VECTOR SUBMISSION TO COMMERCE COMMISSION DEFAULT PRICE QUALITY PATH ISSUES PAPER

CREATING A NEW ENERGY FUTURE

Vector®

CONTENTS

CONTEXT FOR DPP3

Issue	Relevance for DPP3
Auckland has unique challenges	• An unprecedented pipeline of commercial and residential construction projects within a compressed timeframe – requiring significant infrastructure investment. • Significant transportation projects such as Auckland Light Rail Transit triggering additional asset relocations and network reconfigurations. • A growing "wedge" of unaffordability between Auckland and the rest of the country. • Increasing congestion growth in Auckland creating a cost for business not reflected in other parts of the country. • Competition for inputs and skilled resources from the active construction sector. • The asset recovery profile for our investment supporting the Auckland build program is causing concern given long-term investment risks are increasing.
Customer expectations are changing	• Digitalisation and new energy technologies are creating new customer expectations for EDBs to deliver on their existing functions and adopt new roles which need to be supported by flexible regulatory tools. • Technology is driving uncertainty for load growth, such as EV uptake, and new mechanisms are needed to address this additional uncertainty – especially given the expected heightened discipline for capex efficiency through proposed changes to the IRIS. • Understanding the customer through effective engagement and insights and adopting data driven decision-making.

Issue	Relevance for DPP3
	• Recognising the different ways of achieving resilience and the roles and opportunities for collaboration and sharing responsibility by harnessing the capability of new technologies.
Expenditures and incentives	• The Commission should use the most recent available AMP for assessing resourcing for the setting of the DPP across its decision-making process. • Replacement and renewal of assets is expected to grow over DPP3 as major asset fleets reach end of life. • New capability needs to be developed to ensure system and connections growth can leverage the digitalisation of energy. • New obligations are expected to occur within DPP3 that will change historic responsibilities such as the impending reform of the *Electricity (Hazard from Trees) Regulations 2003* and reforms needed for improving the safety of customer service lines – especially for Right of Way (ROW) assets in urban environments. • Non-wire alternatives (NWA) need to be actively fostered to provide an effective alternative to poles and wires as has been successfully demonstrated in other regions – such as New York. Merely increasing the capex IRIS retention factor will not reduce the natural inclination for EDBs to build more poles and wires.
Service Quality	• Reliability indices need to reflect changing operating environments such as heightened community expectations for worker, contractor and public safety to be prioritised when controlling the hazards from electricity. • Other dimensions of the customer experience need to be recognised given the range of activities

Issue	Relevance for DPP3
	undertaken by EDBs and the changing expectations from customers which will require capability to meet new roles.

EXECUTIVE SUMMARY

1. The setting of the 2020-2025 Default Price-Quality Path (DPP3) demonstrates a maturity in the Part 4 price-quality incentive regulation framework. It will be the third price-control period applying to non-exempt electricity distribution businesses (EDBs).

2. The purpose of Part 4 of the *Commerce Act 1986* (the Act) requires that suppliers:

    a) Have incentives to innovate and invest including replacement, upgraded and new assets;

    b) Have incentives to improve efficiency and provide services at a quality that reflects consumer demands;

    c) Share with consumers the benefits of efficiency gains in the supply of regulated goods or services, including through lower prices; and

    d) Are limited in their ability to extract excessive profits.

3. Where each of these purposes is achieved then the regulated service will have the correct incentives to produce outcomes consistent with competitive markets. There is an obligation in setting price-quality paths in Part 4 for the framework to both encourage efficiency but also retain incentives for EDBs to improve in ways that reflect consumer demand. The long-term benefit of consumers needs to consider the "overall" benefit being obtained by consumers from regulation and this should be considered in the context of the overall supply chain.

4. The DPP Determination sets both the revenue constraint and quality outcomes expected to be achieved annually by EDBs. Allowable revenue is set through the "building blocks" model of revenues.

5. A key element of the "building blocks" is the calibration of the expenditure building blocks of operating expenditures (opex) and the forecast capital expenditure (capex) which forms part of the capital building block. The expenditure calibration is important to ensure costs reflect the efficient investment and operational management to achieve the desired outputs.

