

TRANSITIONING TO A LOW- EMISSIONS ECONOMY

DRAFT REPORT



INTRODUCTION

- Vector welcomes the Productivity Commission's draft report on transitioning to a low-emissions economy, released on 27 April 2018.
- As a company, Vector has committed to being carbon neutral (net zero emissions) by 2030.
- This commitment aligns with Vector signing up to the United Nations Sustainable Development Goals, including goal 13; '*Take urgent actions to combat climate change and its impacts*'.
- Vector largely agrees with the findings and recommendations outlined in the Commission's draft report.
- Importantly, the report recognises the need for a stable policy environment. Vector maintains hope that this report will support the development of a long-term political consensus, without which, New Zealand will not achieve sustained emission reductions.
- Vector, as an innovative and tech-centric company, is leading the way for the role electricity distribution businesses (EDBs) can play in a low-emissions future - supporting EV uptake, playing a key role in the penetration of smart meter technology, undertaking analysis on the resilience impacts of an electrified economy, introducing distributed energy resources (DER) to enable consumers to participate more actively in energy markets, and introducing internet of things (IOT) technology to manage the electrification of our economy.
- Vector is working hard to reduce emissions, increase resilience, and empower consumers.



REGULATION, TECHNOLOGY, AND THE ROLE OF EDBS

- Vector's central concerns regarding New Zealand's ability to transition to a low-emissions economy relate to: regulatory framework; ability to embrace new technology; and the role of EDBs in this transition.

Regulatory Framework

- Energy regulation, administered by both the Commerce Commission (ComCom) and the Electricity Authority (EA), is increasingly becoming out of step with international regulators that specifically recognise carbon as a mandatory consideration in decision making (e.g. Ofgem). Carbon is not considered a relevant factor by either regulator under current statutory settings.
- New Zealand requires an inclusive regulatory framework that holds to account all regulators, all sectors, and all gases.

Embracing New Technology

- Vector firmly believes that technology will drive decarbonisation. Regulators should identify and address barriers to the uptake of new low-carbon emitting technologies. Regulators must be technology agnostic and not protect existing industry structures and models. Regulation will never keep pace with rapid technology change, and must be cautious not to rely too heavily on traditional economic theory at the exclusion of behavioural economics.
- Regulation should enable 'first movers' to be rewarded for undertaking market-testing and research, encouraging industry participants to invest and innovate in disruptive low-emissions technologies.
- As new technologies emerge, it is vital to ensure equitable impacts on all consumers amid differing rates of uptake.

Role of EDBs

- DERs, such as solar panels and batteries, are going to play a considerable part in reducing emissions in the electricity sector. EDBs must play a central role in leading the roll out and infrastructure enablement for DERs as they will have a significant impact on the security and resilience of the electricity network, for which EDBs are responsible.
- EDBs will require increased access to data to oversee the security and resilience of the network and additionally be embraced as a market participant to test and understand the impact of DERs to ensure the lights (and as our infrastructure electrifies - vehicles, water, sewerage, and heating) don't go out!
- EDBs will have a significant role to play in the transition to a low-emissions economy, and as the economy continues to electrify, the cruciality of EDBs will continue to rise.



THE CONTEXT FOR VECTOR'S SUBMISSION

- Vector commissioned a report¹ in 2017 on the economic impacts of a transition to a two degree world with a particular focus on the sectors of most relevance to Vector. The modelling used three scenarios for how New Zealand might achieve net zero greenhouse gas emissions – two of these were aligned to 2050 (including a shock scenario) and one by 2040, which has a growing scientific consensus. This has set the scene for Vector's opportunities and challenges in the transition to net zero.
- Some of the key insights from that report include:
 - Significant growth in **residential electricity consumption** driven by increasing population and the transition to electric vehicles (EVs). This highlights the need for distribution businesses to be smarter about managing demand for electricity, utilising an array of new technologies. Alongside this increased demand, we can also foresee a number of households moving to solar to better manage their own supply. EDBs need to be able to co-ordinate, dispatch, and schedule connected devices so as not to cause excess costs or collateral damage. EDBs must protect the security of the network.
 - Overall our modelling work is showing that if we are to achieve net zero, **solar** will need to grow as a proportion of electricity generation, and may need to be as much as 15% of total generation by 2050.
 - The scale and relative speed of the **electrification of transport** that is required is very ambitious. Reaching price parity for EVs with internal combustion engine vehicles (ICEs) will be a key tipping point for increased uptake. This is expected to occur in the 2020s.
- **Gas** as a source of energy in generation and for residential uses will decrease as emissions pricing increases. Residential usage will transition to electricity over time. Gas is still likely to have a role in the industrial and commercial sectors, being less sensitive to increased emission prices.
- **Wind** generation will meet most of the shortfall caused by exiting coal and gas and a growing demand for electricity.
- Significant **energy efficiency** improvements can be assumed over time – almost doubling by 2050.
- We can expect to see a tipping point of around \$110 per tonne for carbon where new renewable generation will replace non-renewable sources including **coal** and gas.
- As a business that wishes to provide leadership in the transition to a net zero economy, this modelling work helps Vector to paint a picture of what the pathway may look like to reach our net zero target.

