



TRANSPOWER

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Strengthening the Resilience of Aotearoa New Zealand's critical infrastructure system

Submission to:

National Security Group
Department of the Prime Minister and Cabinet
Level 8 Executive Wing, Parliament Buildings
Wellington 6011

Preliminary matters

Our submission does not contain confidential information.

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Introduction

As the owner and operator of critical infrastructure, Transpower welcomes the opportunity to comment on *Strengthening the resilience of Aotearoa New Zealand's critical infrastructure system (Discussion Document)*. It is difficult to overstate the importance of planning for resilient infrastructure, including electricity infrastructure, and preparing for resilient communities.

Recent severe weather events have provided case studies that illustrate this importance. In the case of the Auckland floods, we were able to demonstrate risk reduction through modern designs that ensured transmission service was not interrupted even when the substation was inundated to 1.7m. In the case of Cyclone Gabrielle, our ability to respond and recover was demonstrated, but so was the vulnerability of those substations that were flooded. These vulnerabilities stem from investment decisions made nearly 100 years earlier.

Transpower's high voltage network traverses almost every district in the country and provides a key link between the North and South Island. In addition, the Grid supports and is supported by telecommunications networks, and information and operational technology systems.¹ Our people and service providers, the equipment and spares in our warehouses, and our systematic approach (using the Co-ordinated Incident Management System (CIMS)) enable us to prepare and respond to events.

¹ The bulk of the fibre we use is owned by other infrastructure operators.

The resilience of our assets to natural hazards has received increased focus, in part due to the increased severe weather events due to climate change and in part due to emerging science in areas such as seismic hazards. People risks are also front of mind, with impacts on Grid assets being the subject of the country's first sabotage conviction.² Our supply chain security and procurement resilience has been regularly tested since the outbreak of COVID-19. Our cyber-security defences are frequently enhanced to remain fit for purpose.

Summary of position on the Discussion Document

We agree with the description in the Discussion Document of the 4 megatrends that are increasing risk to infrastructure and people/personnel resilience. We also agree with the interdependencies between infrastructure articulated in the Discussion Document.

The administrative burden, and associated costs, of regulatory change could be significant. The need for this additional burden must be justified before being imposed. Transpower considers that any reform should proceed on an incremental basis – if a light touch in terms of regulatory change to require adherence to already established frameworks achieves the desired outcomes, no additional regulation should be imposed.

While Transpower recognises improving resilience as a key area of focus, it is important that any investment is considered on a risk-weighted basis and within the broader investment programme of the business. This will allow a more optimised planning approach and a more effective delivery of resilience benefits. In this regard, we do not support deterministic standards being imposed. Our preference is for resilience to be measured on our systems and processes to plan, respond and deliver.

We support mandatory information-sharing, as well as interaction with others – both are crucial to improving overall resilience of the infrastructure system. But the sharing and/or development of information must come from central government as well – we need greater information on hazards and threats. We need a common data-set. For the system to be resilient, interdependent infrastructure, and our existing regulators, must be working from the same base information.

We oppose the imposition of an additional regulator. Transpower is already subject to regulation by the Commerce Commission and the Electricity Authority – both capture resilience to a certain extent (primarily through reliability requirements and service quality measures). However, our economic regulation limits our ability to fund resilience works. Other regulation places barriers on our ability to carry out necessary works, and some increases the stress our infrastructure faces. As a result, we consider there is a need for a central agency with policy oversight in relation to infrastructure resilience – existing regulatory frameworks can be amended to have the right settings, and broader legislation and regulation can be strengthened to ensure resilience is getting the right focus.

General questions

Does this document accurately identify the issues with New Zealand's current approach to regulating the critical infrastructure system?

At a very general level, we agree that the document identifies issues with regulating critical infrastructure.

² R v Phillip [2022] NZHC 3197

However, infrastructure is complex – as are the threats and stresses affecting it. Not all infrastructure is the same, requiring the same response. An appropriate response for an earthquake will be different from a response for flooding. What is appropriate for electricity transmission and its operation may not be appropriate for an electricity distribution business or a generator. The extent that parts of the critical infrastructure system should be strengthened will depend on what is happening with other parts of the system or value chain – there is little benefit in one part of the chain being out of step with interdependent infrastructure.

For the Grid, providing a resilient power supply to a major city may be different from a small substation servicing a rural area. Similarly, ensuring resilience for Transpower across the 5 domains identified will require a varied approach – what is appropriate for physical infrastructure is unlikely to be the same for cyber-security or for supply chain resilience.

Understanding response and recovery to providing electricity service is dependent on co-ordination across generation, transmission, and distribution companies. Options to improve readiness and risk reduction also require a co-ordinated sector approach. However, the electricity sector is highly fragmented which makes collaboration important, but also provides a challenge to deliver regulation for the sector. These challenges increase given the interdependencies with other infrastructure and potential for other infrastructure solutions, or community-based solutions³, to be appropriate.

