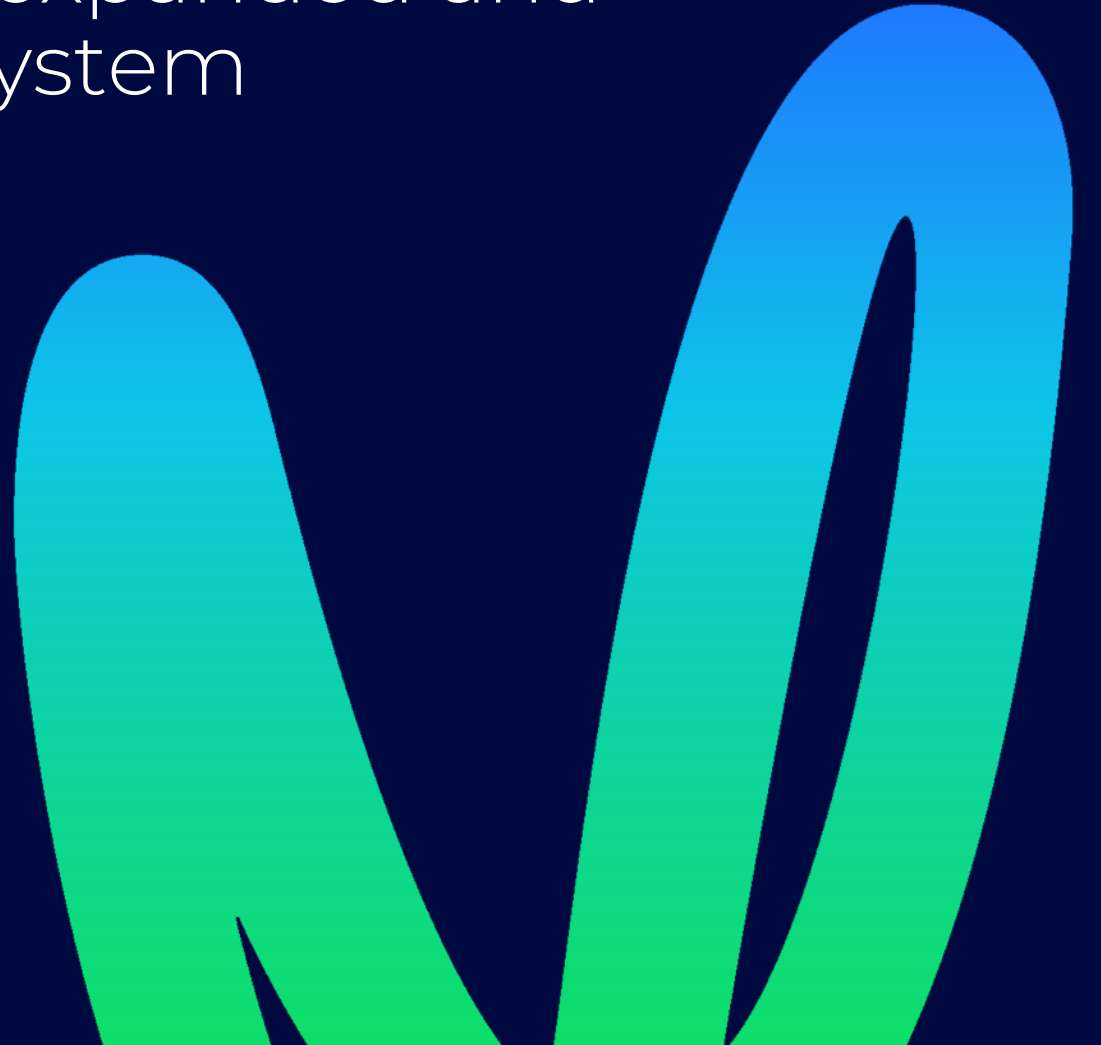


# Measures for transition to an expanded and highly renewable electricity system

**Submission to MBIE's consultation on electricity transition measures**

2 November 2023



# Executive summary

## Vector supports development of a comprehensive national energy strategy

We support the efforts of MBIE to ensure that our electricity system remains fit for purpose to enable a **once-in-a-lifetime** energy transition – in keeping with Aotearoa New Zealand’s commitments under The Climate Change Response (Zero Carbon) Amendment Act 2019.