6. In setting DPP expenditures, it is important for the Commission to meet within the low-cost context of the DPP the circumstances of individual EDBs. Indeed, this type of "tailoring" within the DPP has previously been recognised by the Commission as meeting the Part 4 purpose and the purpose of DPPs and Customised Price-Quality Paths (CPPs) specified in section 53K.

7. Vector operates in the pivotal Auckland region which contributes significantly to New Zealand's economic growth, accounting for $101.4 billion of New Zealand's $270.6 billion GDP in 2017.[1] Auckland is also experiencing an infrastructure "boom" with no modern equivalent. This creates challenges such as forecasting projected demand and ensuring sufficient resourcing to enable infrastructure development as well as all other functions. All this is occurring as the cost of living "wedge" between Auckland and the rest of the country has grown.

8. In the last five years Vector has invested over $800 million supporting the Auckland region. We anticipate over the next 10 years that we will spend approximately $2.8 billion in our service as we manage the "peak" of the Auckland build program expected to occur in DPP3 and the corresponding challenges of integrating more new energy technologies onto our network. Vector is concerned about the long-term recovery of our investments to address Auckland's immediate growth challenges as there are growing concerns for long-term capital recovery. For DPP3 it is important for the regulatory framework to recognise each of the conditions of the Part 4 purpose statement. This is especially the case as changing customer expectations from greater digitalisation and increasing penetration of emerging energy technologies creates new demands on EDBs. Vector commissioned Forensic Technologies International (FTI) and Compass Lexecon (CL) together known as FTI-CL to provide a Regulatory Blueprint of the regulatory tools available for ensuring regulation continues to meet customer expectations – *The regulatory blueprint to meet today's customer expectations* is provided with this submission.[2]

9. The FTI-CL Blueprint demonstrates the source of customer expectations is their service experience in other sectors and it would be naive to expect this not to influence electricity distribution. They also recommend a suite of regulatory tools that should be considered by regulators to ensure EDBs deliver their expected roles, both current and new, to evolving expectations.

10. In this regard, we see an increasingly important need for EDBs to effectively engage and understand changing customer preferences. Complementing effective customer engagement is the need for data driven decision-making. Accordingly, we consider it naive for EDBs to only consider one possible future and not have effective scenario

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[1] Statistics New Zealand, *New Zealand's regional economies 2017* (21 March 2018) available: https://www.stats.govt.nz/infographics/new-zealands-regional-economies-2017

[2] Forensic Technologies International (FTI) and Compass Lexecon (CL), *Regulatory blueprint to meet today's customer expectations* (9 November 2018)

planning for the alternative possible technology paths impacting load and energy forecasting.

11. We also consider the DPP is an appropriate opportunity to consider the important topic of resilience and settling on an agreed interpretation for this important concept. This should be a wide debate that captures input from important stakeholders such as Civil Defence and ensure interpretation is consistent with responsibilities under the Emergency Management Act.

12. Given the emerging opportunities for resilience from emerging technology there needs to be a clear debate of the best model for achieving the appropriate level of resilience. There also needs to be consideration about sharing responsibilities through a shared resilience strategy. Vector has explored this topic in detail in our *Working Together on Resilience* paper.[3]

13. Vector also suggests the traditional reliability metrics for service quality measured by average interruption duration (SAIDI) and average interruption frequency (SAIFI) must also recognise changing operating environments including community expectations around workplace health and safety.

14. The enactment of the *Health and Safety at Work Act 2015* (HSWA) created a new threshold for workplace safety in New Zealand which required workplaces to revisit their practices to ensure staff, contractors and the public are kept safe. This operating environment change was significant in terms of expectations for New Zealand businesses to review workplace practices.

15. In this regard, Vector altered its operational practices in line with the expectations of the HSWA and has suffered from reliability metrics in DPP2 not being updated to reflect this new expectation. Accordingly, Vector suggests the adoption of reliability metrics in DPP3 should have sufficient regard to the new operating environment of EDBs which includes managing workplace health and safety to a new heightened standard.