Further complexity and challenge is introduced given the 5 domains identified in the Discussion Document – resilience issues will differ for each domain, requiring a different response.⁴

It is important that any regulatory and non-regulatory response is developed with this complexity in mind. A one-size-fits all response will not be appropriate.

Do we have any ideas for possible reforms that may help address the problems?

Transpower considers that any legislative response should proceed with care – requirements to meet certain resilience standards, by a certain time, and to report and/or be audited should be last resort. We accept that there is a lot of work to do, particularly in relation to the inter-connectedness between different infrastructure. Requirements to share information should be imposed before requirements to do more.

Our understanding from our Australian industry peers after the implementation of the Commonwealth Government's *Security of Critical Infrastructure Act 2018* is that the framework set up a complex burden of compliance plans and audits. Compliance thresholds, while designed to encourage vigilance were based on "industry best practise," a target that continued to move which was not matched by investment horizons for critical systems.⁵ Costs were also increased through the need for onshoring of data and technical support limiting cost efficiencies gained from cloud-based computing. The standards also created blanket requirements and did not consider the risk-value trade-off between infrastructure used to serve rural areas versus major capital cities. This

³ We note that the focus of the review is on critical infrastructure – we query whether this focus is too narrow and should be broadened to include the role of councils, communities and individuals more generally. Actions that can be taken at the end of the resilience "chain" can impact on what needs to be done earlier on, including by critical infrastructure operators.

⁴ By way of example, our supply chain resilience is managed by an experienced team through the strength of its relationships, and ability to respond flexibly to a dynamic situation. Transpower's procurement team is about to embark on a Supply Chain Resilience Project, that will build on the learnings of the last 3 years.

⁵ By contrast, Transpower's key regulator expects us to meet "Good Electricity Industry Practice" (Electricity Industry Participation Code).

framework has been expensive to comply with and has led to a significant ongoing regulatory burden with a range of unintended consequences. The additional costs will ultimately be paid for by the consumers. Care should be taken before proposing reform that reflects the Australian regime.

An early step in any reform would be to consider existing regulatory frameworks and the broader suite of legislation and regulation relating to infrastructure, including its funding, operation, protection and consenting of works. A gap analysis should be undertaken, and if necessary existing frameworks should be strengthened.

Transpower has two regulators – the Commerce Commission and the Electricity Authority. The role of both is arguably broad enough to capture resilience – although through a reliability lens. Transpower is currently preparing its RCP4 application in relation to our work plan for the 2025-2030 period. Resilience of our network is a prominent part of this work. However, our regulatory regime limits the ability to seek expenditure for all resilience works.

Reforms in economic regulation would assist infrastructure agencies, including Transpower, by providing regulated revenue for resilience in a way that is in the long-term interest of consumers and for New Zealand – different projects or works would be captured. The current economic regulatory framework does not have provision for proactive resilience expenditure to be funded.

Other regulatory regimes that impact on resilience of critical infrastructure that should be considered through any reform are set out in **Appendix A**. More detail can be provided on all matters raised.

If a more onerous legislative response is implemented, a phased implementation would be crucial to the new regime working as intended. The Emergency Management Bill contains a two-year timeframe for existing lifeline utilities time to comply with any new legal requirements relating to critical infrastructure ‘planning emergency levels of service’ and annual compliance reporting. This timeframe is both unrealistic and unreasonable given the complexities involved. There would be significant challenges for Transpower in meeting this two-year timeframe given we need to work with multiple stakeholders. Any new legislative requirements would need to be phased in over time to enable organisations to understand the implications (including responding to any interdependencies), plan, resource and deliver. In addition, a phased implementation may enable some lessons learned early to streamline the compliance effort while meeting the objectives.

Prelude: Objectives for and principles underpinning this work programme

Does more need to be done to improve the resilience of New Zealand’s critical infrastructure system?

We agree that more needs to be done in relation to a shared understanding of:

- hazards and threats;
- the risk and impact of these hazards and threats, particularly the frequency and severity of these events - a consistent data set is needed (eg. different climate change scenarios being used for flood modelling can result in a different assessment of the risk, and warrant a different response);
- community expectations around resilience in an increasingly electrified world and the cost-benefit trade-off from proactive spend versus fast response capability;
- the levels of service critical infrastructure providers design to and maintain, in order for interdependent infrastructure operators to be able to factor these levels of service into their own resilience programming.

Have you had direct experience of critical infrastructure failures, and if so, how has this affected you?

Transpower experienced a loss of supply in Hawkes Bay and Te Tairāwhiti following Cyclone Gabrielle. Our Redclyffe Substation was flooded causing significant damage to our assets. Working together with local distribution companies, Genesis and our service providers, we managed partial restoration (including to the regional hospital) within hours of the event, and full restoration in three days. The speed of this restoration was due to a number of factors, including:

- a Business Continuity Plan based on the CIMS model, trained staff, and nationally spread emergency spares, as well as multi-layered and functional stakeholder relationships;
- a comprehensive 110kV contingency plan having been developed with regional stakeholders;
- an emergency operating contract with Genesis that enabled their on-site resources to perform switching at the Tuai.