The Electricity Transition Measures (ETM) workstream, and the development of the national energy strategy which will follow, offer critical opportunities to achieve this. They must be seized as the vehicles for the changes required.

Enabling **affordable and accelerated electrification** – and the highly renewable energy system which will underpin this – are fundamentally different objectives from the stewardship of the **incrementally-evolving** environment for which our regulatory system was designed. A failure to recognise this – and a continuation of ‘old’ policy thinking and regulatory frameworks in the context of new goals – will surely result in a failure to meet these aspirations, delivering the bare minimum outcomes our electricity system must fulfil.

Rather, there is a need to recalibrate our thinking and frameworks to the goals of the future. We must integrate **whole-of-system approaches** to new investment decisions to drive the greatest consumer value from renewable expansion. This includes the advancement of interventions that can accelerate investment in new sources of renewable generation closer to demand. This can drive infrastructure efficiency, **community resilience**, and add **competitive pressure** in the wholesale market.

Overall, energy policy must be brought **“out of the shadows”** within MBIE, and our regulatory system must be recalibrated to the goals of 2023. This includes an alignment of our economic regulation to the **step-change** in investment required in our sector by recognising **financeability** as a fundamental element of the price-quality regime governing our networks. Our market regulation must in turn be directed to accelerate the integration of new technologies and emergence of new value streams. This can unlock the promise of **demand flexibility** which MBIE discusses in the ETM paper.

To achieve this, we recommend **strong direction** is provided to our regulators. We recommend a change to the Part 4 purpose of the Commerce Act directing the Commerce Commission to **take into account climate change** in their regulation of regulated goods and services. This was not part of their statutory purpose as originally set out – however, it is now the driver of unprecedented change in our system.

In summary, as expanded on in the remainder of this submission, our energy transition requires:

1. A **whole-system approach** to drive the greatest consumer value from renewable expansion
2. **Financeability settings** support a step change in investment
3. Accelerated integration of **digital and demand response solutions** to safely and securely unlock the most whole system value for consumers
4. **Streamlined, coordinated institutions** and policy / regulatory alignment, delivered through a dedicated ministry and a single energy regulator

# Our submission is structured in three parts

## Part 1:

Whole-system consumer-centricity for reliable and affordable renewable expansion and resilience

## Part 2:

Bold regulatory change for a fit-for-purpose future electricity system

## Part 3:

Streamlined, coordinated institutional and **policy/regulatory alignment** to deliver long-term benefits to New Zealanders