CHALLENGES OF OPERATING IN THE AUCKLAND REGION

16. Vector is confronted with significant challenges which are unique and less relevant to EDBs operating in other parts of the country. Most significantly, Auckland is

[3] Vector, Working Together on Resilience, September 2018 – access at https:www.vector.co.nz/media/working-together-on-resilience.pdf

experiencing a rate of infrastructure construction which has no modern equivalent. The forecast rate of dwelling consents for Auckland is exceeding modern historical highs and is being driven (to a large extent) by Crown funded projects for housing. These developments are operating with the benefit of expedited town planning rules to rapidly progress activity.

17. Population growth and traffic congestion in Auckland has created further pressure. Auckland's population has grown by around 170,000 people in the past four years to January 2018 and over 700 additional cars are registered in Auckland every week[4]. This is increasing the volume of congestion and the incidence of car v pole third party damage occurring on the network.

18. The year-on-year projections for forecast dwelling consents between 2017 and 2018 have been revised upward significantly. These are being driven by significant housing projects for Auckland including announcements for 10,000 dwellings for Mt Roskill (September 2018),[5] 10,000 dwellings for Mangare (July 2018)[6] and 7,000 dwellings for Whenuapai and RedHill (September 2018).[7] The combination of these developments occurring simultaneously will create a dwelling construction peak occurring within the DPP3 timeframe.

19. This is occurring when non-housing infrastructure projects are also "peaking" in volume. The expected value of non-housing infrastructure construction is expected to reach $3 billion and stay at that level for the majority of DPP3.[8]

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[4] Ministry of Transport, the New Zealand Transport Agency, Auckland Council, Auckland Transport, the Treasury and the State Services Commission, *The Congestion Question: Phase One Report* (January 2018) available: https://www.transport.govt.nz/assets/Uploads/Land/Documents/The-Congestion-Question-Report-Jan-2018.pdf, page 11

[5] Minister of Housing and Urban Development Hon Phil Twyford, *Thousands of new homes in Mt Roskill redevelopment* (9 September 2018) available: https://www.beehive.govt.nz/release/thousands-new-homes-mt-roskill-redevelopment

[6] Minister of Housing and Urban Development Hon Phil Twyford, *Mangere redevelopment means 10,000 new homes* (13 July 2018) available: https://www.beehive.govt.nz/release/mangere-redevelopment-means-10000-new-homes

[7] Minister of Housing and Urban Development Hon Phil Twyford, *Major infrastructure funding for Auckland's Northwest,* (21 September 2018) available: https://www.beehive.govt.nz/release/major-infrastructure-funding-auckland%E2%80%99s-northwest

[8] Ministry of Business, Innovation and Employment, *National Construction Pipeline Report 2018* (July 2018) page 33

20. The light rail transit (LRT) project will also create even more stress on the construction sector as its timing is expected to overlap with the city rail-link loop and increase the impact of transport infrastructure projects over the DPP3 timeline.[9]

21. All of this is occurring in the least affordable region of New Zealand. The cost of living "wedge" between Auckland the rest of the country has grown during DPP2. This is creating challenges for Vector with supporting the accelerating level of building activity occurring in the city. The ability to resource for the level activity occurring and expected to occur over DPP3 is a matter that needs to be addressed in the resourcing calibration.

EXPENDITURES

22. A key element of setting price-quality regulation is to ensure the starting prices and quality standards have an expenditure calibration that is sufficient to efficiently manage and invest to meet the specified outputs.

Operating expenditure

23. The Commission noted that it intends to apply a "step-and-trend" approach to the setting of opex. This involves taking a base level of opex, carrying it forward by certain trend factors and applying any known step changes. The penultimate year of DPP2 (RY2019) will be the baseline from which the Commission will project forward its opex trends for the next DPP.[10]

24. The "step-and-trend" approach is limited as it simply assumes a static operating environment. Accordingly, EDBs are assumed to adopt legacy business models despite a changing operating environment. For example, the transition to cloud based software means more IT software is licensed where historically such software would have been assets for EDBs.