FINDINGS AND RECOMMENDATIONS: CHAPTERS 5 AND 6

- Vector broadly agrees with the Productivity Commission's findings and recommendations across chapter five of the report – *Innovation*, as well as the findings and recommendations in chapter six – *Investment*.
- Vector believes that embracing technology is central to tackling climate change. Vector supports the Commission's focus on positive incentives in combination with a stronger emissions pricing framework. Vector is also pleased that the Commission highlighted regulatory uncertainty as a key roadblock to innovation and investment.
- It is vital that the regulatory framework for innovation is not only technology neutral but participant neutral. While Part 4 of the Commerce Act, which regulates EDBs, is technology agnostic, the EA recently declared battery storage to be 'generation' under the Electricity Code, potentially impacting industry participation. This is an example of protectionist thinking and inappropriately trying to use existing rules and structures to control new technology. Batteries are neither generation or distribution, but a new asset class. EDB investment in both battery storage and EV charging infrastructure has facilitated the development of new energy markets in New Zealand, reducing network costs for consumers and also reducing New Zealand's emissions.
- Excluding participants from low emissions investments in a country the size of New Zealand, that operates largely without subsidies to encourage market development, will stunt climate friendly innovation and investment in this country.
- According to economist and Oxford University Regulatory Policy Institute Chair George Yarrow, a common mistake in policy making is to believe that bewilderment calls for policy makers to resolve matters in prescriptive ways. While this may be appropriate in 'static' contexts, things look different when there are major external sources of change and uncertainty. "Policy amid disruption itself contributes to policy uncertainty. Regulators should always be wary of substituting their own monopolistic decisions for outcomes that can be determined by many economic agents."
- The Productivity Commission's acknowledgement that a commitment to current technologies is a barrier to innovation certainly rings true in electricity due to the long-term regulatory investment framework and long-life traditional assets. To embrace new lower-emissions technology, regulators may need to consider accelerated depreciation for current assets.
- Utilities are traditionally cautious, however with increasing numbers of DERs entering the electricity system, EDBs cannot delay in adopting new technologies, due to the impacts on the security of the network, for which they are responsible. EDBs need a regulatory framework which supports market-testing and research, so that EDBs can invest in new technologies to understand and assess the impact on the stability and security of the electricity network.
- While the government should not pick winners when funding innovation, consideration must be given to climate impacts. Vector considers that all government funded investment should have a carbon dimension.
- Vector firmly agrees with the Commission's recommendation that the Government should incorporate mandatory climate-related financial disclosures into existing regulatory instruments. Vector reports on scope 1 and 2 greenhouse gas emissions (externally assured) and is working toward its first CDP response this year, which will meet the requirements of the Task Force on Climate-related Disclosures.
- Vector is pleased to note the Commission's request for a definition of what constitutes low-emissions investments, as this has long required clarification.

FINDINGS AND RECOMMENDATIONS: CHAPTER 7

- The findings and recommendations made by the Productivity Commission in chapter seven - *Laws and Institutions*, directly aligns with the ideas laid out by Vector in its previous submission to the Commission.
- Political consensus is the central element for a successful transition to a low emissions economy. Vector agrees that the current systems architecture lacks long-term stability and predictability about the nature and pace of New Zealand's low-emissions transition, with poor policy coherence.
- It is essential that climate change does not become the political football it has become in Australia, with legislative flip flops following each state and national election.
- No single policy will get the job done, therefore all government agencies must work together. A strong price on carbon alone will not transition us to a low emissions economy, it must be supported by more stringent building codes, transport standards, appropriate green financing structures, and so on. Government agencies cannot operate in silos, driven by agendas which override climate considerations, or worse still, not even reflect on climate change considerations, as occurs in the electricity sector.
- Vector strongly supports the Commission's statement that a new architecture for New Zealand's climate change legislation should be built on principles of transparency and accountability, with a backbone based on mandatory processes.
- Vector also supports the Commission's recommendation that the broad principles and framework of the United Kingdom's Climate Change Act should be used as a basis for designing a new

architecture for New Zealand's climate change legislation, being carefully tailored to fit New Zealand's unique emissions profile.