Restoration efforts were however impeded by the unavailability of helicopters to assess damage and plan repairs (noting they were directed to rescue activities) and by the failures of regional roads and bridges. The wider communications failure had an impact on our ability to communicate to our workforce.

Historically, Transpower has direct experience with many events that have damaged our assets, or damaged our assets and caused loss of service, including floods, snow and ice, earthquakes, volcanic eruptions, ex-tropical cyclones, tornadoes, equipment failure, substation fire, space weather, sabotage, tree-fall and third party actions damaging our assets.

We note that during major events, resources may be diverted to higher priority activities such as rescue activities (as was the case in the Hawkes Bay) and then impact service restoration. In this regard, impacts may differ from those expected.

How would you expect a resilient critical infrastructure system to perform during adverse events?

For Transpower, the resilience of its infrastructure will vary depending on the location of its assets. The National Grid is long and stringy, with little to no duplication at the extremities. If a substation at the end of a spur line was severely damaged as a result of an extreme event, it might take days to weeks to get it back up and running. This timeframe would likely be significantly longer than for an area that was supplied by more than one substation or more than one line. After Cyclone Gabrielle, we started to restore power just hours after the event, because of our more extensive network in the region.

In determining how a resilient infrastructure system should operate during an adverse effect, consideration needs to be given to the level of redundancy for systems and the people required. For example, for Grid infrastructure, backup control and communication systems could all be provided. Again, there are interdependencies with telecommunication providers and other industry participants, such as generators or distribution companies, which impact our overall resilience during an adverse event.

Consideration also needs to be given to the age of the infrastructure, and the likelihood that the adverse event in question will occur. The bulk of the Grid is old, built 50-70 years ago, – there are legacy issues from a resilience perspective. But, even if we harden aged assets, we may not bring them up to the same standard as for a new build – something less may be appropriate to reduce

risks of the most likely adverse effects. In this regard, we may upgrade an asset to survive a 1:250 year flood event, rather than a 1:450 year flood event.

Would you be willing to pay higher prices for a more resilient and reliable critical infrastructure system?

The consultation document proposes that the costs of enhancing resilience should, where possible, be paid by those who benefit from those investments. Transpower's existing regulatory framework provides for cost recovery for enhancing reliability on a beneficiary pays basis.

However, whether it is justifiable to impose higher costs for more resilient infrastructure depends on a number of variables, including interdependencies with other critical infrastructure operators and the resilience of communities and individuals more generally, as well as the location of the assets and their role.

Costs to harden infrastructure to reduce the risk of failure may not be justifiable if a fast response to recover was sufficient for the relevant location or community (and the costs which it could reasonably bear). Further, as discussed earlier, what is appropriate for our major centres would not be appropriate for communities at the end of a spur line. Application of a deterministic standard for all infrastructure may not be appropriate for even our major centres – it may require too much hardening of infrastructure, without application of a risk-based assessment.

Whether increased costs are reasonable needs to be considered across a network, not merely by individual asset. As an example, we are currently scoping work to address flooding risks as part of our RCP4⁶ application. Our approach recognises that it may be more cost-effective and beneficial to target key vulnerabilities across many sites, even if not to bring them up to full current standards, than focussing on bringing a few very high risks sites up to full standard.

We note this question relates to costs associated with more “resilient” and “reliable” infrastructure. As discussed later in this submission, Transpower's regulatory regime allows cost recovery of works to increase reliability. Some, but not all, resilience projects would fit within the existing regulatory regime.

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 growth. Do you agree with these objectives? If not, what changes would you propose?

We agree that the objectives of the work programme need to be pragmatic and meaningful.

We note the objectives and the others outlined on page 8 covering technological change, regulatory change in relation to cyber risks and protecting critical infrastructure against risks to information and operational technology; and enhancing alignment with other regulatory regimes, including resource management, emergency management and climate change response.

Additional objective in relation to enhancing alignment with other regulatory regimes

We agree with the additional objective of “enhancing alignment” between other regulatory regimes relevant to critical infrastructure, including resource management, emergency management and

⁶ ie. For Transpower's revenue control period that runs from 1 July 2025-30 June 2030. Further information can be located on Transpower's website: <https://www.transpower.co.nz/our-work/industry/regulation/rcp4>

climate change response. However, those other regimes may require amendment to ensure critical infrastructure is resilient. See **Appendix A** for further details.

Do you agree with the proposed criteria for assessing reform options? If not, what changes you would propose?

The proposed criteria for assessing the reform options are:

- Criterion A: How well does the option enhance resilience?
- Criterion B: How does the option change regulatory burden and regulatory certainty across the community?
- Criterion C: How does the option change the regulatory system's complexity?

These criteria seem reasonable for the current stage of the Discussion Document. We note that criterion C, as expanded on at page 10, has a financial focus than about complexity. In our view, cost should be a factor. However, options should ultimately not be discounted because they are complex. As indicated earlier, both the infrastructure system and 'hazardscape' are complex – the response needs to be fit for purpose for this complex system and across all domains within the system.

