

2 November 2023

Northern Energy Group submission to the Ministry of Business, Innovation & Employment

Response to the consultation on advancing New Zealand's energy transition

Introduction

The Northern Energy Group (NEG) welcomes the opportunity to provide feedback to MBIE on the consultation paper *Measures for Transition to an expanded and Highly Renewable Electricity System*. Our feedback has been structured in three sections:

1. Our perspective on the current electricity sector
2. Our key priorities for the energy transition; we have noted which consultation questions these are each relevant to
3. Appended relevant NEG submissions on:
 - a) The Electricity Authority's issues paper on *Updating the Regulatory Setting for Distributed Networks* (for more information about the need for regulatory alignment, critical enablers for digitisation and settings to safely unlock distributed flexibility)
 - b) Transpower's *Renewable Energy Zones National Consultation* (for more detail about REZs).

This submission should be considered alongside our NEG DSO Evolution. (Which we shared as an email attachment with this submission.) This is a new piece of work which provides a detailed overview of the role of a DSO and illustrates our expectations and understanding of DSO functions and issues in New Zealand. NEG undertook this work to help bring clarity to an area where definitions can be ambiguous, and functions are often misunderstood. We would welcome engagement and discussion with MBIE on this topic.

In the interests of brevity and clarity, the NEG have responded to this consultation by setting out what we believe to be the key enablers of the energy transition. We have not commented in detail on the various sections of the consultation document. We have however noted how each element of our response relates to questions posed. We hope that the style of this submission will provide an easier to navigate view on the key opportunities available to enable an effective energy transition.

About the Northern Energy Group

The NEG formed in 2019 around a shared belief that consumer voices need to be stronger in industry and government decision-making, and that their interests belong at the heart of our energy sector. We want to be a leading voice for change which benefits energy consumers.

The NEG is made up of seven consumer-trust owned EDBs in the North Island (Top Energy, Northpower, Vector, Counties Energy, Waipā Networks, The Lines Company, and Electra). The NEG consists of companies with a track record of taking action and being willing to give things a go. Across our group you'll see the very best in consumer engagement, generation development, future thinking, systems deployment, field operations, and engaging in practical ways with grass roots communities. Collectively we're all companies who have grown and evolved over the years.

Government has a critical leadership role to play to enable and direct the energy transition. As a collection of community trust-owned EDBs we are directly connected to our consumers and are always available to share our perspectives and expertise.



1. Our perspective on the current electricity sector

New Zealand’s energy sector holds an enviable starting point with a ~87% renewable base. We are now entering two pivotal decades that will deliver electrification of our economy. Deep, deliberate shifts will be required in the way we generate, transport, distribute, and orchestrate electricity supply.

New Zealand can access the resources, capability, technology and capital to achieve this transition. However, collective uncertainty about the tools that should be applied to ensure an effective energy transition means execution is currently behind the pace likely to be needed to meet the government aspiration, and national commitment to decarbonisation.

In setting policy and regulation, NEG believe we should acknowledge the strengths in our sector as retaining and leveraging those strengths will be central to lifting the pace of delivery. In summary, we have a high renewables base, a sector that is well capitalised, a track record of investment at scale, and modern technical transmission and distribution systems with the capability to scale investment quickly and decisively when target outcomes are clear.

But NEG consider we must also be honest about the emerging issues to be solved. Doubling energy throughput is a material undertaking. It will require large capital investments across all parts of the electricity sector, new approaches to balancing the system, and the ability to manage high volumes of distributed energy resources (DER) as an integrated element of future networks.

Strengths	Weaknesses
Strong renewables starting point (~87%)	We lack a cohesive national energy strategy and transition framework
Capable generating companies, with credentials to deploy renewables at scale	Our regulatory settings do not incentivise investment at the required pace or in the right part of the sector
Capable transmission & distribution sector, with a proven ability to scale infrastructure spend	We fail to recognise that energy issues are regional in nature, nor that the contribution of regions will differ in scaling generation
A gas sector well placed to support an orderly transition	We risk taking transitional tools off the table too early, limiting our longer-term options

Strengths	Weaknesses
A mature sector that is safe, resilient and adaptable	As a sector, we're failing to include consumers in the energy transition
Trust ownership of distribution, with strong community affinity, as a trusted guide and partner of transition	We're failing to recognise the value to communities of growing capacity and jobs at a local level
Participants are highly competent and experienced in their individual parts of the sector	There is a long-term lack of focus on energy market architecture, interoperability and whole-of-system value
Established and well-integrated energy system with consumers having access to multiple energy vectors	The gas sector is now subject to a high degree of commercial, policy and regulatory uncertainty

The NEG believe the strengths in the sector are significant, and the weaknesses reflective of a lack of clarity regarding the 'new rules of the game'. As an industry we have the capability to transition strongly and effectively, we simply need to ensure government, and industry re aligned on the nature of the transition we require, the roles that each part of the sector must play, and the regulatory settings which will apply.

2. Our key priorities for the energy transition

Government and Industry alignment (relevant questions: 39, 57, 58)

We believe urgent development of the National Energy Strategy is needed – as is a workable and deployable transition strategy. Government focus, support, and prioritisation will be essential to enabling the development of the National Energy Strategy and we encourage the new Government to make this a central priority. We believe the National Energy Strategy needs to be completed within the next 12 months.

The NEG is supportive of MBIE’s development of a comprehensive national energy strategy but suggest that a simpler governance arrangement than currently exists, or are being proposed, will be required to achieve the desired changes. As a minimum, the NEG believe the Government must align the interested government departments – ideally, establishing a *Ministry for Energy & Net Zero*, or similar setup, with relevant government departments operating ‘under the same roof’.

The NEG suggest alignment of departmental responsibilities could be complemented and amplified by establishment of a single energy regulator, covering electricity market and network regulation (including network access, quality, revenue and investment), and gas. The transition issues are becoming too complex and interwoven to be managed by separate entities. A blank sheet approach, designed to enable a focused transition with pace, would be unlikely to arrive at the current arrangement.

The sector has an enviable starting point, and strong capability that is ready to deploy. Setting a clear strategy and transition plan, that enables the right regulatory settings and sector governance to be crafted and deployed would help bring clarity to the path to be taken, and confidence for the necessary investments to be made.

Aligned Market Regulation (relevant questions: 40-44)

The NEG would like to see a move away from a linear market design approach towards more aligned market regulations with the goal of accelerating and unlocking technological solutions that deliver whole-of-system value. Uncertainty within the current regulatory framework is not conducive to the acceleration and uptake of technological solutions.

The current regulatory framework was designed when we did not have the technological solutions we have today, when scopes of and boundaries in roles were more defined, and when climate change was a less pressing concern. In order to achieve the energy transition, the regulatory framework must be explicit about

climate considerations and policymakers and regulators must be directed to take climate change into account.

Clearer settings on market design will support investors to move with more confidence. These include removing restrictions on EDBs to invest in and connect renewable generation to their networks (deepening markets), or to provide themselves non-traditional solutions, if their owners deem it to be in the interests of their constituents (optimising network operation and throughput).

Whole-of-system approach (relevant questions: 27-37, 39, 57)

Our objective is a sustainable regulatory framework which is based on a whole-of-system approach. Currently, at each level in the energy system, everyone is optimising within their own layer, while no-one has oversight of all the layers.

The energy system must be treated as the system it is, so that capital can be directed to the investments that benefit the whole system. NEG supports a whole-systems approach in assessing the total cost and value of investments to consumers, accounting for impacts across the supply chain. Currently, the market is siloed and there are knock-on effects of decisions made in one part of the supply chain to other parts, increasing total costs across the system. Ultimately, consumers are affected and bear the additional costs of siloed thinking.

