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Dear Keston,

Vector cross-submission on IM review submissions

1. This is Vector's cross-submission on the Commerce Commission's (Commission) Input Methodology (IM) review draft decision and report dated 16 June and 22 June respectively. This submission provides Vector's view on relevant matters raised in stakeholder submissions.
2. Vector's contact person for this submission is:

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3. No part of this submission is confidential and we are happy for it to be publicly released.

Form of control

4. Vector has some concerns with the NZIER report submitted on behalf of the Major Energy Users Group. We are especially concerned with the statement that "quantity forecasting risk can be lowered by electricity distribution businesses (EDBs) aligning their pricing structure with the drivers of the cost of the service they provide."¹ NZIER has not provided any evidence as to how this proposition is borne out in practice. Instead it appears to suggest this proposition to be "self-evident." We cannot see the self-evident logic as to how quantity forecasting risk can be materially lowered by the form of pricing. There will continue to be forecasting error under other forms of pricing. We cannot see how the Commission or EDBs can control this risk and the impact the form of control has on incentives to address this risk.

¹ NZIER, *Form of control for EDB draft decision – Advice on submission to the Commerce Commission, report to Major Energy Users Group*, 3 August 2016.

5. NZIER appear to endorse the Electricity Authority's distinguishing of the circumstances in New South Wales (NSW) to that in New Zealand on the basis of state ownership of EDBs in that jurisdiction. This analysis is trivial and unhelpful. NSW EDBs are state owned but have legislative objectives to "operate as at least as efficiently as any comparable business" and "maximise the State's investment in the business".² Accordingly, were the NSW businesses not operating *commercially* with their customer pricing then they would be in breach of their governing legislation. NZIER has not provided any evidence as to whether the NSW businesses have deviated from their statutory obligations with their pricing approach.

6. NZIER also appears to attribute a greater role for the Australian Energy Regulator with EDB tariff setting in the national electricity market (NEM) when describing its role in tariff structure statements in Victoria. The AER is clear about its role in assessing EDB tariff structure statements:

*The new tariff rules require distributors to set out their tariff approaches in a new document, the Tariff Structure Statement (tariff statements). Our role is to assess the tariff statements to make sure they comply with the new rules.*³

7. Victorian EDBs (and EDBs operating in other parts of the NEM) are still responsible for engaging with customers and setting prices for their regulated service. The AER has not usurped this responsibility from the EDB. The tariff structure statement merely requires the AER to check whether EDBs have set their tariffs in accordance with the principles set by the Australian Energy Market Commission for distribution pricing.⁴

Regulating assets

Part 4 regulation is technology neutral

8. Some submissions have questioned the service based approach to Part 4 of the *Commerce Act 1986* (the Act). Meridian has suggested:

*...in choosing to regulate electricity lines services Parliament anticipated that the only way such services would ever be provided was by traditional poles and wires networks.*⁵

9. There are inherent challenges with "anticipating" Parliament's intention when deciding Part 4 of the Act would apply to goods or services, and not assets or infrastructure. Had

² *Energy Services Corporations Act (NSW) 1995*, Part 3 Section 8(1)

³ AER, *Issues paper Tariff Structure Statement Proposals – Victorian Electricity Distribution Network Service Providers*, December 2015 p. 3

⁴ AEMC, *Rule Determination National Electricity Amendment (Distribution Pricing Arrangements) Rule 2014*, 27 November 2014

⁵ Meridian, *Submission on Input Methodologies draft decision papers*, 4 August 2016, p. 7

Parliament intended Part 4 regulation only to apply to “poles and wires” networks, it may have sought to apply regulation directly to assets or infrastructure instead of goods or services.

10. However, the purposes of Part 4, namely having incentives for regulated suppliers to “innovate and invest” and providing “services at a quality that consumers demand”⁶, provide compelling evidence that regulated services are expected to evolve with innovation. Regulated services are also expected to reflect changing customer preferences consistent with the types of behaviour expected in a competitive market.
11. Technology neutrality is a cornerstone principle of Part 4 regulation. Inhibiting suppliers from innovating will stifle incentives to seek the most efficient options for delivering the regulated service within the price-quality constraints imposed on them. The more inflexible obligations imposed on the supplier, the less likely it will make decisions in the long term benefit of end-users as defined in the Act.⁷