# Electricity transition measures: our key priorities

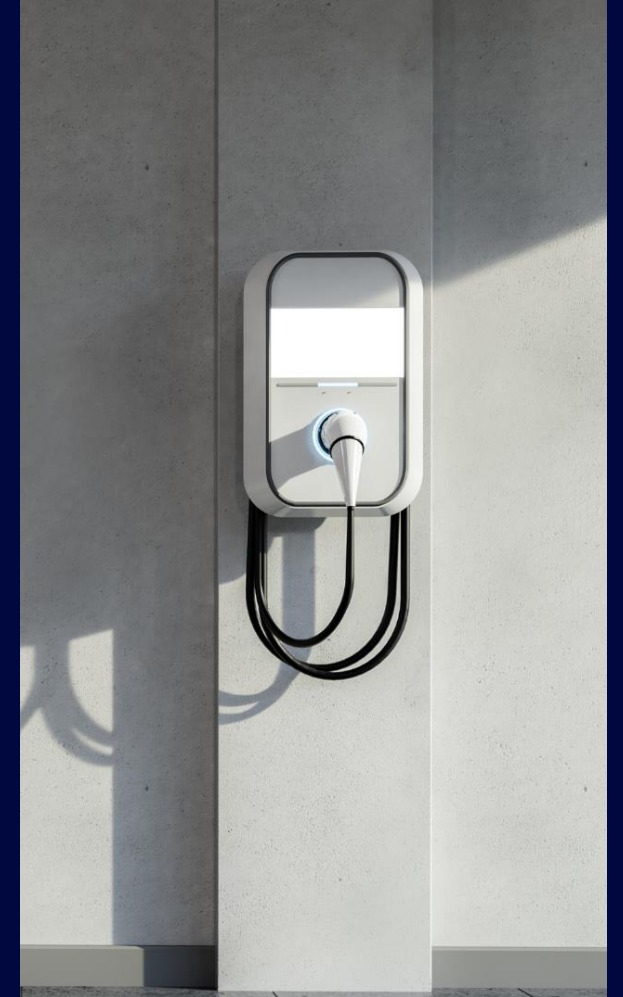
1. Ensure policy and regulatory decisions are made with a **consumer-centric, 'whole-electricity-system'** mindset
2. Advance **renewable energy zones** to accelerate and coordinate renewable investment and resilience, and enable network companies to invest more in **connected renewable generation**

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3. Deliver **thriving competition** between generation and demand response in a **v2.0 wholesale electricity market**
4. Regulate for **smart EV charging** capability and establish **regulatory settings for distributors** to **safely** unlock whole-of-system value from DER
5. Ensure that the Commerce Commission recognises **financeability** as a core element of the price-quality regime, via a Government Policy Statement

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6. Drive greater and more **streamlined coordination** across regulation and policy through a Ministry for Energy & Net Zero, and a single electricity regulator
7. Change the **Part 4 purpose** of the Commerce Act to ensure network regulation takes **climate change** into account



# Part 1 – Whole-system consumer-centricity for reliable and affordable renewable expansion and resilience

# Recommendation 1: Ensure policy and regulatory decisions are made with a consumer-centric, 'whole-electricity-system' mindset

## Relevant question: 57 (ch.11)

Without New Zealand's energy system keeping **consumers at the centre**, and having **affordability** as a key objective, the energy transition will be in vain. This consumer-centric approach requires a **whole-of-system perspective** to deliver the long-term benefits to consumers promised.

However, since the 1990s the industry has been structured and regulated in silos. Typically, investment and policy valuation does not incorporate full whole-of-system value assessment. But new technology – especially DER – **cuts across these traditional boundaries**. Vector commissioned Frontier Economics (UK)<sup>1</sup> to repeat their UK analysis of whole-energy-system costs (WESC), for the NZ context. They found that, for example, smart EV charging can deliver benefits right across the value chain far in excess of their costs.

The Government should embrace whole-of-system analysis and decision-making in development of the national energy strategy.

Two clear areas in which we do not think whole-of-system costs and benefits are adequately taken into account are:

- the impact of intermittent renewable generation on ancillary service and other system costs (as we submitted to MDAG in 2022<sup>2</sup>)
- the benefits to **resilience** of co-locating generation near load centres. The current nodal pricing + TPM signal for generation location does not necessarily account for low-probability but high-impact major transmission outages. These benefits were seen clearly following Cyclone Gabrielle when Genesis's hydro stations on the East Coast were able to support service to the local area. More reliance on renewable generation at the bottom of the South Island increases New Zealand's **exposure**.