This is clearly demonstrated by the contrast between the Electricity Authority's TPM and the current approach to new connection costs for distributed generation. The EA is attempting to optimise efficient investment in transmission and generation and "ensure that those who set to benefit from areas of grid investment will pay for it" (Electricity Authority, 2022), however the approach to connecting DG enshrined in Part 6 runs counter to this. Private actors and businesses are able to cause significant additional costs to connect to our networks, but not all can be recovered from them. The residual costs are then passed onto our customers, at the very time they can least afford to pay. This is particularly pronounced in the more regional areas with high levels of large-scale DG development. As a sector, we are failing to realise the impacts of new connections to the whole-system.

An alternative approach would assess investment options in terms of their value or cost across the whole system in an integrated way, including the impact on system balancing, grid transportation, or network capacity. For example, the capability for smart-charging of EVs in homes and businesses will deliver significant value across the entire electricity system, but may not deliver enough value across any individual layer to warrant the participants in that layer making the investment.

The difference in value of an investment when it is assessed for one part of the supply chain vs when it accounts for the whole system impacts is demonstrated by the whole energy system cost metric (WESC). The WESC was developed by Frontier Economics for the UK's Department of Business, Energy and Industrial Strategy (BEIS) to inform their significant transition from fossil fueled electricity

generation to enable their decarbonisation goals, efficiently. Frontier Economics has also prepared something similar for the New Zealand context in their report for Vector: *Whole Electricity System Costs*.¹

Adopting a REZ model as part of the solution(relevant questions: 57, 59)

The NEG supports Renewable Energy Zones (REZs) as a tool to enable rapid deployment of renewables to support decarbonisation, to more efficiently utilise existing infrastructure, and increase system resilience, as well as reducing overall system costs.

Increased generation within a region will have strong benefits for those local communities, and help overall system development by targeting renewable energy developments close to renewable resources and load growth. We believe the current method of influencing generation location, the combination of TPM charges and nodal pricing, understates the national benefit of aligning development of generation to areas of optimal resource.

Ultimately NEG believe it makes intuitive sense to formally recognise, and leverage regions where rich natural resources exist. This would enable regionalised solutions to be developed with confidence, in support of an optimised system.

What is the need?

REZs have been explored and applied overseas, but the specific characteristics depend on the challenges being addressed in that jurisdiction. New Zealand requires accelerated build of renewable electricity to meet the forecast demand, but a continuation of the incremental approach to network upgrades to support this increased generation is unlikely to achieve the step change we need. The challenges we need to address include:

- As the existing transmission and distribution capacity is taken up by first movers, network upgrades and new builds will be required to connect new generation
- Challenges in co-ordinating the required investment across distribution and transmission, to match the timing required by generation providers, and to ensure that the costs of network augmentation flow to those who benefit.
- The restricted ability of distribution companies to build ahead of demand or apportion investment costs associated with a REZ amongst generation developers
- The risk and cost of funding upgrades. Current mechanisms (under the TPM or Part 6 of the Code) restrict cost recovery and may result in local

¹ <https://www.frontier-economics.com/media/4629/frontier-whole-system-costs-in-nz-stc-250321.pdf>

communities bearing this cost of upgrades post-connection, when the benefits are more widespread and accrue to the generation-owning companies, at least, and possibly to consumers in other regions

- The absence of firm capacity rights to give developers certainty to invest in an area
- Environmental consenting timeframes for new lines does not always align with the timeframes of renewable energy.

What are the benefits?

NEG supports the Northland REZ pilot. Proving the concept in Northland would enable it to be applied in other regions with strong renewable potential and active development interest. NEG urges MBIE and other Government entities to be bold and rapidly pursue a Northland REZ pilot – trialling a new regulatory framework, to give effect to the following benefits:

Supporting decarbonisation

REZs would support the achievement of a net-zero carbon economy by unlocking more renewable generation through efficient transmission and distribution development, by removing barriers to generation development. Storage could also be integrated in time, to amplify the benefits of co-located generation, particularly given the intermittent nature of solar and wind. The REZ can enable the “rapid expansion of our electricity system that needs to start now” recommended by the Climate Change Commission – at least total cost to consumers.

Additional supply resilience

REZs would result in greater diversity of electricity sources and generation locations. Prima facie this is likely to result in an integrated energy system that is more reliable and resilient; as noted above, resilience benefits for high-impact, low probability events are unlikely to be fully accounted for in the existing model of investment incentivisation (i.e. TPM + nodal pricing). Unlocking new solar and wind can play a key role in reducing our reliance on fossil fuels to meet increasing electricity demand. It will also provide additional generation that would reduce the risk of dry winter outages through increased solar and/or wind generation enabled by the REZ framework.

Affordable energy prices

REZs would accelerate the development of renewable energy, increase the overall supply of electricity and should therefore help contribute to affordable energy prices for households. This is especially true as solar and wind generation becomes more economically viable and if REZs are able to leverage both public and private capital.

Secondary economic benefits to regions

REZs have the potential to not only benefit the energy system but to also deliver improved social and economic outcomes. Benefits that expand beyond the energy system include enabling regional economic development and job creation, and broader economic development by providing co-location opportunities for large energy users. Consideration of these benefits could be included in the REZ development process and form part of the economic case.

What could it look like?

Within a defined region, a REZ could have the following features:

- Co-ordinated planning of transmission (connection and interconnection) and distribution infrastructure
- A competitive connection process which sizes transmission and distribution capacity upgrades based on developer commitment
- Streamlined resource consenting process for generation development and transportation infrastructure
- Associated network upgrade costs socialised across NZ to reflect decarbonisation benefits. (Note: except for the dedicated generation connection.)

Greater affordability and equity through smart networks technologies (relevant questions: 47, 51, 52, 54)

The energy transition presents an opportunity to reduce energy costs for consumers and achieve greater levels of equity by utilising smart technology across our networks. Critical to this is the safe and secure utilisation of flexibility services.

We would like to see a greater level of urgency on supporting consumers to access these technological solutions, especially those experiencing energy hardship. This could be through:

- Targeted support for vulnerable consumers through the energy transition to participate more in new energy technologies. E.g. The Lines Company (TLC) community solar initiatives – TLC partnered with MBIE, Te Nehenehenui, and Tūwharetoa to pilot a whānau based solar energy sharing initiative.
- Supporting consumer uptake of home batteries and other smart-home enablers, especially for those consumers unlikely to commit to making this investment themselves
- Supporting investment in smart EV charging capability for households
- Doubling Ara Ake's Distributed Flexibility Innovation Fund.

Boost investment ambition (relevant questions: 27-37)

As above, our regulatory system must be recalibrated to the goals of 2023. The energy sector needs to build new generation as fast as we possibly can, supported by the necessary network upgrades, to assist New Zealand's transition away from fossil fuels and towards a long-run, affordable electricity supply.

Large and structured investments are needed to achieve these goals. We simply won't transition at the pace required if an incremental approach is adopted. Government needs to provide clear signals to encourage investment while also removing regulatory barriers to achieving greater levels of investment. The NEG believe the National Energy Strategy needs to construct and arrange the required investment by setting firm emissions and generation side reliability targets. These will act as clear market signals to encourage investment. Our economic regulation must also be aligned to the step-change in investment required in our sector by recognising financeability as a fundamental element of the price-quality regime governing many of our networks.

While investment decisions are left to market participants, a coordinated central plan (akin to Australia's *Integrated System Plan*) is essential to provide the supporting transmission and distribution planning and investment. The NEG believe designated REZs, as part of an integrated system plan, would be an important improvement to the current planning and investment regime.

The difference in thresholds for EDBs to connect generation to their own distribution networks versus to the grid, are completely arbitrary for the types of generation being considered by EDBs. While dispatchable generation such as diesel peaking plant may be able to provide specific services to the host distributor, inflexible baseload geothermal generation, or intermittent renewables such as wind and solar, are less likely to do so.

The NEG recommend that the restrictions on EDBs investing in either inflexible baseload renewable generation, or intermittent renewables, are removed completely. New Zealanders need more power stations built as quickly as possible, by anyone willing and able to commit the capital required.

The NEG also endorses Vector's perspective on financeability and supports their recommendations.