The scope of the regulated service

12. Alan Lear has provided a legal opinion to the Electricity Retailers Association of New Zealand (ERANZ) defining the scope of the regulated electricity lines service.⁸ His legal advice narrowly defines the regulated service by a strict and literal interpretation of what is *associated with the conveyance* of electricity and what is an *electrical installation*. On the basis of this narrow interpretation, Alan Lear concludes energy storage assets located “behind the meter” cannot form part of the regulated lines service because they are not an electricity conveyance related fitting.
13. We do not agree with this legal interpretation of the regulated service under Part 4 or his approach to the definitions under *the Electricity Act 1992*. We consider:
 - Section 54E of the Act regulates the service of conveying electricity, and not lines or assets, which provides the most sensible interaction with section 54C.⁹

⁶ Section 52A *Commerce Act 1986*

⁷ *Ibid* n 3

⁸ Alan Lear Barrister, *Input Methodologies review: Treatment of Emerging Technologies in the Electricity Industry under Part 4 of the Commerce Act 1986: legal definition and interpretation of electricity lines services*, 2 August 2016

⁹ Commerce Commission, *Input Methodologies Review – Emerging technology pre-workshop paper*, 30 November 2015, p. 15

- In determining whether an asset falls within the scope of the regulated service the test is whether it is “used in providing (or the costs are attributable to) the service, not whether they are themselves actually used (or incurred) in the physical conveyance of electricity.”¹⁰
 - The exception to the definition of “electrical installation” is particularly relevant to the point above, where any fitting used or intended for use in association with the conversion, transformation, or conveyance of electricity by distribution is not an “electrical installation” is not limited to conveyance related fittings.¹¹
14. Regardless of where an asset is installed or constructed it can form part of the regulated service. The relevant test is whether the supplier is using the asset, or intends to use it, in association with conveying electricity. This interpretation is consistent with the overarching purpose of Part 4 to ensure suppliers have incentives “to innovate and to invest, including in replacement, upgrade, and new assets”, as well as “to improve efficiency...that reflects consumer demands”.¹² Importantly, restricting suppliers from investing in new technology and alternative solutions would frustrate this purpose of Part 4 to the detriment of consumers, as described above in paragraph 10.
15. Alan Lear’s interpretation of *electrical installation* recognises load control devices fall outside of the definition. Nonetheless, he asserts “ripple control devices”, a type of load control device, is able to be regarded as part of the regulated service. This is through an exception to the definition of *electrical installation* where the assets *are in association with the conveyance* of electricity¹³:
- ...assets such as ripple control devices located beyond the point of supply, as these are especially designed and used for load control in association with the conveyance of electricity.¹⁴
16. However, he also states this exception would not apply to electricity storage located beyond the meter despite acknowledging such assets are *in association with* the conveyance of electricity:

¹⁰ *Ibid* n 9 p.16

¹¹ Section 2, *Electricity Act 1992*

¹² Section 52A, *Commerce Act 1986*

¹³ *Ibid* n 7,

¹⁴ *Ibid* n 3

...batteries do not “convey” electricity in distribution or in private networks but are designed and used specifically to store electricity to be made available when required and conveyed using wiring systems or lines...customer batteries fall outside the exception to the exclusion to works that the electricity lines services definition relies on, notwithstanding that they could be used in an indirect sense “in association” with the conveyance of electricity by distribution lines.¹⁵

17. We find these two arguments inconsistent and contradictory. Load control devices do not “convey” electricity, they are used to control the supply of electricity to a specific location whereby the controller can enable and disable the supply. The purpose of load control is to assist suppliers to manage peak demand and support the wider grid in times of critical events compromising grid stability or security of supply.
18. Electricity storage *conveys electricity* by storing energy for use at a later point in time, such as during network peaks. Accordingly, electricity storage assists with providing an efficient electricity lines service. While electricity storage is a more sophisticated technology with more uses than load control, electricity storage supports network and grid management in a very similar way to load control by providing an alternative and controllable source of energy used in connection with the lines service. Electricity storage assists with alleviating network constraints, enhancing reliability and deferring traditional investment.
19. Alan Lear’s interpretation does not appear to make sense as he proposes to treat load control devices as part of the regulated service, but exclude other forms of technology purely because (by virtue of their sophisticated nature) they achieve the same outcome via a different means. If the scope of Part 4 was determined by a literal interpretation of *in association with* the conveyance of electricity as suggested by Alan Lear, suppliers would own a fragmented set of assets rather than a fully operable electricity lines service. A number of assets would not be captured by Alan Lear’s narrow interpretation and exclude assets such as load control, global information systems and communications equipment even though such assets are fundamental to the operation of an electricity lines service business.
20. Accordingly, the Commission should not deviate from its own interpretation of Part 4 to the Alan Lear opinion for the following reasons:
 - The Commission’s proposed approach is more consistent with standard regulatory practice as contemplated by Part 4 than the literal interpretative approach set out in the Alan Lear opinion.