25. Further, where the Commission has opined on the operating practices of EDBs via an investigation into quality compliance then it must consider the ability for the EDB to practically implement the programs suggested by the Commission. In that sense,

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[9] New Zealand Transport Agency, *Auckland Light Rail Introduction* (accessed 18 December 2018) available: https://www.nzta.govt.nz/roads-and-rail/rapid-transit/auckland-light-rail/

[10] The selection of RY2019 is consistent with the "base" year assumption in the opex IRIS model which assumes incremental permanent efficiencies across the DPP and penalises gaming of expenditures in any one year with recoverable cost financial penalties

where the EDB is subsequently implementing the expected model behaviours recommended by the Commission then this should not be compromised by a calibration that does not allow for the recommended actions in the trade-offs.

Network scale growth considerations

26. The Commission articulated two correlating variables for trending the growth in opex for DPP2.[11] Opex was divided into two forecast categories:

    a) Network expenditures – the relevant relationships were installed control point (ICP) growth and circuit length growth; and

    b) Non-network expenditure – the relevant relationship was growth in ICPs.

27. Vector considers these relationships are appropriate for driving expenditure changes for EDBs. The ICP growth experienced in the Auckland region over this DPP was responsible for changing our resourcing at both the central office and field force levels.

28. Our connections team has increased in size to meet the volume of work created by new connection requests for both small scale developments and for larger urban development projects such as those undertaken by the Tamaki Regeneration Company.

29. New connection projects are resource intensive and involve bespoke equipment to meet design expectations of developments and interconnection. Indeed, we anticipate this area to be more complex as novel energy solutions become more common.

30. Nonetheless, econometric relationships have no insight into the operational needs for EDBs. Accordingly, we recommend the Commission have regard to EDB schedule 11b forecasts in their asset management plans (AMPs) as these forecasts will illuminate resources and needs EDBs are expected to incur over the DPP3 period and should be considered where they are well justified.

Disaggregating network drivers

31. The Commission has sought to determine whether there is greater ability to disaggregate opex further at a category level. We consider there to be limited scope to make any further significant changes. The Commission has proposed some possible options such as[12]:

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[11] Commerce Commission, *Default price-quality paths for electricity distributors from 1 April 2015 to 31 March 2020: Low cost forecasting approaches* (28 November 2014) at 3.15

[12] Commerce Commission, *Default price-quality paths for electricity distribution businesses from 1 April 2020: Issues Paper* (15 November 2018) at A8

a) An inverse relationship between replacement and renewal capital expenditure and replacement and renewal operating expenditure; and

b) A positive correlation with EDB vegetation management and overhead circuit length.

32. Whilst intuitively an inverse relationship between replacement and renewal capex and opex could be expected. In practice, there are substantial portions of the maintenance and renewals capex program that will not be mapped to opex maintenance savings. For example, high voltage underground cable replacements are a significant undertaking for replacement capex in any one year. The maintenance scheduling with such assets is not proportionate to the replacement needs. This is quite a common occurrence across asset fleets and will obviate the strength of any econometric relationship. Further, there is a timing issue for unpicking any benefit to maintenance from asset renewals. Accordingly, the effort required to accurately capture any relationship should not be underestimated. This is especially relevant given the importance of this type of expenditure for networks.

33. There could be cause for estimating EDB vegetation management in relation to overhead circuit length. Indeed, undergrounded cables have much less cause for vegetation management hazard prevention. There are matters that need to be considered with vegetation management modelling such as type of species and climate which will influence the effectiveness of tree-trimming programs. For example, EDBs operating in warmer (tropical) environments such as Vector will expect to manage a faster regrowth rate with vegetation compared to EDBs operating in more temperate climates. This is especially important given the impending review of the regulation governing tree trimming.

Step-changes in expenditure

34. The Commission has outlined criteria it would apply to consider "step-changes" in operating expenditures. The Commission has specified the following criteria, for a step-change[13]:

a) The expenditure must be significant;

b) Robustly verifiable;

c) Not captured in other components of the projection;

d) Largely out of the control of the distributor; and

[13] Ibid, at A17

e) In principle, be applicable to most, if not all, distributors.