Greater investment in distribution as the platform for electrification (relevant questions: 29-37)

"These networks (electricity distribution businesses) must ensure they invest adequately in order to be ready to deliver a markedly different energy future." - Transpower

In the next 15 years, renewable electricity generation will need to increase by 47 percent (Climate Change Commission). Distribution and transmission networks are the critical platforms that will enable this increase in renewable electricity generation to occur.

The NEG believe our primary focus, as an energy sector needs to be on where capital needs to flow to provide a reliable and resilient future for consumers. As a sector, our current primary focus is the new technology and systems which will enable orchestration and balancing – these are important elements to address. However, we believe this cannot be at the expense of focussing on our core infrastructure platforms, our distribution and transmission networks, that will enable that technology and will require an order of magnitude more capital than any other aspect of the energy sector to achieve the transition.

NEG note that that, as we transition to an electrified economy household dependence on electricity will increase. As household management, transport, and heading converge into fully electrified homes, customers will be increasingly reliant on electricity to fuel their lives. For that reason the underlying distribution and transmissions that support this electrified outcome must be robust and resilient. Transmission and distribution networks are the core foundations of that new system, and they must be rock solid. It is critical that network owners and regulators embrace that point, and invest to ensure that outcome.

The NEG believe regulators must act to support rapid evolution at a distribution level – regulations and allowance-setting cannot be backward-looking, as historic investment levels will not enable the energy transition. The increasing regulatory overlap between Comcom and EA (particularly around network access terms, pricing, consumer engagement, funding for and use of non-network alternatives, and reliability standards) creates a number of issues which are only going to worsen as we move through the transition.

Reciprocal engagement with communities (relevant question: 57)

The NEG believe Government community engagement needs to be reciprocal – not just canvassing views – but providing communities with a practical stake in the energy transition. For example, by ease of connection of self generation and storage solutions, and through ownership of grid scale generation via their consumer owned distributor (where this makes economic and financial sense to do so). This may deepen markets and provide tailored local solutions not currently provided by the existing market.

NEG also believe that Trust-owned companies are critical and impartial advocates for their communities in understanding and explaining the complexities of the energy system. Trust owned companies are proven at engaging their communities and can play a critical role in supporting connected customers as they contemplate their position and role in engaging with the transition. Distributors have at time been viewed in market design as having ‘back room’ roles rather than

taking a front desk role in working with customers. NEG believe that this view is changing, and needs to change to ensure an appropriate customer experience.

Further engagement with communities is important to determine who should bear the costs of connecting new load and generation to the network, including the funding of growth infrastructure. The cost of creating new capacity in the network is considerable, and any change to require networks to fund greater share of connection costs, including capacity charges, will drive additional cost to consumers. This runs counter to delivering a more affordable electricity supply system.

Three considerations for engagement with mana whenua (relevant question: 57)

The NEG would like to highlight three considerations for MBIE ahead of engagement with mana whenua on the development of the National Energy Strategy:

- Local knowledge will be essential and time may be needed to unpack any ongoing or historical anguish. History is unique in every area, each hapū needs to be worked with in a different way.
- Engagement must be meaningful, and inequities need to be addressed. Mana whenua are disproportionately represented in energy hardship.
- There is commercial opportunity for mana whenua to participate in energy markets, and there is a desire for iwi to have energy independence and invest. However, capacity is being chewed up quickly by those with the required capital. Some hapū and iwi are not in a position to invest immediately and may be locked out from participating in the future if action is not taken now. Some of the capacity could be ring-fenced to recognise this practical timing issue. The NEG believe this is an issue worthy of greater consideration

Building capability and engaging young people (relevant questions: 57)

The scale of the energy transition requires capability, vision and engagement. Engaging young people in the energy transition as participants is essential for ensuring a sustainable energy future. Government and the energy sector must work with educators and training providers to understand the barriers, raise the profile and grow the skilled workers New Zealand will need throughout the transition.

There is also a significant gap of skilled workers in the New Zealand electricity industry today. Concerted effort is required to ensure immigration settings for those needed in the electricity supply industry are supportive and reduce barriers for those wanting to move to New Zealand. For example, increasing the range of

skilled roles that do not fall into the current “green list”, including electrical technicians/power technicians, line mechanics, cable jointers. We are in a global search for electricity industry talent, and all settings need to be enabling, including removing restrictions on partner visas, so that families are easily able to relocate.

The NEG believe there is a nation-wide opportunity to grow energy construction and general construction expertise as part of the Energy Transition. As an industry and nation we should build educational opportunities into the design of the transition. There are significant educational opportunities to train new entrants to the sector ‘on the job’ via a renewed focus on modern apprenticeships, and cadetship programmes. A highly skilled workforce, capable of supporting a fully electrified economy would be the end result. This is an opportunity that should not be missed.

Final Thoughts

The NEG have responded to this consultation by setting out what we believe to be the key enablers of the energy transition. We believe the scale of the transition demands urgent development of an overall strategy, transitional plan, investment incentives, and critical enabling elements to support electrification and decarbonisation at the required scale and pace.

The balance of this submission is prior submissions made by the NEG, where we have traversed many of the more detailed points raised by this consultation. We stand by this prior work, and we would be happy to engage with the consultation team at any point.

Appendix

3. a) NEG submission on the Electricity Authority's issues paper on Updating the Regulatory Settings for Distributed Networks

Our submission below provides more detail about the need for regulatory alignment, enabling settings for EDBs to unlock whole-system value in a high-DER future, capability requirements (including access to data) and how EDBs can enable new connections.

14 March 2023

Northern Energy Group submission to the Electricity Authority

Submission to the Electricity Authority's issues paper on Updating the Regulatory Setting for Distributed Networks

Introduction

The Northern Energy Group welcomes the opportunity to provide feedback to the Electricity Authority (Authority) on its issues paper *Updating the Regulatory Setting for Distributed Networks* (Issues Paper). Our feedback has been structured into three sections:

1. Core messages for the Authority regarding the Issues Paper and distribution networks more broadly
2. Thematic feedback on each section of the Issues Paper
3. Our response to selected key questions within the Issues Paper.

NEG is highly supportive of this workstream and urges the Authority to progress it as a matter of urgency. Our submission is focussed on the most significant issues we see within the sector regarding the regulatory settings for distribution networks, which include those not discussed in the Issues Paper.

Our member networks have submitted individually. This submission has remained at a high level and is intended to provide a shared perspective on the issues and areas that are most pressing.

Core messages

This section sets out our core messages and priorities for consideration by the Authority.

What DSO and DG could have looked like during cyclone Gabrielle and the Auckland Floods

Increasing levels of DG and other DER on our networks create opportunities for consumer value, but also pose a new risk to public safety and system stability. This risk needs to be addressed and managed accordingly, and regulatory settings must support this. As network operators we will need the ability to orchestrate the load and generation on our networks under emergency situations to protect the health and safety of our communities and our teams working in the field to repair the network, and manage system security.

Conversely, increased DG and DER on distribution networks is an important enabler of future resilience and energy security. It appears unlikely 'always on' distribution networks would be economically viable. However, residential and community 'always on' solutions have real potential to enable community resilience.

Our role as distributors will look increasingly like Transpower's, with both network owner and system operator roles, but at a local level. Transpower's has traditionally been a two-way network, and we are becoming the same. We will need equivalent powers to Transpower's, to balance demand and supply and address constraints on the network, particularly during emergency situations.

This must be a consideration in relation to DG and DER moving forward. We do not want this to be a barrier to DG on our networks, but just as Transpower can call us during an emergency and instruct us to undertake certain actions, we will need equivalent powers during emergencies to enable safe management of networks and community resilience in real time, and continue our ability to enable demand and supply to stay in balance.

Our responsibility is heightened during times of real strain on the network. With increasing EV uptake we are mindful this will place more urgency on restoring connections where people are reliant on EVs as their sole/main mode of transport. Dynamic capacity allocation and/or pricing to charge EVs will no doubt have to part of the solution.