¹⁵ *Ibid* n 5

- There is no clear statutory intention supporting the literal interpretative approach in the ERANZ Opinion and justify a departure from standard regulatory practice.
- The conclusions reached in the Alan Lear opinion rely on an assumption that physical assets falling within the definition of electricity lines services must be the same as RAB assets. There is nothing in the statutory framework that suggests conflating these two separate concepts is necessary or appropriate.

Pre-emptively regulating assets

21. Contact Energy have suggested “waiting for market failure before acting risks creating a self-fulfilling prophecy.”¹⁶ The Commission has appropriately sought evidence of impending market failure before creating further regulation. The Commission recognises arm’s length transaction costs risks “undermining the incentive on the EDB to improve efficiency through diversification”. Such non-trivial transaction costs will be borne by customers through higher prices or suboptimal networks. We see great risk with the Commission imposing accretive regulation on the “prophecy” of how the market may develop in the future.
22. The *Electricity Network Transformation Roadmap – interim report*, commissioned by the Australian Energy Networks Association and Commonwealth Scientific Industrial Research Organisation noted:

*Electricity was considered an essential service and provided by a regulated monopoly business. However, just as technological systems are transforming, so are business models, revenue streams and cost structures that underpin them. For this reason network business models must be able to similarly transform to both deliver the new value desired by future customers and ensure the economic and technical efficiency of networks as enabling platforms.*¹⁷

23. The number of new opportunities for network businesses from emerging technologies have been identified by Accenture Strategy *Network business model evolution*,¹⁸ however no particular model was found to deliver better value for consumers. Given the rapidly evolving nature of network enhancing emerging technologies, it would be imprudent to put obstacles in the way of such innovation.

¹⁶ Contact Energy, *Input Methodology Review*, 4 August 2016, p. 11

¹⁷ ENA and CSIRO, *Electricity Network Transformation Roadmap: Interim Report, 2015*, p. 12

¹⁸ Accenture Strategy, *An investigation of the current trends on DNSP business model planning*, 23 January 2015: http://www.ena.asn.au/sites/default/files/network_business_model_evolution_ena_final_2015.pdf

International perspectives

24. Vector is concerned about the caricature of the AER consultation on ring-fencing.¹⁹ The ERANZ submission suggests the AER's purpose of the ring-fencing consultation is to address issues with "behind the meter batteries".²⁰ ERANZ's submission gives the impression that behind the meter batteries have only recently been contemplated for energy regulation in Australia.
25. Rather, the primary purpose of the AER's ring-fencing guideline consultation process is to consolidate the state based jurisdictional ring-fencing rules.²¹ This is due to the historical delineation of responsibility in the Australian NEM where state regulators were responsible for the economic regulation of electricity distribution networks. Given the AER has inherited the responsibility of the economic regulation of electricity distribution networks from jurisdictional regulators, consolidating the different jurisdictional rules into a single NEM wide document is part of this transition.
26. The jurisdictional ring-fencing guidelines have a similar mandate to Part 3 of the *Electricity Industry Act 2010*, namely to separate certain distribution from electricity retailing and electricity generation. The AER has recognised the need for discussion about more specific rules for new developments such as emerging technologies.
27. The AER's recently published *Draft Ring-Fencing Guideline*²² is a heavy-handed approach to addressing any perceived risk from EDB investment in emerging technologies via separation and will invariably create significant transaction costs. The obligations to address an unrealised concern are disproportionate. The requirement to legally separate all non-distribution services²³ will create significant uncertainty for EDBs in the NEM. The contrast between unregulated distribution services and non-distribution services is unclear. However, the obligations for EDBs on the basis of this supposed distinction are significant.
28. The AER's *Draft Ring-Fencing Guideline* indicated service classification will be considered in forthcoming Framework and Approach (F & A) papers for EDBs.²⁴ The F & A papers have a similar function to the IMs, providing certainty to suppliers about how the AER will assess a suppliers' regulatory proposal.²⁵

¹⁹ AER, *Electricity ring-fencing guideline preliminary positions*, April 2016

²⁰ ERANZ, *Submission to the Commerce Commission on Input Methodologies for emerging technology*, 4 August 2016, p. 36.