35. The criteria adopted by the Commission are unnecessarily restrictive for dealing with the issue of unanticipated step-changes to opex. This is especially relevant given the inclusion of the opex IRIS within the regulatory tool kit for expenditure efficiency. The opex IRIS operates on the presumption of the sufficiency of the opex allowance set for a regulatory control period. Accordingly, the inclusion of new prescribed responsibilities for EDBs to discharge during an inflight DPP will create the impression of sudden inefficiencies that are penalised under the opex IRIS. Such penalties will be incurred not because of sudden inefficiency but due to the need to execute new responsibilities.

36. There are changes anticipated to occur during the next DPP which will have such an effect – but not contemplated in the opex allowances due to the overly restrictive "robustly verifiable" criteria applied by the Commission. We recommend this criterion be reclassified as being "reasonably likely" to occur.

37. In this context, we suggest there is a need for the Commission to consider the MBIE review of the Tree Regulations (discussed below) as a matter generally addressing the criteria and requiring specific attention in expenditure calibration.

38. We also suggest the topics of access to smart metering data and guaranteed service level (GSLs) (discussed in the quality section of our submission) should be considered within this context.

Review of Tree Regulations

39. The government's review of the *Electricity (Hazards from Trees) Regulations 2003* (the Tree Regulations) is likely to create a step-change in expenditures relating to vegetation management. This review was announced in August 2015 but is expected to occur in calendar year 2019 with changes to the regulation to occur during the 2020-2025 period.

40. We anticipate the results of the review will enable greater rights to address offending vegetation. However, we cannot speculate how this will be implemented. The overwhelming likelihood is that costs for managing this program will increase although we anticipate corresponding benefits from reducing impact of vegetation related outages, especially in normal operating conditions. However, weather conditions are the key element to the impact of vegetation outages will have in any one year.

41. Should the changes to the Tree Regulations involve increasing the perimeters of the growth limit zone (GLZ)[14] around overhead circuits this will result in more resourcing for both site inspections and the administration of cut and trim notices to customers.

42. The Tree Regulations currently put the onus of trimming offending vegetation on the tree owner. There is an exception to the obligation where the cost of the "first cut" is at the expense of the EDB. The redrafting of the obligations may confer more powers onto EDBs such as bearing the cost of all vegetation within the GLZ which will significantly increase the cost of vegetation management for EDBs.

43. In the Powerco CPP the Commission approved a forecast vegetation maintenance program that significantly increased Powerco's expenditure associated with vegetation trimming (almost doubling the expenditure) predominantly to improve the program to meet good industry practice.[15]

44. Any of the above changes to the Tree Regulations will have an impact on vegetation related expenditures which will be more significant than the Powerco step change. We recommend the Commission ensure EDBs can meet the impending changes to the Tree Regulations to ensure any new rights can be translated into outage reductions.

45. Given the inherent uncertainty of the Tree Regulations review it may be possible for the Commission to consider an uncertainty mechanism trigger to allow for any prescribed changes resulting from the review. The inherent limitations of the DPP "change event" mechanism also appear insufficient to deal with the Tree Regulations review as the re-opening criteria are unnecessarily narrow. Our recent experience of seeking to re-open the DPP for changes implemented because of the HSWA illustrate the rigid interpretation by the Commission of the criteria for re-opening the DPP.

Smart-metering data

46. We consider the need for visibility and network planning for the low voltage network needs to be supported by real time consumption data provided by smart-meters. Over the course of DPP3 we consider this network imperative will become more acute and the status quo less acceptable for networks. In this respect, Vector considers the

[14] See Schedule *Electricity (Hazards from Trees) Regulations 2003*

[15] Commerce Commission, *Powerco's customised price-quality path: Final Decision* (28 March 2018) at 425 to 428

costs associated with accessing smart meter data be considered an issue meeting the criteria articulated by the Commission for a potential "step-change" in expenditure.

Input price escalations

47. The Commission translates opex forecasts into nominal dollars using a blend of the all industries labour cost index (LCI) and producer price index (PPI).[16] These indices have been used in recognition that they are a better indication of changes to opex drivers than general consumer prices.

