetation is foreseeable. New Tree Regulations must mitigate against this future, including the clear evidence it is upon us, as recently experienced through Cyclone Gabrielle. SAIDI and SAIFI normalise extreme weather events, therefore, as climate change events cause more damage to networks, the actual impact of vegetation on networks may not be transparent through that data (raw SAIDI and SAIFI, however, will show that impact).

All references to 'high voltage sub-transmission and distribution lines or infrastructure' in this submission describe distributor assets and equipment used for conveying electricity from Transpower or embedded generators at voltages of 11kV and greater, to lower voltage lines (400V and 230V) that feed electricity to consumers.

Appendix Three: Extract form Unison and Centralines submission to MBIE on proposed amendments to the National Policy Statement and National Environmental Standard on Electricity Transmission dated 3 June 2023

12.2. In your view is 110 kV an appropriate threshold for determining high-voltage transmission?

Distribution is critical to delivering renewable electricity

110kV is a bare minimum and will not meet the policy objective of the review. Distribution networks play a critical part in the system, conveying renewable electricity from the national grid, or an embedded generator, to consumers. Sub-transmission (66kV and 33kV) infrastructure is both critical to:

- facilitating decarbonisation (increasing how much electricity from the national grid can be fed to a customer, and how much can be received into the system); and
- communities' welfare needs, as the growing reliance on electricity increases the significant adverse effects of being without power. Unison is acutely aware of the role of electricity in providing for people's welfare following the impacts of Cyclone Gabrielle.

In the next decade, EDBs must undertake many upgrades to sub-transmission infrastructure to facilitate the larger loads resulting from electrifying transport (EV charging), solar uptake, process heat, and other large industrial equipment and processes. Sub-transmission infrastructure, while physically smaller than transmission and less dominant in a landscape, comes with effects that may become less palatable as upgrades and increased voltages are required. Better electricity system and emissions reduction outcomes may also result from extending enabling and protecting national direction to 11kV distribution lines in some or all circumstances.

Electricity network lines charges (contributing to the overall price of electricity) will increase considerably if electricity distributors cannot facilitate electrification by upgrading existing infrastructure or are unduly constrained in the placement of new critical infrastructure (taking longer, less efficient, or increasingly underground routes).

Efficient network planning

In responding to known or projected customer demand, some key issues for Unison and Centralines efficiently planning upgrades to the network are:

- upgrading pre-1993 assets (predominately pre-1970s infrastructure) not within road reserve (70% of Unison's network is pre-1993 and much of its runs through rural private land including agricultural, horticultural, forestry and rural-residential - very high proportions of 33kV and 11kV assets are outside road reserve);

Unison's assets	Road reserve	Outside road reserve
11kV	34%	**66%**
33kV	19%	**81%**

- utilising existing capacity in the network to meet increased demand by placing new loads where the network can currently cope with it (analogous to directing new traffic onto an under-utilised wide road); and
- protecting distribution assets from other land uses or risks to resilience that district and regional planning has not managed (increasing sensitive uses such as large industrial and commercial buildings, residential housing, vegetation especially in high wind events, car vs pole, flooding, slips, and other natural hazards).

Effects and conflicting national direction

Upgrades of existing infrastructure potentially alter the nature and scale of the activity as it can result in greater or new effects, including: visual effects, heat, increased perceptions of amenity effects and increased risk of reverse sensitivity effects.

Extending the improvements of the NPS-ET and NES-ET will provide greater certainty that local decision-makers can and will give appropriate weight to national emissions reduction and the benefits of a resilient, safe, and affordable electricity system. Without extension of the NPS ET and NES ET to sub-transmission lines, there will be higher costs (passed on to customers). Longer, less direct, and more expensive routes will be required to comply with other NPS 'avoidance' policies and subsequent environmental standards.

It is consistent with Part 2 of the RMA to direct local decision-making and ensure the appropriate weight is given to the environmental benefits relating to efficient electricity system outcomes. Areas of risk that may increase overall costs and slow down reducing national emissions are:

- 'avoidance' policies that prohibit upgrades of existing infrastructure because of environmental effects, potentially creating stranded assets by requiring new assets that can safely carry the increased loads; and
- local discretion and perception that:
    - undergrounding distribution infrastructure[11] may achieve better environmental outcomes without recognising the considerable cost involved and the negative impact that may have in a national emissions reduction context;
    - cost-efficiently upgrading existing infrastructure is not otherwise consistent with the RMA due to amenity or other effects; and
    - there are unpalatable effects associated with new solutions to obtain the best network and customer outcomes (i.e. increasing use of 66kV lines and constructing larger lines for future load but conveying lower voltages through in the short-term).

[11] As provided to MBIE recently in consultation feedback on the review of the Electricity (Hazards from Trees) Regulations 2003: *"Improved regulation is required to protect overground networks as the cost to underground electricity distribution infrastructure is approximately $1.1 million per km of line ($61 billion across Unison's network)".* Most of Unison and Centralines 33kV lines are overhead.