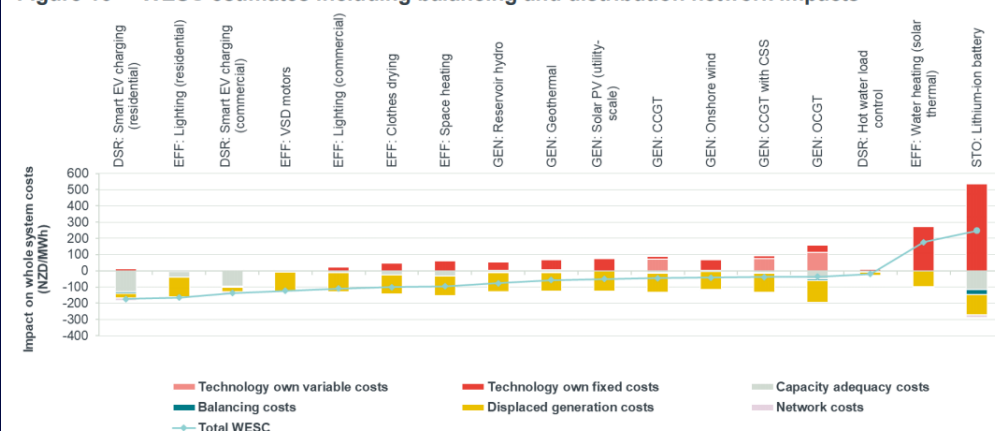


Relatedly, we do not think EDBs are currently incentivised to make investments (for example in ripple plant) that could accrue more value for DER in the wholesale market.

Similar to the concept of 'double-duty policies', advanced by economist Joseph Stiglitz, **'triple-duty' actions** or assets serve multiple purposes. Whole-system optimisation can deliver both the outcomes of security and efficiency by coordinating our system and providing it with access to connected capacity for stability, and, by managing the peak avoiding unnecessary capex.

As is discussed further, triple-duty investments are supported by the whole systems approach – and they risk being undervalued and obstructed by regulatory silos. **Smart EV chargers** are an example of a triple-duty solution, helping to affordably decarbonise transport, reduce energy and network costs, and boost network and system reliability – at the same time as ensuring consumers' preferences can be met, easily.

Figure 16 WESC estimates including balancing and distribution network impacts



Source: Frontier Economics

Note: These illustrative figures should not be interpreted as "generic" estimates of the whole system impact of a class of technologies. Whole system impacts are dependent on the wider electricity system and when technologies are assumed to be built.

# Recommendation 2: Advance REZs and enable network companies to invest more in connected renewable generation and boost resilience

Relevant questions: 1, 2 (ch.2), 18 (ch.6), 59 (ch.11)

There is a clear disconnect between current electricity futures prices and the cost of building new power stations. While we acknowledge current and future prices have been inflated due to rapidly increasing fuel and carbon prices, leaving prices well above long-run costs of investment, we also have long-standing concerns about **levels of competition**. The solution is to build new generation as fast as we possibly can, to assist New Zealand's transition away from fossil fuels and towards a long-run, affordable electricity supply.

Much of New Zealand's remote power generation facilities were originally developed by local power boards, the forerunners of today's EDBs. But today there are **unnecessary barriers** to EDBs increasing the quantity of generation connected to their networks themselves.

For EDBs, the use of **non-traditional solutions** such as DER or micro-grids can play a key role in improving system security and resilience. DER can reduce communities' reliance on a single point of potential failure, providing alternative sources of energy in an outage. This can reduce the risk of a community being cut off from central power supply, even when the grid or network has been compromised. The development of the Ngawha generation plant (below) is an example of a triple-duty solution.

The benefits of local generation, and community hubs, were seen clearly during and post Cyclone Gabrielle. It is unlikely that these **resilience benefits** had been fully appreciated or valued up to that point.



The current difference in **thresholds** for EDBs to connect generation to their own distribution networks versus to the grid, are completely **arbitrary** for the types of investment 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.

We 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.

Further, although investment decisions are left to market participants, the need for **transmission planning** and investment makes a degree of central planning inevitable. Designated **REZs**, as part of an **integrated system plan** (as used in Australia), would be an important enhancement to the current planning and investment regime.