²¹ *Ibid* n 7, p. 6

²² AER, *Draft Ring-fencing Guideline Explanatory Statement*, August 2016

²³ *Ibid* n 18 p. 15

²⁴ All DNSPs in the NEM have recently had their regulatory periods reset so the next time F & A papers will be considered again will be approximately 2020

²⁵ *Ibid* n 18

29. Our view is the *Draft Ring Fencing Guideline* will impose a high regulatory burden on EDBs in the NEM. Should the proposed Draft Ring Fencing Guideline proceed in its current form, we expect the “waiver” process to be used extensively and surpass the 2000 plus exemptions (published across 106 webpages) for the AER’s administration of the retailer exemption process.
30. However, the AER’s prevailing view on emerging technology (non-traditional investment) is found in its final F & A paper.²⁶
31. The AER provided the following view on non-traditional investments:

*We do not consider it necessary to classify a service for non-traditional investments. This activity is directly concerned with the provision of network services, which is a classified service. Our expectation is that businesses will, in their day-to-day operations, consider the most efficient means of delivering regulated services.*²⁷

32. The AER’s final F & A paper also considered whether EDB investment in assets located at the customers’ premises could form part of the distribution system. The AER provided the following view on network investment in “behind the meter” assets:

*United Energy has questioned whether assets installed in a customers' premises would still form part of a distribution system. We consider that they will for the following reason. When a distributor (or any other third party) installs an electrical asset within a customer's premises we consider that this will result in the customers' wiring becoming an embedded network, which is also a special type of distribution system. This is because the NER definition of a distribution system is traceable to the ownership of physical assets. When the customer's wiring becomes an 'embedded network', under clause 2.5.1 of the NER it is subject to registration as a network with AEMO or to exemption from registration by the AER. Consequently, the investment by the NSP in assets installed within the customer's premises would continue to form part of a distribution system as defined in the NER.*²⁸

33. The AER was clear about businesses having the choice over what assets they can use to deliver the classified (regulated) service. This could be either using traditional or non-traditional assets. The AER’s view is also clear and supports the Commission’s approach, that it is the service, and not a narrow agglomeration of assets to the “point of supply”, that forms the regulated service.

²⁶ AER, *Final framework and approach for Victorian distributors regulatory control period commencing 1 January 2016*, 24 October 2014

²⁷ *Ibid* n 3, p. 69

²⁸ *Ibid* n 3

34. While much has been made of the Australian Energy Market Commission's (AEMC) *Integration of Energy Storage*²⁹ report in submissions, the AER's approach to non-traditional investments for assessing regulatory proposals demonstrates the range of possibilities regulators may take with dealing with emerging technology investments.
35. The issue of emerging technology services provided by EDBs is an evolving issue internationally, with very few jurisdictions wishing to miss out on the benefits EDBs can deliver to facilitate innovation. This view is recognised by the Council of European Energy Regulators (CEER) which noted:

*This means that there is no single model for what a DSO can and cannot do, but rather a number of grey areas.*³⁰

36. Given the inherent challenges with anticipating how emerging service markets may evolve, CEER is reluctant to recommend that national regulatory authorities in the European Union preclude DSO participation in emerging technology services. This is the case even where there is the potential for competition to emerge. CEER has recommended:

*DSOs may be allowed to perform activities even if there is a potential for competition under certain conditions or regulatory controls, if there is a clear, specific justification, possibly based on a cost/benefit analysis.*³¹

37. The guiding view from CEER recognises the benefits DSO participation can offer emerging technology service markets. Indeed it has recognised without DSO participation there may be inadequate incentive from other parties to seek out the innovation emerging technologies can deliver. To this end, CEER noted:

*Participation by DSOs may be beneficial in cases where a new market with potential benefits for consumers is relatively under-developed due to market failure and limited participation by the DSO might help "kick start" the development of that market e.g. by creating an economy of scale for new products related to that market.*³²

Technology lock-in

38. Several submissions³³ have expressed concerns about emerging technologies being recovered by the regulated business – encouraging irresponsible investment in untried

²⁹ AEMC, *Integration of Energy Storage: regulatory implications*, 3 December 2015

³⁰ CEER, *The future role of DSOs – A CEER Conclusions Paper*, 13 July 2015 p. 11

³¹ *Ibid* n 25 p. 9

³² *Ibid* n 25 p. 11

³³ *Ibid* n 3, p. 6

emerging technologies locking in second best technology. However, this discussion ignores a fundamental aspect of price-quality regulation where capital expenditure (capex) for the regulated service is capped by the Commission. EDBs only have a finite expenditure to provide the regulated service to meet regulated service quality targets. Were an EDB to spend more than the Commission's capex allowance in any particular year, it will be compromising (or further compromising) shareholder returns and be subject to financial penalties under the Commission's capex Incremental Rolling Incentive Scheme (IRIS).