Input prices – Auckland is a special case

48. The Commission's blended indices the LCI and PPI are not disaggregated at a regional level. Accordingly, they do not illuminate any regional differences in costs which affect whether the indices are able to reflect regional changes in costs.

49. Vector is an Auckland region business with an electricity distribution system spanning the entire Auckland city boundary. Operating in the Auckland region is costlier than the rest of the country. There is an absolute cost premium for being an Auckland centred business.

50. More recently, there has been an acceleration in the cost differences for operating in the Auckland region versus other parts of the country. Failing to recognise these regional differences limits the benefit of using indices better correlated with opex drivers.

51. There are many factors that are driving the "increasing wedge" between Auckland costs and the rest of the country. These include:

    a) Household expenditure for Auckland has increased at a faster rate than the rest of the country in recent years;

    b) Construction activity including the number of in-flight infrastructure costs and forecast construction activity is disproportionately located in the Auckland region; and

    c) Congestion growth which has a significant impact on efficient travel within the Auckland region.

52. Auckland household costs have risen faster than the rest of the country over the last 10 years. Accordingly, living and working in Auckland requires more household

[16] Commerce Commission, *Default price-quality paths for electricity distributors from 1 April 2015 to 31 March 2020: Low cost forecasting approaches* (28 November 2014) at 3.35

income dedicated to living pressures than historically. This has been magnified by the recent introduction of a regional fuel tax in the Auckland region.

53. Present and forecast construction activity for infrastructure in Auckland is also significantly higher than for the rest of the country.[17] This environmental factor is imposing a competitive pressure for construction costs that are not as significant in other regions. The impact of infrastructure construction creates pressure through competition for scarce skilled labour and for common construction inputs.

54. The costs of congestion are also more pronounced for Auckland than other parts of the country which imposes a cost to Vector's operations. NZIER has estimated congestion costs Auckland's economy between one to two percent of its GDP.[18]

55. Recognising regional variation in expenditure drivers is one aspect of the DPP we believe should be considered for regional "tailoring". The Commission has indicated that it does not intend to apply EDB and regional specific tailoring for the DPP. We are surprised at this approach as it is inconsistent with the approach adopted for the 2017 DPP for gas pipeline businesses (GPB). In the GPB process the Commission applied a regionally tailored approach and justified the decision on the basis that:

> *In order to best promote section 52A, in light of section 53K, our design and implementation of the DPP should be tailored to accommodate suppliers' circumstances at a level of cost and scrutiny that is proportionate and commensurate with the intent of the regime.*[19]

56. It is important for stakeholders to have confidence in the consistency of the Commission's decisions over time. A continuous shift in decision-making parameters undermines the certainty stakeholders expect with regulation decisions. We anticipate that any departure from precedents should be undertaken cautiously and be well justified otherwise it risks undermining the certainty stakeholders expect with the regulatory framework.

57. The Commission must consider the practicality of high level regional tailoring of costs given local conditions are a significant driver of cost changes that are

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[17] Ministry of Business, Innovation and Employment, *National Construction Pipeline Report 2018: A Forecast of Building and Construction Activity* (July 2018) page 27

[18] New Zealand Institute of Economic Research, *Benefits from Auckland Decongestion: NZIER report to the Employers and Manufacturers Association, Infrastructure New Zealand, Auckland International Airport Ltd, Ports of Auckland Ltd, National Road Carriers Association* (10 July 2017) page 33

[19] Commerce Commission, *Default price-quality paths for gas pipeline services from 1 October 2017: Policy for setting price paths and quality standards* (30 August 2016) 3.43

underrepresented in national indices. Indeed, the use of national indices for projecting cost changes for the current DPP has materially under-represented the costs for Vector as an Auckland region EDB. At a minimum, we expect such changes should be "caught up" otherwise Vector risks being continuously penalised for operating in the Auckland region.