# Part 2 – Bold regulatory change for a fit-for-purpose future electricity system



# Recommendation 3: Deliver thriving competition between generation and demand response in a v2.0 wholesale electricity market

Relevant questions: 15, 16 (ch.5), 21, 22 (ch.6)

We understand the **primary role** of New Zealand's wholesale electricity market is to **keep the lights on**, at minimum cost to consumers. It needs to do that this half-hour – first and foremost – but also the next half-hour, tomorrow, next week, next year and next decade. This role, with the same objective, is still required in a highly renewable energy system.

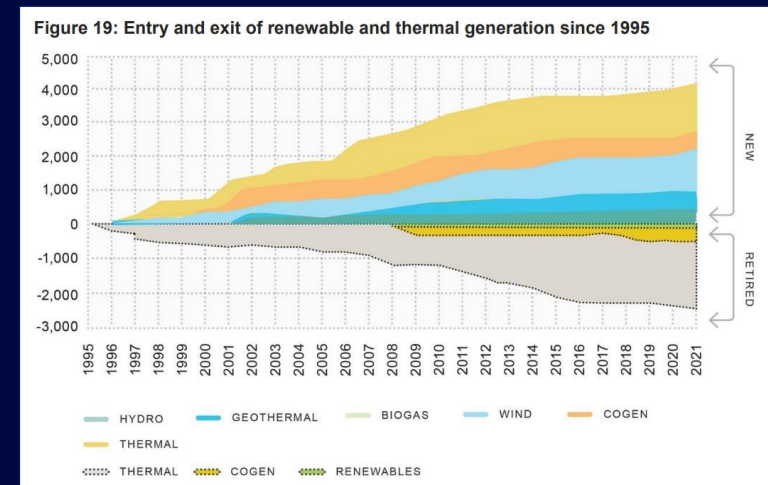
We are supportive of the MDAG's work in reviewing the design of the wholesale market to ensure that it can continue to meet that primary objective. Dispatch could become more challenging, as the traditional roles in the power system (flexible supply balancing inflexible demand) are flipped on their heads.

However, as we submitted to MDAG<sup>3</sup>, sufficient levels of competition are critical to realising the theoretical benefits of the intended market design. A theoretically perfect market design can be undone (and potentially is already) by a market structure that is **too concentrated**. Without a **level playing field** between large and small participants – for generators, retailers and consumers alike – intended benefits will not be realised, and confidence will remain low. MDAG has been right to highlight that there are certain sub-components of market supply in which concentration is likely to increase; interventions such as **virtual disaggregation** should be explored further, now. We have been concerned for some time that intervention is required to unlock the sufficient competitive pressure our market design relies on.

Further, there is an increasing need for more active and sophisticated **market monitoring** to build confidence that the market is delivering positive outcomes for consumers. This will require the EA to significantly increase its capability and capacity, especially through the use of new technology and data analytics, in the same way participants are. The system operator also needs to increase its capability and the timeliness with which it can undertake and publish analyses of changing dynamics in the system.

Flexible demand and increased demand-side participation can drive competition and efficiency going forward. As we set out on the following page, some key operational settings are required to enable market participation by DER to happen safely and securely. We have an open question whether demand-side response should be **paid** for the service it provides, over and above the benefit the respondents achieve from **avoiding high energy prices**, but defer to MDAG's analysis of this issue.

Over time, marginal pricing signals will provide signals for investment and retirement of generation. One lingering concern we have with the market design is the fact that, although a large amount of new generation has been built, and old generation retired, since 1996 (as shown in MDAG's chart below), a large quantity of pre-1990s hydro plant has been online throughout, and will never retire. **Fully-costed marginal pricing** is still critical to ensuring efficient dispatch, but carbon and fuel prices have been extremely high for the past five years. While these provide a strong signal for new generation, equally they have been providing those existing, pre-1990s plant much greater revenues than they could have anticipated, or require to stay online.