39. We are unsure about the argument that EDB investment in emerging technologies will result in "technology lock-in". Rather, EDB selection of emerging technology assets will be dictated by the requirements for their regulated service. "Technology lock-in" appears to be another way to describe the current lack of interest or compelling reason to invest in emerging technologies by parties other than EDBs.

Emerging technology network investments will not foreclose markets

40. Vector agrees with Mercury that EDB investment in emerging technology investments will be principally dictated by network needs such as alleviating capacity, improving reliability and assisting with maintaining service during planned works.³⁴ Any other party wishing to provide emerging technology services are unlikely to have a similar driver. Instead such persons will be dictated by drivers other than network quality. These divergent interests suggest any potential market foreclosure risk from EDB investment in emerging technology are unlikely to materialise.
41. Accordingly, precluding EDB investment in emerging technology assets is likely to result in the regulated service missing out on the benefits that emerging technology assets are capable of delivering. This misalignment of incentives was acknowledged by Synergies Consulting and Professor George Yarrow:

...it is evident that optimising a storage facility within a network so as to maximise the total benefit to customers requires intricate knowledge of that operation, performance and development options of the network in which it will be placed (at both a point in time and over time), not merely knowledge of current wholesale prices or the storage technology itself. The most valuable knowledge may well lie within the NSP, in which case regulation that constrains NSP involvement in storage is likely to limit the benefits that storage can deliver.³⁵

³⁴ Mercury, *Input Methodologies review draft decisions, topic 3 the future impact of emerging technologies in the energy sector*, 4 August 2016, p. 2

³⁵ Professor George Yarrow and Synergies Economic Consulting, *Applying the Hilmer Principles on Economic Regulation to Changing Energy Markets*, April 2016, p. 65

42. In this respect, EDB investment in emerging technology assets will ensure the regulated service benefits from the investment, therefore ensuring consumers derive the maximum benefit from both regulated and unregulated services.

Sales platform

43. Contact Energy has suggested an advantage EDBs have is their ability to fund a “sales platform” to sell emerging technology services which can cost “millions of dollars”³⁶. Vector agrees a sales platform is a formidable barrier. However, this is not an area where EDBs possess a competitive advantage. A sales platform would require, *inter alia*, the set-up of multiple sales channels, customer support, complaints and order fulfilment.
44. An important complement to the development of an effective sales strategy would be a means to target “most likely” users. Potential user information such as typical monthly bill for energy, credit worthiness and propensity to pay on time or riskiness of default are invaluable. In this respect, “gentailers” appear to have the incumbency advantage over any other party including EDBs for leveraging existing retail sales platforms and retail customer relationships. EDBs possess none of this capability and appear more like a new entrant as opposed to an entrenched incumbent. Energy retailers have established energy customer relationships, intimate knowledge of end-user energy usage and, in many instances, economies of scale from significant generation/retailing operations to cross-subsidise activities. Accordingly, it would be equally relevant to create “ring-fencing” rules to prohibit retailers from exploiting their competitive advantage over a new entrant seeking to provide an emerging technology service.

Other proposals for asset regulation

Transpower Demand Response Program

45. ERANZ has suggested the Transpower demand response (DR) program as a possible model for governing EDB investment in emerging technologies. Vector has some concern with ERANZ’s description of the Transpower’s DR program. ERANZ noted “Transpower is not permitted to include non-transmission solutions as part of its major capex improvement process.”³⁷ The ERANZ description is technically correct that the “non-transmission alternative” only applies to major capex approvals processes. However the Commission’s capex IM reasons paper is very clear that Transpower may invest in non-traditional transmission investments as part of their base capex where the investment is not an

³⁶ *Ibid* n 10, p.13

³⁷ *Ibid* n 14, p. 21

alternative to a major capex project.³⁸ This is quite a different concept to pre-emptively regulating assets which ERANZ has proposed for EDBs. The ERANZ proposal for EDBs is directed at precluding EDB investment in assets that “could be potentially delivered in a workably competitive market.” This will require the Commission to be up to date with changing innovation for regulated services and decide which technologies can or cannot be used as part of the regulated service. There is no equivalent prohibition on Transpower even as part of the DR programme.