DSO Capability Building and Funding

LV network visibility, capacity allocation and constraint management are all critical to enabling more DER in markets and unlocking some of the billions of dollars of potential value to consumers discussed in the Issues Paper.

EDBs are transforming at speed and increasing our capability in advanced distribution system operation (DSO). The necessary network capability building is only accelerating. Over time, we anticipate our evolution and development of DSO capability will lead to lower costs to our consumers than would otherwise be the case. But, in the short term, as we invest in capability building, our total costs may increase. To date, we have each (and collectively) taken a no-regrets approach, investing in core DSO capabilities and functions that will be required of best-practice EDBs irrespective of the future scenarios that play out.

We want effective, forward-looking, and dynamic Government and regulatory leadership; some elements of the future energy system will require central coordination and planning. We are encouraged by the Authority's focus on no-

regrets capabilities, and we encourage the Authority to support an environment that enables 'learning by doing'.

It has become clear from offshore jurisdictions that DSO may not simply materialise from the market, as the business case is much broader than a single user. Iterating solutions to unlock the core value proposition, and associated commercial construct is critical to ensuring we move forward with this critical enabling element.

To this end, NEG strongly believes the Authority should advocate for funding to support trials undertaken by multiple parties in collaboration. Application criteria could specify that results of any initiatives and trials must be shareable and priority could be given to widely applicable initiatives.

NEG supports MBIE operating this fund as discussed in the Issues Paper. However, if MBIE is unable to operate such a fund it will be essential some other entity is funded to do this crucial work.

Network Visibility

NEG support the Authority's overall direction to make energy sector data publicly available and ensure two-way communication between retailers, EDBs and other parties managing DER.

Historically, network operators have not needed high-frequency data, as power flows were generally one-way and relatively predictable, meaning that networks could be constructed and operated on a "set and forget" basis. This contrasts with Transpower (system operator), which operates a two-way network, and to enable this has real-time communication at the point of connection for each of its customers.

However, increases in DER penetration are requiring evolved distribution system operation, and currently we do not have the data we need to fulfil this role. Getting to the maturity where relevant data could be publicly available will require sufficient funding and regulatory direction. There are significant equity concerns regarding how EDBs are funded to achieve this as costs to do so will be considerable and not all customers will benefit directly.

Broadly speaking there are two simultaneous issues:

1. Access – while some of our networks now have access to *half-hourly kWh consumption data* for much of their networks, others do not. The majority of our networks do not have access to any *network operational data* (NODs) from smart meters, at scale.
While implementation can be phased, to transition to a two-way network, network operators will need real time data at most or all points of connection. This requires access to consumption *and* network operation data, in real time.
2. Insufficient data – the focus of smart metering deployment to date has been on enabling the collection and provision of *consumption* data for retailers. This is not necessarily the data we need to operate the network, nor to implement some of the cost-reflective pricing advocated for by the Authority. Regulatory direction is needed to establish a standardised approach to smart meter data including the type, frequency and costs of

information provided (and to ensure the equipment installed has the technical capability required). Further, network operators will need to be sufficiently funded to procure and unlock the value of this data. Regulatory direction is needed to ensure that consumers do not pay twice for the supply of this data to retailers and to distributors.

Reaching alignment on the types of data required, and access to that data are critical elements to be resolved to enable a resilient, cost effective, and effective method of operating networks in the future.

Distributed Generation and the Part 6 review

DG penetration on some of our networks has reached such material levels it is causing issues for our network managers and planners.

For example, at the top of the North Island, multiple solar providers are competing to connect in areas with limited capacity to host them, and network operators will soon be having to make decisions around dispatch and curtailment. The context in which the original Part 6 (formerly the DG Regulations) was developed has changed significantly, meaning Part 6 is not fit for a future in which DER is expected to become ubiquitous.

NEG supports the Authority carrying out a full review of Part 6. The issues identified are all significant. We support all proposed DER standards actions and urge the Authority to do more. NEG believe a full review is the most pragmatic and equitable way to address these and other related issues. We would support a two-part review if the Authority considered this necessary to prioritise certain elements urgently needing reform.

While we agree with the Authority the scope of Part 6 *could* be expanded to include all DER (i.e. *importing* DER, not just *exporting* DG) we are not yet convinced this would be the most sensible avenue for such additions to the Code to be made. We believe the scope of the review should be to determine the appropriate Code for managing the connection and operation of all DER, rather than limiting scope just to a review of Part 6 itself. Changes to Part 6 may result from such a review, but equally many other parts of the Code may need enhancement.

In addition, we would like to bring the following to the Authority's attention for further consideration:

- a. Currently, the limit on charging DG incremental connection costs only means DG applicants effectively get free access to the shared assets in the network. This means our domestic customers are paying for these assets to support commercial generation businesses.
- b. Because Transpower's regulatory regime enables it to take a commercial approach under the TPM rather than the incremental costs approach under Part 6, commercial generators are driven to connect to local networks even when it is more efficient to connect to the national grid.
- c. Establishing rules and processes for EDBs to engage DER operators on the network to manage performance, safety, and emergencies should be an immediate priority, in the same way that Transpower is able to do so with its customers on the grid.

Constraint Management

NEG believe constraint management should be an immediate priority for the Authority. EDBs will need to lead on this critical emerging issue and NEG would welcome an opportunity to discuss this further with the Authority.

We are concerned the Issues Paper is silent on constraint management. EDBs will soon need processes and the technical ability to allocate scarce capacity to competing DERs and communicate openly with sector players about congestion and constraints to maintain network reliability.

For example, there is currently no ability to communicate with, nor constrain small-scale solar. Effectively the only way these will trip off is if the voltage rises sufficiently that the inverter trips off. As a result, large-scale DG (which we require to have communications under the network approval) have to scale back, because we can't scale back the small DG.

As mentioned above, network design and operation has traditionally been focussed on meeting consumer demand via one-way power flows (i.e. GXP to ICP). The FlexForum² noted in a recent insights paper that:

Diversity of demand, and predictable one-way flow patterns on networks, have meant it has not been necessary to monitor or manage capacity for consumption or generation on a connection-by-connection basis. Maintaining power supply and quality has been straightforward for distributors to achieve under a 'set and forget' basis due to stability and predictability in network use patterns and flows on their networks over time. ...

In an environment where there is increasing demand for network capacity, making optimal use of available network infrastructure would traditionally involve identifying and applying physical or contractual limits on the import and/or export of electricity to reflect the physical limits of the network over time.

Experience has indicated it can be economically preferable (and more affordable for consumers) to have reasonable limits in place during peak times rather than to incur the cost to reinforce networks to provide more peak capacity. For the same reason, the transmission network is not sized to enable all possible flow scenarios – constraints occur frequently, and usually when output from renewable generation is particularly high.

While constraints have not been a feature of distribution networks to date, by design they will be a key feature of the networks going forward. Not every possible combination of DER behaviour will be able to be accommodated – to do so would not meet the affordability objective.

² FlexForum insights paper available at: <https://www.araake.co.nz/assets/Uploads/FF-insights-making-better-use-of-available-distribution-network-capacity-31-January-2023.pdf>

Therefore, EDBs will need a process to manage constraints by allocating scarce capacity to competing DERs. Crucially, EDBs will need avenues and guidance to communicate openly with sector players about congestion and constraints, and to ensure these allocations are adhered to.

The FlexForum's paper continues, highlighting the immediate concern we have about operators of DER prioritising participation in national markets, without any cognisance of what behaviour the host networks can accommodate:

Flexible DER will have a growing impact on network operation as it increasingly participates in national markets for energy and ancillary services and is dispatched by Transpower, the System Operator (especially after the introduction of *Dispatch Notification* product in April 2023).

Distributors can manage sudden falls in load. Restoring load (including after a period of load control) requires more careful management. A fall in wholesale prices, due to increases in wind or solar generation across a part of Aotearoa New Zealand, could see many distributed batteries, EV chargers and smart hot-water cylinders being dispatched on by the System Operator. Similarly, large numbers of DER, such as household batteries, are already being armed to respond at short notice to a fall in system frequency on the grid.