We note that it may be too soon to develop evaluative criteria without understanding what is being evaluated. The proposed criteria are very generic. More specific criteria could be developed as the work programme progresses.

Section 1: Background and context

Why a new regulatory approach may be required

The paper discussed four mega trends: i) climate change, ii) a more complex geopolitical and national security environment, iii) economic fragmentation, and iv) the advent and rapid uptake of new technologies. Do you think these pose significant threats to infrastructure resilience?

Yes. All four feature in some guise in our strategies and identified external risks. We note that the advent and rapid uptake of new technology is a risk, as much as it is an opportunity. New technologies might provide increased options for greater resilience – Transpower now has a mobile substation that can be deployed if needed following an event.

We also agree with the 2 indirect impacts of climate change (megatrend 1), being:

- Continued transformation of electricity generation and distribution; and
- Changing consumer demands and preferences.

We note that the first indirect impact should also refer to "transmission," as it is not merely distribution lines that will be impacted by climate change.

Are there additional megatrends that are also important that we haven't mentioned? If so, please provide details.

Yes. Consumer resilience in New Zealand is changing - our increasingly urban population appears to be less resilient to external shocks. The decreasing appetite for outages ramps up pressure on infrastructure providers and operators to further enhance resilience, even where that might not

have been demanded several decades ago. Further, electrification will only increase reliance on electricity, resulting in the need for greater resilience going forward⁷.

Consideration should also be given to how to enhance the resilience of communities, including the funding of these wider solutions.

Do you think we have described the financial implications of enhancing resilience accurately? If not, what have we missed?

We support the comments in the Discussion Document (at paragraph 68) that significant attention will be given to minimising the scale and consequence of any cost increases. In this regard, we agree that:

- the focus should be on “lifting the floor” of critical infrastructure resilience;
- timing of introduction of any new regulatory requirements should align with businesses’ existing investment plans.

However, the discussion on costs is brief and makes some very general statements. A statement is made that increasing annual investment in high-quality critical infrastructure resilience should save money in the long term. Whether there are any cost savings will depend on the stress or shock that impacts on the operation of the relevant infrastructure. By way of example, Transpower may make infrastructure investments that are not tested by relevant stresses or shocks – earthquakes, volcanic eruptions and tsunami may not occur, or may not occur to the design level. Other investments may be regularly tested (as occurred at the Wairau Road Substation during the Auckland flooding event).

We further query the accuracy of the comment that where significant additional investments are required, any costs increases are expected in most cases to be gradual rather than as a one-off increase. The reason given is that critical infrastructure assets are long lived and investments to enhance their resilience also occur over lengthy timeframes (para 67b). This reasoning is not correct for ICT investments – which have a much shorter life. These assets would repeatedly be impacted by any minimum standards.

The statement about cost increases being gradual due to the long-life of assets is generally accurate for physical infrastructure. However, some smaller communities will bear the bulk of costs of infrastructure resilience investments. By way of example, if a new line is considered a connection asset, the electricity consumers benefiting from the line will bear most of the costs. While these will be incurred over the life of the asset, there will be an initial step change. If communities are facing the costs of resilience projects from multiple infrastructure operators, the costs may be unexpected.

⁷ In its terms of reference for the Energy Strategy, the Government has announced a target of 50% of the country’s total energy needs being from a renewable source by 2035. Achieving this target requires a substantial and rapid increase in electricity volume. In *Whakamana i Te Mauri Hiko*, this target is achieved in our *Accelerated Electrification* scenario, which contemplates an increase in demand by 68% compared to 2020, and an increase in installed generation of 137%. We expect a large proportion of generation to be centralised – with geothermal, wind and hydro generation representing 63% of total capacity installed and generate 81% of the total annual electricity generated. Our recent modelling forecasts a need for 60-70 new Grid scale connections between 2020-2035, comprising 30-40 generation connections and 3- connections to accommodate increased demand due to electrification. Our modelling identifies a need for 10-20 large Grid upgrade projects by 2035 to accommodate this increase in demand and supply.

We consider that the cost increases associated with any resilience focussed reform could be significant. Transmission charges would increase. Further, if the system operator service became more expensive to operate the Electricity Authority would likely pass this increased cost onto consumers.

Section 2: Potential barriers to infrastructure resilience

Building a shared understanding of issues fundamental to system resilience

How important do you think it is for the resilience of New Zealand's infrastructure system to have a greater shared understanding of hazards and threats?

We consider it crucial that there is a greater shared understanding of hazards and threats – resilience of our infrastructure will only be as good as the data on the hazards and threats. Some information is readily available from national organisations to a high standard, including the Lifelines National Vulnerability Assessment for Critical Infrastructure, and information provided by GNS Science, MetService and Niwa). However, collection of some hazard and threat data is incomplete or out of date. By way of example, flood modelling is devolved to local authorities, who in some instances may have inadequate funding, capabilities, or other priorities.