- Vector supports the recommendation that a long-term greenhouse gas (GHG) emissions-reduction target should be set. When considering the development of new primary legislation, it will be vital to ensure the principles are clear, and not suffer the same fate as the current Climate Change Act, which is information dense and difficult for market participants to understand their role and responsibilities.



FINDINGS AND RECOMMENDATIONS: CHAPTER 9

- Vector believes strongly in the concept of an inclusive transition, which is explored in chapter 9 - *Policies for an inclusive transition*.
- Vector, as a majority consumer trust-owned entity, is focussed on the equitable impact of new technology, and ensuring consumers are not limited in their opportunity to control their energy bill and are resilient to the impacts of climate change.
- Vector collaborated with Ngāti Whátua Órákei to install solar and battery storage in homes, paid for through a monthly fee by residents. Energy bills for residents have fallen to as low as \$13. This technology also gives residents the ability, in future, to 'share' power, spreading the benefit wider than individual households. Spreading capital cost has a vital role in ensuring all consumers are able to transition to lower-emissions technologies.
- There is a persistent message that the less fortunate will end up paying more for electricity as a result of new technology, with wealthy customers leaving the network, and those remaining paying a greater proportion of lines charges. Vector doesn't foresee complete departure from the network, due to the desire for security of supply and to transact energy e.g. peer to peer electricity trading. Innovative pricing methods can encourage equitable network charges for all consumers.
- Another essential capability highlighted in the Productivity Commission draft report to reduce electricity spend and emissions, lies in developing more flexibility as to when energy is used –namely demand response (DR). For example, tariffs for charging EVs may encourage people to charge their electric cars when the wind is blowing or the sun is shining. Intelligently managing energy use helps encourage the optimized use of energy during times where it is least

expensive and/or when the supply has low carbon intensity. This is a vital role for EDBs, for which Vector is increasing its capability through the use of Israeli 'system of systems' technology – mPrest.



FINDINGS AND RECOMMENDATIONS: CHAPTER 11

- Vector generally accepts the findings and recommendations of the Productivity Commission in chapter 11 - *Transport*. Key for Vector is the development of emissions standards to mitigate the risks of New Zealand becoming a dumping ground for ICE second-hand vehicles as transport around the globe electrifies.
 - Implementing strong building codes and vehicle standards is urgent, because vehicles and buildings last a long time. Even well-designed standards require years to achieve their full benefits, as building stocks and transportation fleets take years to turn over.
 - Vector suggests further consideration of a legislated ICE programme for second-hand imports to support the EV market. New Zealand needs a clear signal to drive behaviour and encourage long-term planning.
 - With regards to EV uptake, the high access to off-street parking in New Zealand, as noted in the draft report, should enable good access for home charging. International evidence has demonstrated that the majority of charging will occur at home (>95%), which means that a vast charging infrastructure is in fact in place. Messaging around the lack of public charging is echoing a misconception of concerned customers that may not yet perceive their home as a convenient 're-fuelling' station. Public charging infrastructure is merely used for emergencies or less commonly undertaken long trips.
 - However, while the infrastructure may be available, bottlenecks in the electricity system can manifest themselves on the low voltage network at 10% penetration of EVs with slow chargers (7kW). The draft report does not discuss the importance of efficient integration of EVs into the electricity distribution network. If this is not planned well at conception, then it could become a major hurdle due to rising network costs or reliability challenges for all network participants and could
- undermine decarbonisation efforts. The important pillars for integration are:
- Mandatory EV registration data to support network planning;
 - Charging management using a dynamic/staggering charge (and tariff);
 - Vehicle-to-grid and vehicle-to-home technology to enable EVs to earn additional benefits from market and network support, and facilitate the integration of local renewable generation and provide resiliency.
- Vector supports the idea of a feebate scheme to encourage EV uptake, however the policy framework will need to ensure the scheme is not withdrawn before price parity can be achieved.
 - Whatever policies are developed to encourage low-emissions transportation, to be effective and equitable, they must cover all forms of transport, including transit and heavy vehicles.