About every five minutes of every day, the System Operator uses security-constrained economic dispatch, via the SPD tool, to work out which power stations to run, which flexible load to dispatch on or off, and which response resources to arm for reserves. However, by design, this tool can only see as far as the grid exit point (the boundary between the transmission network and distribution network) and has no visibility of the security and power-quality constraints on the distribution networks. As with the transmission grid, the capacity available on distribution networks can change materially at short notice – for example due to storms, car versus pole outages, every-day network switching and planned outages.

To enable flexible DER to provide services to national markets in a way that keeps distribution networks safe and stable, and maintain power quality to consumers within legislated limits, distributors will need to provide operators of flexible DER with network access that represents not just maximum physical operating limits, but possibly also physical limits on the rate-of-increase of demand or output that the network can handle to avoid creating unmanageable surges (which could happen if the wholesale price, or the system frequency, suddenly drops or increases).

With more DER operating, distribution networks will increasingly need to be operated similarly to the transmission network.

While there are mechanisms for EDBs to coordinate DER operation with retailers on their networks (via the DDA), these are relatively untested at this stage. Further, no such vehicles exist for parties managing DER who are not retailers. This is a large hole in the existing market design, and one the Authority needs to address urgently. As the FlexForum paper continues, dynamic operating envelopes would

appear to be an excellent tool for managing these issues, and are something our members are actively exploring.

Thematic feedback by section

Equal access to data and information

NEG believe the issues identified are significant and supports the Authority's overall direction to make sector information publicly available – as well as actions d) – f) described in the Issues Paper.

It is critical for EDBs to have visibility of where DER is, and how it is operating – for both operations and planning. EDBs are becoming more digitised, and data-driven, to enable them to operate safely and effectively in a DER world. Smart meter data and DER visibility are the core foundations to enable this. We would expect the Authority to work with EDBs and others to determine what information would be useful, and who would be responsible for providing and maintaining it.

MEPs are currently able to negotiate and contract directly with EDBs to provide NODs, and some of our members are trialling NODs acquisition currently. However, there are only limited relationships between these parties, and there is no Code support governing or guiding them. The data template is part of the DDA between EDBs and retailers, and retailers do not collect NODs. This leaves EDBs without Code-backed access to NODs.

NEG is concerned about the current wording and implied approach to providing data to Flexibility Traders (FTs). Consumption data and NODs are only one part of the network planning picture, and this data would not provide a FT with a useful view on the likelihood of any opportunities for DER persisting for a reasonable length of time. We are concerned the unfiltered info may cause more confusion than solutions, and would welcome further discussions with the Authority to consider how this information could be contextualised or filtered for FTs to retain reliability and safety for our mass customers and the whole network.

We support the Authority amending the data template and streamlining information sharing processes. However, the NEG considers amendments to the Code would be more effective in the long term.

NEG considers the “reasonableness” of the costs of obtaining data from retailers a serious concern that is currently being overlooked. As consumer-owned trusts, our priority is the long-term costs and benefits to our customers. Currently there is huge variability between different retailers' costs, and industry standard pricing methodologies do not exist.

In contrast, MEP data pricing is currently mixed. The market for NODs is nascent, meaning it may be too early for regulation at this point. However, NODs are critical to EDBs' planning and operation of the network, so the Authority should continue to closely monitor the MEP/EDB interface and how freely data is flowing.

Maintaining customers' privacy is critical moving forward. More data flowing between sector players, and eventually the public, will mean more customer information is available to more people. More customer data will be available, and that data will be more revealing about customers' usage profiles. NEG believe the

Authority will need to safeguard customers' privacy to protect customers and ensure these significant privacy concerns do not become barriers to core functions and capabilities of distributed networks.

Recommendations:

- Provide enabling settings that allow EDBs to communicate directly with MEPs – and for MEPs to negotiate and contract directly with EDBs.
- Consider and closely monitor the impacts of costs for data acquisition by networks, and work with the Commerce Commission to ensure EDBs are sufficiently funded to purchase and unlock the value of this data.
- Reconsider the proposal for Flex Traders to be able to acquire consumption and operational data, in favour of ensuring EDBs prioritise filtering and communicating whole-of-picture data that would be useful for their business cases.

Market settings for equal access

NEG believe the issues identified are minor and agrees with the Authority's desired outcomes. We want the best long-term outcomes for our customers, and our primary concern regarding flexibility services is if customers would have to pay more for these services than they otherwise would.

There is currently no need for the Authority to consider ringfencing as the market is still developing, and is far from maturity. However, the market would benefit from guidelines on how the Authority *might consider* ring-fencing in future, and the NEG encourages the Authority to provide this.

EDBs have successfully self-provided flexibility services through direct control of hot water cylinders for decades. Some EDBs have other flex resources, including grid-scale batteries and relocatable generation. The Authority appears to have taken the view that self-supply is something that will always be inferior to market-procured options. NEG members' experience has shown that this is not the case, and would be highly concerned if the Authority acted on these assumptions. There is a large body of literature supporting self-supply being efficient, called *theory of the firm*. NEG would welcome further discussion about this with the Authority.

From our perspective, some EDBs will elect to self-supply flexibility services while others will procure, and in many cases there will be a combination. This should be up to individual EDBs to decide, in the long-term interests of their customers, as is already regulated by the Commerce Commission. The Commerce Commission's cost allocation and related party transaction rules already manage and mitigate the risks identified in the Issues Paper. The Commerce Commission's competition branch and surveillance processes also play an important role. We are not advocating for EDBs to have monopoly rights in providing flexibility services but believe the current arrangement, where EDBs are able to participate in the market, should continue.

Recommendations:

- The Authority should provide guidance on how and when they might consider ring-fencing in future, to provide more certainty to EDBs' and other parties' decision-making.

- Continue to support the Commerce Commission enabling greater flexibility in EDBs' funding mechanisms to enable true comparisons between network and non-network solutions, and fungibility between funding sources if appropriate non-network solutions are identified.

Capability and capacity

NEG believe the issues identified are minor. We would like the Authority to support 'learn-by-doing' approaches and highlight successful sector collaboration. Currently, successful initiatives are not always visible to others in the sector, and lessons from these can be highly valuable.

From our perspective, how EDBs are funded to develop DSO capabilities – including LV network data and visibility, and constraint management – is a much larger concern and should be a top priority for the Authority (as discussed above).

NEG believe the Authority should monitor the issues identified but would be highly concerned if the Authority introduced formal collaboration requirements and reporting processes to address the issues identified. Our experience is these processes are largely ineffective and time-consuming.

Recommendations:

- Monitor and report on successful collaboration within the industry.
- Advocate for EDBs and other industry players using 'learn-by-doing' approaches.

Operating agreements for flexibility services

NEG believe the issues identified are somewhat significant.

As previously addressed, we have significant concerns about our future ability to effectively and efficiently manage constraints on our networks, and orchestrate responses to local or national emergencies. Our role will look increasingly like Transpower's in future, yet we do not have the same powers to enforce compliance with constraints and to manage emergency situations.

Standardised default operating agreements for DG owners and operators of other DER would create industry efficiencies and provide assurances to those customers about how constraints and emergencies will be managed. A degree of national consistency would be preferable for these parties, who will likely operate across a number of different networks. This is still relatively uncharted territory in Aotearoa.

The allocation of risks between flexibility buyers and flexibility sellers/traders is another key concern. Currently, buyers have little or no experience in procuring such services, and sellers face both the risk of technology deployment and technology performance. NEG members actively out-source critical components of their operations and are keen to build their experience doing so with parties offering non-network solutions, in a commercial environment.

Recommendations:

- The Authority should prioritise development of an operating framework for distributors hosting DER on their network, including:
 - network capacity allocation,
 - constraints management, and,
 - emergency management.