This uncertainty, and lack of agreement about hazard and risks can place projects at risk, particularly where the infrastructure operator and regulator are not aligned. By way of example, there could be agreement that flooding is a risk, but the regulator may not agree with the risk assessment of where it will happen, how badly it will flood, or how frequently. This broader agreement is necessary to ensure regulated investments are approved.

From a cyber security perspective, information sharing is currently facilitated through the National Cyber Security Centre (NCSC) and the NCSC facilitated Control System Security Information Exchange (CSSIE) group. This could be enhanced through more timely exchange of threat information, as incidents impacting other providers evolve.

If you are a critical infrastructure owner or operator, what additional information do you think would best support you to improve your resilience?

We require:

- Accurate climate data. We are currently relying on ageing datasets provided by the Ministry for the Environment and others;
- Probabilistic risk models for landslides for our infrastructure;
- Wider coverage of 2D and 3D flood modelling, including climate change scenarios;
- Information regarding trends in cyber-attacks;
- Timely threat information with regards to active incidents;
- Improved access to security screening services for key operational personnel;
- Improved guidance on building performance with the national seismic hazard model;
- Resilience priorities for roading and telecommunications;
- Community expectations, including an understanding of appetite to bear the increased costs for resilience;
- Understanding of respective responsibilities of Transpower, compared to others in the electricity industry, other infrastructure providers, or Councils and communities more generally.

What do you think the government should do to enable greater information sharing with, and between, critical infrastructure owners and operators?

Currently information sharing occurs between lifeline utilities via meetings arranged at a regional level – usually by the local authority that runs the relevant civil defence group. Neither the need for the meeting, nor attendance at it, is mandated. Instead, they are organised due to community concern should an emergency event occur, with the meetings and attendance at them voluntary.

Some infrastructure operators opt out of attending the meetings and sharing information. This situation may possibly be a consequence of competition or privatisation, or potentially competing priorities.

Further, while meetings with a regional or local focus will be helpful for councils and communities, they are less useful for national providers. Meetings with a much broader, or national, focus would be useful.

We consider that:

- Meetings between interdependent infrastructure operators should be mandated. However, there should be flexibility to determine the frequency of meetings and/or attendance based on the interdependence of the relevant infrastructure providers. In this regard, wider infrastructure provider meetings may occur less frequently than meetings between infrastructure operators with a closer relationship (such as Transpower and the generators or EDBs);
- attendance at a minimum number of the meetings should be mandatory;
- provision of key information necessary for inter-dependent infrastructure operators to make decisions about their own resilience should be mandatory.

However, care needs to be taken about the type of information that is mandated to be provided – it needs to be both practical and possible. By way of example, clause 57 of the Emergency Management Bill requires critical infrastructure operators to “establish and maintain planning emergency levels of service” and to publish the emergency levels of service on its website. Depending on what is required, this task would be incredibly difficult to the point of being impossible.

Transpower supports transparency about emergency levels of service. But, the provision of this information must be at a level that is practical – and practical for each infrastructure operator, taking into account the make-up of their assets, and the impact of each of the domains. For Transpower, it must be at a broad-brush level, and may need to be worst case. The ability to restore electricity supply after a stress or shock at a particular substation or a particular line or cable would depend on a number of factors, including the combination of assets in the location, the availability of generation, the weather at the time, what the stress or shock was, and the ability to access a site for repairs.

Any requirement to carry out extensive scenario testing for all Transpower’s assets would be a significant workstream – and may not provide benefit to interdependent infrastructure operators that justify the time and cost required.

Setting proportionate resilience requirements

Would you support the government having the ability to set, and enforce, minimum resilience standards across the entire infrastructure system? If so:

– what type of standard would you support (eg. requirement to adhere to a specific process or satisfy a set of principles)?

– do you have a view on how potential minimum resilience standards could best complement existing approaches to risk management?

As identified in the Discussion Document, Resilience standards can be prescriptive, principle based, or process based. Ultimately, a mix of these may be best. However, where minimum standards are imposed, this can lead to unintended consequences due to the uncertainties of information and variety of scenarios encountered.

What is meant by minimum standards needs context. For example, Transpower's new build design standard (target) for flooding is for a 450-year return period. However, there could be a minimum standard around resilience for flooding that the service can survive a storm event that is a 200-year return period (allowing for climate change). This is different to the minimum standard of return to service time. Note that we specify return periods for seismic performance and most infrastructure providers have design standards they build to.

There are further reasons for not supporting a prescriptive regime where the government sets or enforces firm resilience targets. In particular, significant parts of the Grid are decades old and were built to different resilience standards than today. Setting a firm resilience target could require a substantial part of our current asset base to be upgraded to the latest standards. Not all assets may warrant the same level of upgrade, given their location and purpose. Further, as discussed earlier in our submission, due to the long stringy nature of the Grid, the resilience at the extremities is likely to be lower than where there are a greater number of interconnected assets, such as major urban and industrial centres. For some of our more isolated substations it will be impractical to create a similar level of resilience as for those where we have an alternative nearby. There may be cheaper community resilience options that could meet the need.