# Recommendation 4: Regulate for smart EV charging capability and establish regulatory settings for distributors to safely unlock whole-of-system value from DER

## Relevant questions: 45-56 (ch.10)

Just as DER can deliver benefits across the whole system, they will also bring new **system complexity** through bi-directional flows of power. Optimising consumer value from DER requires strong **network coordination** and visibility of these assets, including to:

- Manage **voltage** levels from the synchronised import and export of power – from the various types of DER
- Ensure devices are aligned with network requirements – including **congestion management** policies – for safe and efficient operation, and
- Ensure there is adequate network capacity. This can be driven by future-focused network planning and investments informed by data, as well as the smart and proactive management of demand.

The emergence of vehicle-to-everything (V2X) technology presents an exciting opportunity to increase customer resilience, balance the network and to flatten peak demand – as a result, minimising whole-of-system cost.

As shown on the right, taken from our latest TCFD report<sup>4</sup>, our modelling estimates that new demand in Auckland could increase the peak demand experienced on the network by around 150%, compared to if this demand is managed. With a higher peak demand comes a need to invest in more network capacity, and more peaking generation. Inefficient capital investment increases electricity bills for every electricity consumer.

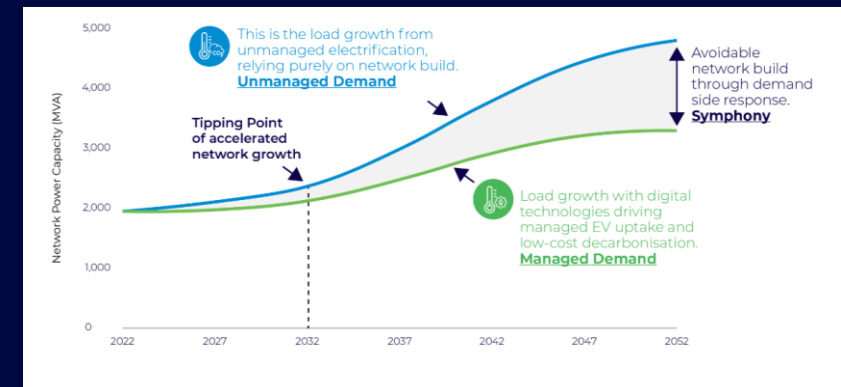
However, when demand management – such as smart EV charging – is utilised for **network management purposes** – this peak demand increase could be reduced by two thirds. Smart demand management can *increase utilisation* of infrastructure, reducing avoidable cost.

**Digitisation** will be the number one enabler of mass participation in wholesale and other markets. In future, the response of flexible consumer resources will likely be automated – with little active participation required by consumers themselves, once their preferences and needs have been established.

As we noted to the EA earlier this year<sup>5</sup>, supported by expert economists NERA<sup>6</sup>, there are two key, essential workstreams required to enable and unlock these affordability benefits through whole-system optimisation:

- Regulation of the **capability** for smart-charging, regardless of form, and **compulsory connection** to a demand management system to enable automated response – especially in emergencies
- Regulation of the settings EDBs require to **safely enable** and **unlock** aggregator-led participation of DER in wholesale and other markets (“value stacking”). These settings include compulsory adherence to network constraints, through **dynamic operating envelopes**, and powers for EDBs to orchestrate DER response to local and national **emergencies**.

It is important to note that these requirements are essential to distributors being able to continue to deliver safe, secure supply to consumers, and meet their **statutory obligations**. In contrast, value-stacking and other market services offered will be the realm of aggregators.



# Recommendation 5: Ensure that the Commerce Commission recognises financeability as a core element of the price-quality regime, via a Government Policy Statement

## Relevant questions: 29-32 (ch.8)

Over the next seven years alone, in order to meet the expected increase in New Zealanders' electricity demand, it is estimated that network companies (including Transpower) will need to spend more than **\$30 billion in capex and opex**. This investment will power electric vehicles, ensure electricity networks are resilient as we face more severe weather events brought about by climate change, ensure an orderly transition away from fossil gas, and keep pace with increasingly complex consumer needs. The global recognition of the impacts of climate change, including New Zealand government legislative and international commitments to meet carbon targets, is strong evidence of what undoubtedly must be considered to be in the long-term interests of consumers.