FINDINGS AND RECOMMENDATIONS: CHAPTER 12

- Vector agrees largely with the findings and recommendations in chapter 12 - *Electricity*. Vector strongly supports the Productivity Commission's recommendation for government to remain technology neutral. It is important that regulation does not impede the integration of DER and DR into the electricity system, the development of multiple trading relationships, or more fluid data exchange.
- One area of the report Vector would like to highlight, is that the Commission is not comparing apples with apples when contrasting Vector's comments about the capacity of the electricity system to cope with the uptake of EVs, against Mercury's. Mercury maintain there is sufficient capacity in the electricity market at the generation level to enable EV uptake. The limitations highlighted by Vector are at the network distribution level. As noted on the previous slide, bottlenecks in the electricity system will manifest themselves on the low voltage network first and can already occur at 10% penetration of EVs with slow changers (7kW).
- Vector also has concerns about the claims made by the IEA regarding EDBs operating as neutral platform facilitators. The recommendation for EDBs to operate as a platform is projected as mutually exclusive from EDBs providing value-adding services. First and foremost, in a country the size of New Zealand, no viable market participant should be excluded from the market, especially a market without subsidies. The state of California is a prime example, where participation was limited in the roll-out of EV charging infrastructure. Initially, the California Public Utilities Commission (CPUC) barred utilities from participating. However, California then faced difficulties enticing third-party providers to invest on a meaningful scale. Ultimately, the CPUC had to backtrack to support EV take-up.
- While Vector sees its role as a platform provider, we are also committed to investing in new technology to understand the impacts on the network. EDBs cannot be tasked with the responsibility of network security, while being hamstrung in their ability to achieve it.
- The recommendation by the Productivity Commission for the EA to focus on equal access to electricity networks is also concerning. Open access is already the status quo. There are more than 400 embedded/customer networks, 16,000 distributed generators connected, and over 29 retailers operating on Vector's network. The technology agnostic incentive principles behind Part 4 of the Commerce Act encourages network suppliers to use the most efficient combination of inputs, either insourced or from third-parties, for delivering the network service. Furthermore, because platforms increase in value the more participants engaged, all electricity platforms are incentivised to be technology agnostic and encourage competition.
- With recommendations for increased regulatory intervention, there is an unexamined counterfactual at play. Economist and Oxford University Regulatory Policy Institute Chair, George Yarrow, has stated that pursuing more comprehensive regulation of all EDBs carries costs "including the scope for harm caused by less than perfect regulation". Attempting to pre-emptively regulate represents a systematic overconfidence about the ability to predict and control the best market outcomes.
- As recognised in the draft report, there are many management structures that could be implemented to provide additional market safeguards. EDBs could enter into regional shared-services and management agreements, or form joint ventures to manage and operate distribution assets.

FINDINGS AND RECOMMENDATIONS: CHAPTER 12 [CONTINUED]

- However, Vector agrees that there are considerable risks associated with adapting the legal and governance structures for electricity distribution, given the substantial uncertainty around the nature and timing of this.
- EDBs could enter into regional shared-services and management agreements, or form joint ventures to manage and operate distribution assets. However, Vector agrees that there are considerable risks associated with adapting the legal and governance structures for electricity distribution, given the substantial uncertainty around the nature and timing of this.
- Finally, our energy system is aging, and millions of dollars are required for improvements and maintenance. EDBs cannot be restricted to long-term infrastructure investments such as poles and wires, that may be obsolete long before consumers are finished paying for them. EDBs need to be encouraged to invest in modular short-term infrastructure to help lower costs and emissions. Flexible asset coordination will remain central to the reliability of energy systems with significant levels of renewable energy. By directly tying sophisticated forecasting tools into resource planning and grid control systems, grid operators will be able to maximize the effectiveness of clean energy assets.



CONTACT

If you have any queries regarding Vector's submission, or would like to learn more about Vector's work programmes, which are embracing the shift to a lower emissions economy, please contact:

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Disclaimer: The results of EY's work, included on slide four, including the assumptions and qualifications made in preparing the report, are set out in *Two Degree Economic Modelling and Analysis – Report of Findings for Vector Limited* dated March 2018 ("The Report"). The Report has been prepared for Vector. EY disclaims all liability in relation to any other party who seeks to rely upon the Report or any of its contents.