Resilience can be improved through a range of investments – both big and small. It is possible to focus on individual assets, such as having a “substations” or “towers” programme. But, a linear network needs to be considered as a whole. A resilience regime that focusses on the approach to asset management and risk management will result in a more effective resilience regime.

Minimum standards also cut across the complex nature of the infrastructure system and its interdependencies. An individual asset could be made more resilient by a range of responses – ranging from hardening through to joint or community-side approaches to mitigations. By way of example, it may be more effective to raise a stopbank than to harden the infrastructure behind the stopbank.

Instead of specifying minimum standards, we consider that a process-based standard would be more useful. This process would require the infrastructure owner to provide information that demonstrates that they have the ability and means to provide a resilience service effectively.

Would you support the government investing in a model to assess the significance of a critical infrastructure asset, and using that as the basis for imposing more stringent resilience requirements? If so:

– what options would you like the government to consider for delivering on this objective?

- what criteria would you use to determine a critical infrastructure asset's importance?

We assume a model, or at least some principles, will need to be used to determine what entities or assets come within the amended definition of “critical infrastructure” proposed in the Emergency Management Bill. However, we have no view on whether a model needs to be developed for this purpose.

However, further information is required to understand the difference between determining an asset’s “significance” (addressed in this question) and its “criticality” (addressed in the question below). We address the need for a Government model below.

We disagree that the criticality of an asset should automatically correspond to a more stringent resilience requirement. Given the inter-dependence of infrastructure, the identification of an asset as significant or critical gives rise to the question of what level of resilience should be provided for that asset – and what level of resilience should be provided for interdependent infrastructure – so that the system is resilient.

These issues can be seen by considering electricity supply to the West Coast after a magnitude 8 Alpine Fault earthquake (AF8). The West Coast uses less than 1% of the country’s electricity supply – via two separate Grid connections over mountainous terrain. In a major earthquake, we expect major slips to cut supply from the Grid, as well as the road and rail networks, for weeks and months. It is not feasible to avoid these impacts by hardening the Grid assets. It is also likely that an earthquake of this magnitude would reduce electricity demand. As a result, a community response may be a more appropriate. This response could involve a number of strategically placed larger diesel generators, and reliance on any smaller hydro schemes in the region that are still functioning connecting to Buller or Westpower’s distribution network, as both their networks and our own connections into region are rebuilt.

Would you support the government investing in a model to assess a critical infrastructure asset’s criticality, and using that as the basis for imposing resilience requirements that are more stringent on particularly sensitive assets? If so:

– what options would you like the government to consider for delivering on this objective?

– what features do you think provide the best proxies for criticality in the New Zealand context?

Transpower considers that there may be a role for the Government in supporting organisations who are unable, or ill-equipped, to assess the criticality of their infrastructure. However, we do not consider there to be value in the Government preparing a single model – particularly given the complexity of infrastructure and the significant number of variables that would need to be modelled. We also note that development of a comprehensive model is likely to duplicate work that has been carried out by individual operators (thereby adding unnecessary costs to end-users).

Transpower assesses the criticality of Grid assets. We have quantified asset criticality that monetises the loss of energy, environmental impact, direct cost and safety. However, for the purposes of understanding importance relative to other agencies, we have developed categorisations of National, Regional and Local for our substations and transmission lines. This uses the modelled

unserved energy (impact) but also the importance of those parts of the network for black start⁸ and regional contingency plans (recovery time). We consider the National, Regional and Local categorisations to be sound, and that the limits set to define these have been developed across many agencies and not been overly simplified.

Managing significant national security risks to the critical infrastructure system

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:

- **what type of powers should the government consider?**
- **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?**

Transpower agrees with the comments in the Discussion Document (page 40) that the Government, with its significant legislative powers, is best qualified to detect and disrupt sophisticated intelligence and cyber security threats. For this reason, there must be necessary sharing of that information with critical infrastructure operators, despite its sensitive nature. Appropriate clearances could be put in place with relevant personnel.

National security threats could also be improved through the development of a robust security screening process, that could be used by critical infrastructure operators when making employment (and potentially procurement) decisions. Currently, the options are limited to a police check or full SIS screening (with the latter having limited capacity).

We accept that there may be a need for legislative change, so that the Government has last-resort powers to intervene in relation to cyber-security and other national security matters, as it can with traditional states of emergency. However, the drivers for and consequences of any legislative powers of direction or intervention would need to be understood in order to develop fit for purpose legislation. In this regard, given the complexity of operating the electricity system (as an example), we query whether the Government would be best placed to assert the mitigations that must be put in place in relation to a national security threat.

If legislative change is to be considered further, care will need to be taken in its development. It may be appropriate for a working group to be formed involving critical infrastructure operators, to ensure that all issues have been considered in the policy development.

We also note that some existing legislation appears to be outdated given the increased threats to infrastructure, such as the Crimes Act and Terrorism Suppression Act. Updating these Acts should also be considered.