DER Standards

NEG does not support the Authority's proposed limited review of Part 6 of the Code. We believe a full review of Part 6 is needed. A full, two-stage review would allow the Authority to prioritise elements of the code most urgently needing reform and ensure the full scope of potential Code amendments and solutions are addressed in a timely and cost-effective manner. We would support a two-stage review if the Authority considered this necessary to prioritise certain elements urgently needing reform.

NEG believe the issues identified are significant and supports all the Authority's proposed DER standards actions and urges the Authority to do more. NEG believe the Authority's proposed three-year timeline for this work is too long and will not deliver either:

1. The more immediate reform needed to address current issues, such as those mentioned above, or,
2. Longer-term regulatory settings that enable increasing levels of DG and DER participation in the market while also providing network operators the tools and capabilities to ensure network reliability.

Answers to selected questions from the consultation document

Issues Paper questions:	NEG comment
2 – Does this capture the key data needs for distributors to make informed business decisions that will unlock the potential of distributed energy resources (DER) for the long-term benefit of consumers? If not, what data is missing and what would it be used for?	Broadly, yes. However, we suggest that meter <i>status</i> data (e.g. last gasp, ping) is in a different category to power quality data (PQD).
3 – Do you agree with the prioritisation of the key data needs for distributors? If not, why not and how would you	Yes.

<p>suggest the priority is changed?</p>	
<p>6 – Do you agree that the Authority should amend the Data Template to address the above issues to improve its workability? If not, why not?</p>	<p>While the template negotiated between ERANZ and ENA is superior to the existing Appendix C, NEG believe the Authority should amend the Code to address these issues. Amending the Data Template would function as a short-term fix and would not address the more fundamental issues. It is also unclear to us how we could amend all our existing DDAs to incorporate a new Appendix C.</p>
<p>9 – Should the Authority amend the Code to clarify that MEPs can contract directly and provide both ICP data to distributors (and flexibility traders) for permitted purposes? If not, why not?</p>	<p>Yes. NEG is highly supportive of the Authority amending the Code to ensure MEPs <i>must</i> negotiate and contract directly with EDBs, and that permission is not required from retailers to supply data.</p> <p>In addition, the Authority should consider the impacts of data prices and closely monitor the MEP/EDB interface to assess how freely data is flowing.</p>
<p>10 – Should the DDA Data Template be updated to include Power Quality Data? If not, why not?</p>	<p>The DDA is an agreement between EDBs and retailers. It is not clear how the data template could apply to the relationship between EDBs and MEPs. However the DDA should state that MEPs can (and retailers will not object to) provision of data to distributors by MEPs, and that retailers will address privacy requirements to enable such in their terms and conditions.</p>
<p>11 – Do you think that the transaction costs associated with negotiating access to MEPs is a problem that the Authority should prioritise? If no, why not? If yes, do you think there is merit in developing a template to develop a default template to help reduce transaction costs?</p>	<p>Negotiating access with MEPs has been a mixed experience to date, dependent on the MEP. We think a default template would help reduce transaction costs, and enable access for data from MEPs which are otherwise slow to engage.</p> <p>NEG considers the “reasonableness” of the costs of obtaining data from retailers a serious concern that is currently being overlooked. As consumer-owned trusts, our priority is the long-term costs and benefits to our customers. Currently there is huge variability between the costs that different retailers seek to recover, and industry standard pricing methodologies do not exist. The EA could clarify whether reasonable costs includes just costs or a profit margin (Part 6 limits to reasonable incremental costs).</p> <p>MEP data pricing also currently varies. The market for NODs is nascent, meaning it may be too early for regulation at this point. However, NODs are critical to EDBs’ planning and operation of the network, so the Authority should continue to closely monitor the MEP/EDB interface and how freely data is flowing.</p>

<p>12 – Do you agree that MEP pricing for ICP Data (including Power Quality Data) and related data services is not unreasonable at this stage? If not, why not?</p>	<p>As above, MEP data pricing is currently mixed, depending on the MEP. Furthermore, pricing for data quality services (and products to deliver such) are not yet available.</p>
<p>15 – Do you agree that distributors' visibility of the location, size, and functionality of DER needs to be improved within the next 3–7 years to support network planning? If not, why not?</p>	<p>Yes. This is critical to efficient and effective management of the network going forward. Distributors also need to understand which party (if not the retailer who we are providing lines services to) has contractual responsibility for managing that particular DER, and they need to have operating agreements in place with those parties.</p>
<p>16 – Do you have any views on the type and size of DER that needs more visibility?</p>	<p>The most helpful data would be the locations and types of EV chargers (both smart and non-smart), solar DG installations, smart hot-water and batteries.</p>
<p>17 – The Authority acknowledges that definitions of 'real-time' vary, please explain what real-time data means to you.</p>	<p>We support the Authority creating agreed definitions. As EDBs we expect we will get a lot of this data from other sources not just MEPS.</p> <p>Large DG should have dedicated fibre communication which enables instantaneous info and control. For smaller scale DG, NEG believe we should work towards 30minute, then 5min, then 1min.</p>
<p>18 – Do you agree that access to 'real-time' consumption and Power Quality Data won't be needed for at least five years?</p>	<p>No, we disagree. This will be essential to enable real-time management of the network as DER penetrations increase, especially in relation to constraint management and emergencies.</p> <p>EVs in particular are at the beginning of an exponential adoption curve – we need to consider how we will get 'real time' data now, to make sure the right technology is installed. For example some of the considerations we are concerned about now:</p> <ul style="list-style-type: none"> • what sort of chargers do we want installed? • Are regulations needed to ensure they have the right onboard technology, etc.? <p>If we wait, the exponential rate of EV adoption means the horse will have bolted as a critical mass of households will have already purchased and installed chargers. This is the same reason we are implementing TOU pricing now, despite no peak time congestion – to establish good EV charging habits now, before it becomes a problem and exponential growth makes it impossible to do so at a later date.</p>

	Achieving real-time data is step change in ways of working. There will be significant costs to get to this maturity.
22 – Are there any other issues preventing distributors from providing granular current and likely future congestion data?	EDBs are currently either planning for or already building the capability and capacity to ingest, analyse and make use of this data. The greatest barrier to this will be a lack of funding for EDBs to do so.
28 – Do you agree that model privacy disclosure terms are appropriate?	Yes. But retailers need to be required to implement them (or their own version that achieves the same) so that data can be shared with EDBs. If they are optional, we are concerned we will continue to run up against privacy issues raised by retailers. In our experience, the issue is not the retailer's inability to draft privacy disclosure terms, rather their desire to implement them.
31 – What are your views on the three options presented above, to deal with Issue 1 (that distributors might prefer network investments to NNS)? What alternative option/s would you favour, if any?	<p>Option 2 is favoured. NEG strongly believes the Authority should advocate for funding to support trials undertaken by multiple parties in collaboration. Application criteria could specify results of any initiatives and trials must be shareable and priority could be given to widely applicable initiatives.</p> <p>We also note again, our primary concern regarding flexibility services is if customers would have to pay more for these services than the alternatives.</p>
39 – Do you have any suggestions for how the Authority can support industry-led work on providing guidance on best practice and templates for operating agreements?	<p>As discussed earlier, standardised default operating agreements for DG owners and operators of other DER would create industry efficiencies and provide assurances to those customers about how constraints and emergencies will be managed.</p> <p>The Authority should prioritise development of an operating framework for distributors hosting DER on their network, including:</p> <ul style="list-style-type: none"> • network capacity allocation, • constraints management, • emergency management, • comms and control methodologies and • central registry. <p>However, commercial agreements should be left for market participants to develop. Issues such as risk allocation are complex and the sector should be tasked</p>

	with developing arrangements for these, in the first instance.
40 – What are your thoughts on the proposed scope for the Part 6 review? What, if anything, would you include or exclude, and why?	<p>NEG does not support the Authority’s proposed limited review of Part 6 of the Code. We believe a full review of Part 6 is needed. A full review would allow the Authority to prioritise elements of the code most urgently needing reform and ensure the full scope of potential Code amendments and solutions are addressed in a timely and cost-effective manner. We would support a two-part review if the Authority considered this necessary to prioritise certain elements urgently needing reform.</p> <p>NEG believe the issues identified are significant and supports all the Authority’s proposed DER standards actions and urges the Authority to do more. NEG believe the Authority’s proposed three-year timeline for this work is too long, however, and will not deliver either:</p> <ol style="list-style-type: none"> 1. The more immediate reform needed to address current issues, such as those mentioned above, or, 2. Longer-term regulatory settings that enable increasing levels of DG and DER participation in the market while also providing network operators the tools and capabilities to ensure network reliability. <p>While we agree with the Authority the scope of Part 6 <i>could</i> be expanded to include all DER (i.e. <i>importing</i> DER, not just <i>exporting</i> DG) we are not yet convinced this would be the most sensible avenue for such additions to the Code to be made. We believe the scope of the review should be to determine the appropriate Code for <u>managing the connection and operation of all DER</u>, rather than limiting scope just to a review of Part 6 itself. Changes to Part 6 may result from such a review, but equally many other parts of the Code may need enhancement.</p>

Appendix

3.b) NEG Response to Transpower's Renewable Energy Zones National Consultation

Our submission below provides more detail on the NEG's support for REZs.