In many ways it is hard to overstate how critical the next decade is for electrification of the energy sector and supporting investment, coupled with the expectation of delivering electricity networks that can enable this in terms of resilience, security of supply and capacity. The Input Methodologies (IMs) play a vital role in this and need to evolve to avoid compromising network businesses' incentive to invest, or ability to fund such investment.

There is **no obligation** to invest in network assets, or to provide connections to new customers. Like any other commercial entity, investments can only be made where it is both **commercially attractive** and **financeable**. Unfortunately, the current position of the Commission does nothing to enhance either. In fact, it does the reverse – the Commission is pairing the greatest investment challenge for electrification for 50+ years with the **weakest financing plan**.

EDBs have consistently raised concerns around the **back-ending of cashflows** for new infrastructure investment. Not only does this severely restrict cashflows, but it introduces a significant error due to Commission's continued practice of attempting (incorrectly) to **forecast inflation** for 5-6 years<sup>7</sup>.

The Commission's decision not to provide confidence in adopting a **financeability input methodology** as a core regulatory principle fails to alleviate serious concerns raised by EDBs. The Commission, almost flippantly, is advocating that such investment needs to be funded by the suspension of dividends, while asking companies, somewhat paradoxically, to raise equity.

The Commission has been unwilling to consider expert opinions and leading international regulatory best practice where it differs from the Commission's own **entrenched views**.

As we noted in our recent submission on the IMs review<sup>8</sup>, a network is only 'financeable' if regulated revenues, as determined by the Commission, are sufficient to support certain financial metrics of the notionally efficient network on which the Commission bases its regulatory allowances. An assurance of internal consistency in regulatory decisions would not only be good regulatory practice, but would provide both investors and consumers greater certainty over how the Commission intends to deal with funding issues when they arise, given the **step-change** in investment levels required.

We only need to look to the UK for good regulatory practice as it relates to financeability. The UK energy regulator, Ofgem, must have regard to the need for networks to be able to finance their activities, and is transparent about the financial ratios it monitors. This obligation on the Commission is absent in the New Zealand regime, but could be provided for by the Commission if the Government were to issue a **policy statement** requiring a financeability test be included in the IMs.

Relatedly, there is significant interaction between the investment funding regime, financeability and **customer contributions** and **connection charges**. None of these can be examined in isolation of the others. We explained this in detail in our recent submission to the EA on distribution pricing<sup>9</sup>.

Part 3 – Streamlined, coordinated institutions  
and policy/regulatory alignment to deliver long-  
term benefits to New Zealanders

# Recommendation 6: Drive greater and more streamlined coordination through a Ministry for Energy & Net Zero, and a single electricity regulator

Relevant questions: 39 (ch.8), 58 (ch.11)

Vector believes government energy sector policy and regulatory arrangements urgently need reform. If New Zealand is to accomplish the transformation required and set itself up for a resilient, affordable and low-carbon energy future, then we need to ensure we have policy-making and regulatory functions that are fit for purpose. Our energy policy and regulatory arrangements have not had a **serious rethink** since they were established, and, in our view, are not up to the task.

Ensuring electricity security and resilience through the transition is critical. Gas supply and infrastructure must also be secure, resilient and affordable as this sector transitions. A new renewable gas sector (biogas and hydrogen) may have a material role to play.

The gas sector transition raises longer-term questions about managing affordability concerns for industry, commercial and residential consumers and particularly vulnerable customers.

New Zealand's energy policy function is presently managed at the **third level** within one of our biggest government agencies, MBIE. There is no energy sector expertise at MBIE's leadership table. The responsible branch, Energy and Resources, is one of **six branches** in the Building, Resources and Markets Group, which in turn is one of **eight groups** in a unwieldy department that reports to 26 ministerial portfolios.

While 44% of New Zealand's emissions are from agricultural sources, the remaining emission contributions (manufacturing, energy industry, transport, fugitive emissions, industrial process, waste) are very closely interlinked and require a coordinated strategy. The linkages between transport and electricity supply, in particular, will be critical.