Use of related party rules

46. Contact energy has suggested the related party rules within the cost allocation IM could be used to govern EDB investment in emerging technologies. A key aspect of its suggestion “is to preclude ownership of emerging technologies.”³⁹ Accordingly, Contact Energy’s proposal is no different to other proposals to regulate the assets EDBs may or may not invest in.

Analogy with insource/outsource models

47. ERANZ has suggested the implementation of an asset regulation model is similar to the operation of an arm’s length maintenance / construction activity by many EDBs. Vector sees fundamental differences between a third-party field service provider (FSP) model and regulating assets. The flexibility to either have an outsourced model or insourced service provider assists with ensuring the EDB is not held “captive” by a particular outsourced provider. Indeed the Commission would be aware of some EDBs having transitioned from an outsourced model to an in-source model or vice versa for their FSP to realise better value.

Risk of partial capital recovery

48. A number of submissions have questioned the Commission’s decision to accelerate depreciation to address the risk of partial capital recovery. These submissions have suggested there is insufficient evidence to warrant such a measure. Vector notes the purpose of the Commission’s action reflects a heightened risk of partial recovery and the impact this has on incentives to invest. To this end, the Commission has correctly observed the increasing range of energy independence solutions available for customers as evidence of heightened risk.

³⁸ Commerce Commission, *Transpower Capital Expenditure Input Methodology Reasons Paper*, 31 January 2012, p. 29.

³⁹ *Ibid* n 10, p. 17

49. In addition to the increasing range of technologies available to customers, the rapidly declining costs of some technologies such as solar PV (recognised by the Commission) provide credible means of significantly reducing reliance, or even choosing independence, from the centralised energy system.⁴⁰ The Australian Climate Council's recent report titled *Powerful Potential Battery Storage for Renewable Energy and Electric Cars* observed the cost for battery storage is following the same cost trend as solar PV.⁴¹ In light of the accessibility of these and other technologies, there is a credible fear that suppliers will only be able to partially recover the costs of their long-life investments.
50. We support the Commission taking measures to preserve supplier confidence for investment. Without such measures businesses will have real pressure to abandon investment. This is likely to undermine service quality to the long-term detriment of consumers. As discussed in our submission we believe there are better methods of sustaining supplier confidence than the Commission's proposal. Given the Commission's proposal and Vector's recommendations are net present value neutral to the status quo, we see no reason to risk compromising network quality. Submissions objecting to the accelerated capital recovery have not contested the risks emerging technologies pose for full capital recovery.

ACAM threshold

51. Vector is concerned about the Commission's decision to revisit the ACAM threshold as part of the IM review. As discussed in our submission, the combination of the assurances provided by section 52T(3) and the ACAM threshold have been instrumental in assisting EDBs with the roll-out of Ultra-Fast Broadband (UFB) across the country. If the Commission did modify the ACAM threshold or the circumstances for its application as suggested in some submissions⁴², suppliers will have to revisit asset sharing agreements to ensure the changes do not erode value. Were such value erosion to occur, suppliers will have to renegotiate agreements for shared services (including with UFB suppliers) to ensure their businesses are not worse off.
52. This could reverse New Zealand's recent advances with fibre subscription growth which was recently observed to be the highest in the OECD.⁴³ In this sense, the sharing of EDB assets has been fundamental to New Zealand's relative success in delivering new infrastructure

⁴⁰ Commerce Commission, Input Methodologies Review Draft Decisions Topic 3 – The future impact of emerging technologies in the energy sector, 16 June 2016, p. 60

⁴¹ Climate Council, *Powerful Potential Battery Storage for Renewable Energy and Electric Cars*, 2015, p. 4

⁴² *Ibid* n 16 p. 37

⁴³ OECD, Broadband Statistics, 1.11. Annual Growth of fibre subscriptions among countries reporting fibre subscriptions, Dec. 2014-2015

with the roll-out and take up of fibre-to-the-premises (FTTP) services which have leveraged shared services provided by EDBs.

Yours sincerely



Richard Sharp
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