⁸ Black Start is the systemic and progressive restoration of the whole or part of the electricity grid after a very widespread total loss of electricity supply.

Creating clear accountabilities and accountability mechanisms for critical infrastructure resilience

Do you think 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:

– do you consider that new regulatory functions should be the responsibility of separate agencies, or a single agency?

– do you consider that an existing entity should assume these functions or that they should be vested in a new entity?

– how do you see the role of a potential system regulator relative to sectoral regulators?

Transpower agrees that there could be benefit in a single government agency being responsible for resilience of the critical infrastructure system (ie. an oversight agency). In particular, there is a need:

- for infrastructure resilience to be considered during policy and legislative development. We are currently seeing laws and regulation being developed which are directly or indirectly adding to the stresses our infrastructure faces (see **Appendix A**);
- for a comprehensive understanding of the ability to carry out, and constraints on, resilience-focused projects for critical infrastructure, even where that infrastructure is already subject to existing regulators. Changes to existing regulatory requirements may be needed as a result.

While we consider there to be a need for a Government Department and Minister to be responsible for resilience, at this time, we do not consider there to be value in creation of an overarching regulator. Transpower considers that any reform must proceed in an incremental fashion – an additional regulator must be last resort once other mechanisms have failed.

Various sectors are already subject to established regulations and principles, overseen by separate regulators. For Transpower, these regulators are the Commerce Commission and Electricity Authority.

One of the Electricity Authority’s functions is to promote “reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers.”⁹ To a certain extent, this function captures resilience of the electricity system (although, not the inter-related infrastructure operators). An example of the Electricity Authority ability to focus on resilience is its annual cyber preparedness survey.

We also note that our existing regulators already have a monitoring and compliance function. The performance of Transpower’s system operator function is regulated by the Electricity Authority via the Electricity Industry Participation Code 2010 (Code). The system operator has principal performance obligations under the Code in respect of its operation of the real-time power system. The Electricity Authority administers enforcement of the Code, including via a Rulings Panel, which is an independent body that assists in enforcing the Code.

The Commerce Act, and the Commerce Commission’s role under it, also extends to resilience *to a certain extent*. Its remit extends beyond the electricity industry, but again, not to all interdependent

⁹ Section 15 Electricity Industry Act 2010.

infrastructure. The Commerce Act promotes the long-term benefit of consumers, including that we have:

- incentives to innovate and invest, including in replacement, upgraded, and new assets; and
- incentives to improve efficiency and provide services at a quality that reflects consumer demands¹⁰

The Commerce Commission also has an enforcement regime – with the ability to impose severe penalties, which incentivise service quality targets being met. The Commerce Commission is responsible for determining input methodologies (IMs) - these impact on what we spend our money on, and how it relates to our service delivery. Transpower has recently lodged a submission on the Commission’s review of the IMs¹¹. Our submission raises concerns about the draft decision to not make explicit provision within the IMs for resilience expenditure (consistent with the IMs for other sectors, other than the draft decisions for EDBs). Instead, resilience is limited to either a major capex proposal or enhancement and development type expenditure (as part of base capex). In making this submission we noted that recent experience has shown that new assets that are built to current standards will perform well in major hazard events, but many older assets reflect the lower standards and awareness at the time. While replacement and refurbishment cycles provide an opportunity to upgrade to appropriate standards, the timing may be many years away, creating unacceptable risk.

The regulation of Transpower by both the Commerce Commission and Electricity Authority is broad enough to capture resilience to a certain extent. Other laws and regulation will also impact on infrastructure resilience, but that impact has not been considered. By way of example, the Resource Management Act 1991 (and the national direction under it), Emissions Trading Scheme (ETS) and the Electricity (Hazards from Trees) Regulations are in combination creating additional stresses for electricity lines – trees are being planted close to lines putting them at risk. Plantation forestry is being planted and registered under the ETS in circumstances where the trees cannot grow to maturity before needing to be removed due to risks. Transpower has lodged multiple submissions raising this issue, but no changes have been made and trees continue to be planted too close to lines¹².

We suggest that before considering the creation of an additional regulator, the existing laws, regulations and processes should be reviewed, to ensure that resilience is being given the appropriate focus. If not, the existing regime should be strengthened, before creating an additional resilience regulator. Any review would be a policy, rather than regulatory, function, and could be carried out by the Minister and Government Department responsible for infrastructure resilience.

¹⁰ Section 52A Commerce Act 1986.

¹¹ Link to [Transpower's submission on the IM review](#)

¹² Link to Transpower’s submission on the [Trees Regulations Discussion Document](#). Transpower is also in the process of drafting a submission on the review of the ETS and Permanent Forests discussion document released by the Ministry for the Environment, raising resilience issues.

Do you think there is a need for compliance and enforcement mechanisms (eg. mandatory reporting, penalties, offences) to ensure that critical infrastructure operators are meeting potential minimum standards? If so:

– do you consider that these should be applied to the entity, to the entity’s directors/executive leadership, or a mix of the two, and why?