A new agency that brings together MBIE's energy policy function with key energy-related groups from across Government, including **electrified transport** and energy product standards, offers a compelling way forward for New Zealand. Now is the time for change.

A **Ministry of Energy & Net Zero** would consolidate these inter-linkages, while simultaneously providing oversight of the future impacts of climate change that pose significant risks to energy security itself.

Faced with comparable challenges, and needing clearer definition and management of energy outcomes, the UK and Australia have both recently established new Ministries with a dedicated focus on energy policy and the transition to ensure a strong focus on energy security and affordability.

Unlike those comparable jurisdictions, New Zealand also has **three independent energy sector regulators**. While these regulators seek to coordinate on cross-cutting issues, this will become increasingly challenging because:

- Electricity and gas markets, and new emerging renewable gas markets, are becoming **increasingly integrated**. Gas will have a critical influence over electricity supply for some time to come
- There are **split operational accountabilities** for energy security
- The **boundaries** between regulated and unregulated electricity services and investment are increasingly blurred

These trends are introducing greater complexity when timely decision-making is most needed.

Vector recommends a review be undertaken of the current range of energy sector entities to promote alignment with outcomes set out in the National Energy Strategy. A new, combined regulatory agency should be considered seriously. The review should be led by the new Ministry, be undertaken progressively, and be completed within the next term of government.

# Recommendation 7: Change the Part 4 purpose of the Commerce Act to ensure network regulation takes climate change into account

## Relevant questions: 40-44 (ch.9)

Climate Change legislation must be a **mandatory consideration** in the Commerce Commission's decision-making.

While the Commission has noted the permissive considerations in section 5ZN of the Climate Change Response Act 2002, it has given itself considerable leeway to disregard those considerations if it feels that they conflict with the Part 4 purpose.

This undermines the legislative purpose of promoting certainty, and cuts across the investment ambitions of the sector. It leaves unanswered questions on where the Commission positions itself on investing for the future, of supporting the long-term interests of "energy wallet" savings by customers, of supporting digitalisation and data transformation and other key enablers of decarbonisation. Reinforcements to maintain resilience in the face of more extreme weather will also be critically important. Meanwhile, regulators overseas are moving to ensure such investments are at the heart of their regulatory frameworks to meet their net-zero ambitions.

The Part 4 purpose statement therefore requires an additional, overarching objective: to **promote the Emission Reduction Plan (ERP) Pathway** and the net zero target more effectively.

Accordingly, the Commission should be willing to amend an IM on the basis it will better promote the outcomes of the ERP and net zero target if this does not detrimentally affect the Part 4 purpose.

Regulated businesses must be able to fulfil their roles in the pathway to net zero. Accordingly, s5ZN considerations will be highly relevant to every decision made by the Commission, and are relevant considerations in promoting the Part 4 purpose. That is, they should always be considered in terms of the factual matrix considered in promoting s52A.

We recommend that the Part 4 purpose statement requires an additional overarching objective: to promote the ERP Pathway and the net zero target more effectively, provided this does not detrimentally affect the Part 4 purpose.



# References

## Documents referred to in the preceding slides

1. [Frontier analysis](#) on WESC for New Zealand, 25 March 2021
2. [Vector submission](#) to MDAG, 15 March 2022
3. [Vector submission](#) to MDAG, 20 March 2023
4. [Vector annual TCFD report](#), 25 August 2023
5. [Vector submission](#) to EA on distribution settings, 28 February 2023
6. [NERA report](#), supporting Vector's submission to EA, 28 February 2023
7. [John McDermott advice](#) on inflation forecasting, 13 July 2023
8. [Vector submission](#) to the Commerce Commission on Input Methodologies Review, 19 July 2023
9. [Vector submission](#) to EA on distribution pricing, 15 August 2023

For further information on the recommendations in this submission, please contact:

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