8 April 2022

Northern Energy Group submission to the Electricity Authority

Response to the consultation on *Renewable Energy Zones National Consultation*

Introduction

The Northern Energy Group welcomes the opportunity to provide feedback to Transpower New Zealand Ltd (Transpower) on the consultation paper *Renewable Energy Zones National Consultation* (Consultation Document). Our feedback has been structured in four sections:

1. Our views on the potential benefits of the REZ concept
2. Our commentary on the proposed Guiding Principles for REZs
3. Our suggestions for taking an integrated approach to REZ project development
4. Our response to the consultation questions.

Potential benefits of REZs

We strongly support Renewable Energy Zones (REZs) as a concept that can support decarbonisation, increase system resilience, reduce prices for consumers and several secondary benefits for affected regions

Decarbonisation

REZs would support the achievement of a net-zero carbon economy by unlocking more renewable generation through efficient transmission and distribution development, removing barriers to generation development. Storage could also be integrated in time, to amplify the benefits of co-located generation, particularly given the intermittent nature of solar and wind. The REZ can enable the "rapid expansion of our electricity system that needs to start now" recommended by the Climate Change Commission - at least total cost to consumers.

Resilience

REZs would result in greater diversity of electricity sources and generation locations. Prima facie this is likely to result in an integrated energy system that is more reliable and resilient. Unlocking new solar and wind can play a key role in reducing our reliance on fossil fuels to meet increasing electricity demand. It will also provide additional generation that would reduce the risk of dry winter outages through increased solar and/or wind generation enabled by the REZ framework.

Reduced Prices

REZs would increase the overall supply of electricity and should therefore help ensure efficient and cost-effective energy prices for households. This is especially true as solar and wind generation becomes more economically viable and if REZs are able to leverage both public and private capital.

Secondary economic benefits to regions

REZs have the potential to not only benefit the energy system but to also deliver improved social and economic outcomes. Benefits that expand beyond the energy system include enabling regional economic development and job creation, and broader economic development by providing co-location opportunities for large energy users. Consideration of these benefits could be included in the REZ development process and form part of the economic case.

Guiding Principles for REZs

Section 4.1 of the consultation document presents seven principles to guide how “we might go about developing a Renewable Energy Zone, and particularly, in thinking how we navigate the potential challenges that may arise”.

We consider the Guiding Principles require direct comment, as we understand that they will directly influence the development of the REZ framework. Additionally, the project selection criteria and ‘on the ground’ decisions will also reflect the Guiding Principles.

Principle 01

REZs are built to harness and unlock renewable energy resource, storage and efficient network infrastructure to support the long-term decarbonisation and energy needs of Aotearoa, as well as the region hosting the REZ.

There is massive renewable potential waiting to be unlocked and technological improvements continue to make them more economically viable. However, these resources remain constrained by a lack of transmission infrastructure and grid capacity.

We see the REZ concept as a pragmatic way of unlocking distribution and transmission capacity at a reasonable cost, maximising the use of existing assets,

and providing a structure for co-ordinated investment in the capacity needed to support new generation. This would support markets to do the heavy lifting of generation deployment, we just need to activate the enabling power of Renewable Energy Zones. This needs to happen quickly and constructively to ensure that the infrastructure efficiencies envisioned by the REZ are indeed leveraged in step with the fast-emerging potential of solar and wind developments. This is particularly true for solar – which, facing less resource consenting barriers than wind, has the potential to move fast in New Zealand.

Recommendation:

Unlocking the potential of our regional resources requires a different approach to new investments which appropriately values the benefit of localised generation to the whole system. This principle should therefore make explicit the inherent value of utilising our regions' natural resource potential.

Principle 02

REZs are customer driven and are only built where there is clear demand from generation or load developers. This will help to ensure that a REZ is developed in line with the market, decreases the risk of investing significantly in infrastructure that may be underutilised or local consumers having to cover the incremental cost of network investment.

We know distributed energy is well suited to local optimisation of grid and distribution capacity. We believe that the REZ enables optimisation of grid capacity by enabling generation to take advantage of economies of scale through co-ordinated investment and utilising the potential existing infrastructure (through targeted and co-ordinated asset upgrades). We see this as positive for delivery efficiency and delivery price. It does not make sense to power Northland and Auckland from the deep South Island, when there is an abundance of renewable energy in the upper North Island region and existing assets which can be utilised to get that energy to the load centres.

Locating generation close to demand is also an opportunity to increase the resilience of our system. Traditionally, our energy system's architecture has sought to strategically locate generation close to abundant hydro, thermal and fossil-fuel resources. As fossil fuel generation plants close, new load opportunities emerge (e.g. datacentres) and new generation technologies become economically viable, there are greater opportunities for regions to embrace localised solar and wind investments.

Key point:

Locating generation close to demand can reduce transmission losses and unnecessary transportation costs. As networks who are majority owned by consumers, this is of critical concern to us.

Principle 03

Local consumers will be no worse off as a result of developing a REZ. Our intent is to define a funding model that ensures new generation connections or demands developers cover the cost of the network investments required so that the additional costs associated with a pilot REZ in the Northland region do not fall on local consumers. The funding model needs to align with transmission and distribution pricing regulation.

Consumers should be better off, whether directly through their ownership of consumer owned EDBs, as well as via improved security of supply, reduced electricity prices, or de-carbonisation. It is important that the costs of these generation developments and asset upgrades do not fall on local populations, and we must see a net overall benefit.

The upper North Island will continue to experience high population growth, economic inequality, and diverse geographic challenges. By targeting this region for settings and changes that can enable affordable, resilient and consumer-centred electrification we can offer a blueprint for Aotearoa New Zealand. Northland is an ideal location for a pilot capable of proving up this principle. Networks are community owned, and there is a keen focus from regional stakeholders on fair and equitable cost allocation for communities in Northland.

Recommendation:

We encourage the REZ to increase its ambition for consumers; to improve outcomes for consumers, not just avoid making things worse.

Principle 04

REZs are developed through partnerships and collaboration with local iwi and stakeholders to ensure that regions hosting a REZ receive a net benefit from the development.

We strongly endorse the Climate Change Commission's principles of a just transition, and relationships with iwi are a critical part of this. We urge the REZ to formalise working directly with local iwi to understand what impact policies may have for the wider hapū and community. Through collaboration, there is a better chance of designing solutions that benefit iwi and the wider community.

As an example, The Lines Company are working alongside iwi on an innovative proposal to implement solar energy on two marae, with the surplus power generated shared to 10 nearby iwi member homes. Once proven, a further 15 marae would be added, along with a further 75 homes. Eventually, the concept could be rolled out to enable largescale solar connections.

Iwi are increasingly mobilising to realise the economic potential of their land and asset holdings, however the pace of this transition varies. We consider it appropriate to engage with Iwi as part of this process to understand their aspirations and ensure equitable access to distribution and transmission over time, and renewables are increasingly developed and deployed.