As indicated earlier, we consider that any reform should proceed in an incremental manner. We do not support a regime with penalties and offences being developed at this stage – there is no evidence to suggest that a punitive regime is warranted.

Enforcement is by its very nature “after the fact.” We would be concerned if any new enforcement regime measured the performance of infrastructure post an event. The infrastructure system is complex, with a myriad of interdependencies. Before making decisions on the standard of resilience to apply to a particular asset, an infrastructure operator will consider available hazard and threat data, develop scenarios, consider risks and probabilities and implement mitigations. But, it will always be possible to land on a different mitigation option - to do more. There will also be surprises. The impact of the slash and silt during Cyclone Gabrielle is an example of an unexpected impact. As a result, we query whether a just enforcement regime could be developed.

However, as discussed earlier, we consider that sharing of information should be mandatory. There should be accountability. A failure to share information, and report that you have done so, could be subject to fines.

Appendix A: Existing legislation and regulation that are impacting on infrastructure resilience

Transpower considers that existing regulation and legislation does not give sufficient prominence to the resilience of infrastructure – barriers to infrastructure projects are created or additional stresses result from the lack of prominence.

Note that the following list is not exhaustive. Further, more detailed comments, can be provided.

Barriers

There are a number of barriers to our projects and works – due to funding, timing of obtaining approvals, or incomplete regimes.

Funding barriers:

Draft Input Methodologies for transmission – these do not extend to “resilience only” projects or works (as discussed in our submission).

Consenting barriers due to lack of consideration of resilience or age of assets:

The Resource Management Act 1991 (**RMA**), and various national policy statements and national environmental standards under it are creating barriers to infrastructure projects.

The Natural and Built Environment Bill does not appear to provide a solution to these issues. National Policy Statements provide highly protectionist policies (with strict avoid policies). These are creating barriers to projects. National Environmental Standards are not recognising the age of existing infrastructure and the need to make existing assets more resilient – instead only like for like replacements are given an easier pathway, with works that change the footprint or upgrade the works being treated as if they were new assets and could go elsewhere.

Barriers due to limits in emergency legislation:

- RMA – sections 330 and 330A - provide for “immediate” measures to be taken, and retrospective consents to be applied for during an emergency. For Transpower, the medium to long-term response is often not immediate – it needs to be designed and engineered. However, the need for a solution is no less urgent. We consider that the RMA¹³ needs to be amended to remove requirements of “immediacy” and replace them with requirements that the work is “urgent.”
- Development of wide-ranging legislation to enable response to and recovery from adverse events is required. We also note that other consenting legislation does not provide for any fast-track process in the event of emergencies, including the Wildlife Act and Conservation Act. Fast-track processes under other environmental statutes are required if infrastructure is to respond to stresses and shocks in a timely manner.

Timing barriers:

Conservation Act 1987, Wildlife Act 1953 – no timeframe for obtaining concessions and wildlife permits. Approvals can take more than 6 months. No ability to seek fast-track or retrospective approval during an emergency.

¹³ Similar provisions are contained in the Natural and Built Environment Bill, but these also do not address the issue for larger scale infrastructure.

Barriers in relation to property acquisition:

The Electricity Act and Public Works Act 1981 authorise access to land, including compulsory acquisition. Disputes can often be about the quantum of any property compensation, rather than whether access can or should be able to occur. Projects or works could occur in a more timely manner if the Electricity Act in particular was amended from an authorisation regime to a compensation regime – so that the access could occur on landowner agreement, with the quantum of any compensation to be addressed subsequently.

Increased stresses

Any resilience work programme needs to involve protection of existing physical assets - not merely resilience of the system delivered by those assets. In this regard, transmission lines are subject to increasing risks (or stresses) from inappropriately planted vegetation near our lines. Inappropriate construction of buildings (primarily housing) and structures create additional risks (or stresses).

Increased stresses due to trees:

- Electricity (Hazards from Trees) Regulations – do not prevent trees being planted “in the right place” away from transmission and distribution lines. The Tree Regulations do not authorise removal of trees that place lines at risk due to the ability to fall into lines.
- Emissions Trading Scheme – incentivises trees being planted close to lines, and increases costs of removing inappropriately planted trees.
- Resource Management (National Environmental Standards for Plantation Forestry) Regulations 2017 – does not prevent trees being planted where they will place transmission lines at risk.

Increased stresses due to buildings and other structures:

- Building Act 2004 – does not require buildings to comply with NZECP34 (an electrical code of practice that sets out safe separation distances between lines and buildings and other structures). Buildings are being granted building consent when the building and/or its construction methodology places transmission lines at risk.
- Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021 – enables housing as a permitted activity with no explicit requirement to consider electricity lines.
- National Policy Statement on Electricity Transmission (NPSET) – includes policies 10 and 11, which require setbacks for buildings from lines. However, there is no rule framework to support the NPSET policy framework. Transpower has spent more than \$10M since 2008 seeking rules in district plans nationwide to protect the lines. All councils have yet to include rules – despite the deadline for including rules in plans being 2012.