Recommendation:

We support this principle and urge that iwi collaboration and participation be included in the project selection criteria, and fully explored during the pilot stage for Renewable Energy Zones.

Principle 05

REZs deliver net benefits to Aotearoa's electricity system where existing connection processes cannot. For example, by increasing competition in the wholesale market to potentially lower regional electricity prices, increasing diversity or supporting reliability or security of supply.

We see REZ as a way of widening ownership options, and increasing access to capital has the potential to deepen generation markets. Industrial and commercial scale solar can be delivered at a capital value accessible to a much wider group of investors than is the case for traditional hydro, large scale wind and geothermal. We see that as ultimately good for customers.

Key point:

REZs should enable a wider range of generation projects to be realised, thus increasing optionality and deepening competition.

Principle 06

REZ location and REZ participant selection are done via a transparent methodology to ensure potential regions and REZ participants are given the opportunity to build their case, including demonstration of any wider social, economic or environmental costs and benefits to the region.

We support a whole systems approach in assessing the total cost and value of investments to consumers, accounting for impacts across the supply chain. The REZ is an opportunity to implement a whole systems approach to new generation investments. We discuss this further in Section 4.

Recommendation:

We suggest that the methodology clearly includes a holistic, customer-centric approach.

Principle 07

REZs are enabled with minimal changes to the existing electricity regulatory framework. Large changes to the regulatory framework can take a significant amount of time to undertake and can have wide reaching implications to existing connected customers.

The speed we need to deploy renewables and decarbonise the economy does not suit a centrally planned, incremental connection model. We need to enable and release larger blocks of renewable energy faster and the REZ has proven to achieve this overseas.

We note that resource management reforms seek to achieve greater efficiencies for New Zealanders and stronger alignment with the infrastructure build needed for rapid electrification. We support these goals but note that they will take several

years to achieve through the reform process. While the REZ is a separate framework and the NEG do not suggest it should delay the reforms in any way (or vice versa), the NEG *do* support the REZ as an opportunity to accelerate needed investments today.

Key point:

Customers will ultimately pay the price for an inefficient or slow execution path towards decarbonisation, and we therefore suggest that this principle needs to be framed around how customers are affected not about red-tape burden.

An integrated approach to project development

NEG support a whole systems approach in assessing the total cost and value of investments to consumers, accounting for impacts across the supply chain.

Currently, the market is siloed and while there are knock-on effects of decisions made in one part of the supply chain to other parts, it is ultimately the consumer that is affected.

An alternative approach would assess investment options in terms of their value or cost across the whole system in an integrated way, including the impact on system balancing, grid transportation, or network capacity.

The difference in value of an investment when it is assessed for one part of the supply chain vs when it accounts for the whole system impacts is demonstrated by the whole energy system cost metric (WESC). The WESC was developed by Frontier Economics for the UK's Department of Business, Energy and Industrial Strategy (BEIS) to inform their significant transition from fossil fuelled electricity generation to enable their decarbonisation goals, efficiently. Frontier Economics has also prepared something similar for the New Zealand context in their report for Vector: *Whole Electricity System Costs*.³

By taking into account impacts of generation on the whole system (not just capital and running costs as captured by the levelized cost of energy metric) the WESC reveals that not all generation investments are equal. Some deliver greater benefit to the system – and some higher costs. This reflects:

- the impact that an asset has on system balancing (whether the asset incurs additional cost through volatile output requiring other actions to keep electricity demand in line with supply, or, if it adds value by stabilising this);
- displaced generation (reduced costs of running other generators during the periods that the technology is producing power – just as solar could be deployed to displace fossil fuel peaking solutions); and,

³ <https://www.frontier-economics.com/media/4629/frontier-whole-system-costs-in-nz-stc-250321.pdf>

- network impact (the distribution and transmission network reinforcement costs that the technology may avoid or incur).

The difference when accounting for these wider impacts is significant – for example, applying this metric to generation in New Zealand finds that energy generated from utility scale solar adds value of \$51NZD per MWh (as opposed to costing \$74NZD per MWh under the LCOE). This is a difference of \$125 per MWh of energy produced.

This demonstrates the importance of taking a whole systems approach in assessing the value of investments across our energy system to ensure new investments deliver the lowest total cost to consumers. We see the REZ as an opportunity to implement an efficient, whole systems approach to new generation investments – the value of which is illustrated by the WESC.

Adopting this whole systems approach in assessing the cost and value of new investments is similar to the approach of ‘integrated resource planning’ - which considers the impact of investments across multiple segments of the supply chain. Many of the factors which impact whole-system cost and value are regionally specific (including location of demand and population growth and density; the region’s natural resource potential; as well as environmental impacts on resilience).

Recommendation:

The REZ is an opportunity to implement an integrated approach to new generation investments.

Questions from the consultation document

Submission Questions:	NEG comment
Q1. Do you agree that the first mover disadvantage and high connection costs can be challenges for connecting new renewable generation and/or large electricity loads to the electricity network?	Yes, we believe high connection costs could potentially disincentivise or prevent generators, particularly smaller and renewable generators, from proceeding with a project.
Q2. Do you think the concept of a Renewable Energy Zone could be beneficial in a New Zealand context?	NEG support REZ because it enables decarbonisation, affordability, and resilience. See Section 1 for further detail on what NEG see as the benefits of the REZ concept.
Q3. What region(s) do you think would be suited to Renewable Energy Zones?	NEG support the Northland pilot. This meets the principles of customer-led, plentiful generation resource, and close to load centres. Proving the concept in Northland would enable it to be applied in other regions with strong renewable potential and active development interest.
Q4. What benefits do you think should be considered in the	NEG strongly support prioritising benefits to customers, including realisation of iwi

decision-making process for Renewable Energy Zones in New Zealand?	aspirations, including promoting energy affordability, among other customer benefits.
Q5. Do you agree with the proposed guiding principles? Are there any that you would change or add?	On balance yes. See Section 2 for detailed response. Recommendations: <ul style="list-style-type: none"> • Principle 3 should be more ambitious by making consumers better off. • Principle 4 should be strengthened by making iwi collaboration or participation a requirement for project selection criteria. • Principle 6 could be improved by making it clear that the methodology includes a holistic, customer-centric approach. • Principle 7 could be improved by ensuring the focus on minimising regulatory burden are linked to customer outcomes.
Q6. Do you agree with the proposed criteria for selecting suitable regions for REZ development? Are there any that you would change or add?	We broadly agree with the proposed criteria for selecting candidate regions for REZ development.
Q 7. Do you agree with using a tender process for committing projects in a REZ? Are there alternative processes that could be considered?	We agree, in principle, with the use of a tender process for committing projects in a REZ in the first instance.
Q8. Who should be involved with co-ordinating and undertaking the various steps within a REZ development process?	NEG consider themselves key stakeholders in the development of REZs in NEG members' network distribution areas. NEG has feet on the ground locally. The NEG perspective would complement views of consumers and iwi, who are the priority groups for collaboration and consultation.
Q9. Do you agree with the proposed project criteria? Are there any that you would change or add?	We broadly agree with the proposed project criteria. We recommend including criteria that projects can demonstrate benefits to consumers. Strong stakeholder support, including iwi participation, should also be given due weight.
Q10. Do you agree with the challenges we have identified?	We broadly agree with the challenges identified in this initial consultation. In particular, we agree with the challenges caused by the first-mover disadvantage.
Q11. What are some of the ways to overcome these challenges and who should be involved?	The consultation paper suggests that a third party such as the government underwrite a proposed REZ's capacity not being fully subscribed. The integration of large-scale renewable generation may raise challenges around the timing and level of funding

	<p>available. We support a potential role for Government to help overcome these gaps. For example, Government under-writing of risks would help to reduce the first-mover disadvantage. See also Section 3 on taking a whole energy system cost approach.</p>
<p>Q12. Do you see any other potential challenges that need to be considered?</p>	<p>See our response to Q11.</p>