Capital expenditure

58. Capital expenditure (capex) is less predictable than opex as it is driven by the forward-looking needs of the supplier. There are a range of considerations impacting the investment programs of EDBs including replacement needs, growth driving capacity and network expansion, the ability to defer programs and developing new capability to improve performance and responding to new customer needs.

59. Effective demand and usage forecasting is increasingly important for capex needs. New technology trends such as customer take up of small-scale distributed generation (DG), storage, energy efficient technologies and electric vehicles (EVs) are also important considerations for investment needs. Historically system planning could dependably rely on increasing demand and growing consumption to fund long-life system augmenting assets. However, the greater penetration of new energy technologies is giving customers choice about their energy needs. Accordingly, asset investment must be sophisticated and cannot rely on linear forecasts for demand growth.

60. The failure of getting demand forecasting wrong was highlighted in the ACCC's Preliminary Price Inquiry Report. In that report Ausgrid (the metropolitan Sydney and surrounding regions distribution network service provider) was singled out for the 2009-2014 regulatory control period which had presumed system peak growing to 6700 MW.[20] However, over the five-year period system peak failed to exceed 6000 MW. In 2011, Ausgrid forecast that approximately $11 billion of network assets were used for a period of less than five days per year.[21]

61. Accordingly, Vector has developed sophisticated scenario modelling to accompany our asset management plan (AMP) which endeavours to capture changes to technology and possible alternative new approaches of addressing network needs.

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[20] Australian Competition and Consumer Commission, *Retail Electricity Pricing Inquiry: Preliminary Report* (22 September 2017) page 111

[21] See Energy Networks Australia, *Electricity Prices and Network Costs* (April 2014), page 2

62. The Commission has proposed an approach of using EDB capex forecasts disclosed in their AMP and AMP updates. This approach ensures there is a nexus between the investment program intended by the EDB and the allowances set by the Commission.

63. We recommend the Commission also have regard to the quality of the asset management information of EDBs in their AMPs. The quality of the information in the AMP and the level of detail for defining network programs and needs should provide insight into the reasonableness, necessity and urgency of the investment program.

64. Vector considers it vitally important for the Commission to apply its scrutiny to the latest available information provided by EDBs. In this respect, we recommend the Commission use the latest AMP or AMP Updates for its Draft Decision as well as its updated Draft Decision and Final Decision. The current proposal in the DPP Issues Paper is to use the 2018 AMP for the Draft Decision. We believe this is unnecessary. The 2019 AMP information will be available for the Draft Decision and will provide a consistent information set that can be used for the whole DPP decision-making process. This will ensure consultation on the decision will allow discussion on the most up-to-date investment program of the EDB.

65. The Commission's capex IRIS applies an additional discipline for EDBs to seek out deferrals from their capex allowances with an incremental retention benefit being shared by the EDB with customers. The capex IRIS is symmetrical. Therefore, where the Commission sets capex below the forward needs of the EDB then delivering the necessary capital program will come with a financial penalty which will discourage investment that may not be in the long-term interests of consumers.

Constraining capex forecasts

66. To date when setting DPPs, the Commission has applied a cap derived from historical levels of capex spending as a means of limiting forecast exaggeration. There is a need to scrutinise capex forecasts to minimise the risk of forecast exaggeration.

67. The approach of applying a "cap" on expenditure using historic levels of expenditure is pragmatic and assesses historic accuracy with expenditure forecasting. However, this short-cut approach is not fit-for-purpose for all categories of forecast expenditure and so the Commission should use its discretion where a historically derived "cap" may lead to unintended consequences.

Type of restraint – cap

68. There needs to be flexibility with a "cap" and restraint applied by the Commission. We also recommend the Commission consider the trends with EDB forecasting and actual spending based on the type of expenditure.

69. For some capex categories, the insight from historic forecast accuracy provides a reasonable basis for opining on the reasonableness of the EDB's forecasting process. In this respect, "asset replacement and renewals" is a category of expenditure where EDB processes such as inspections and asset fleet management strategies are particularly important. Therefore, where an EDB has demonstrated reasonable accuracy with forecasting this type of expenditure then the Commission should have confidence that forecasts are credible. Historical accuracy is likely to have developed because of rigour being applied to controllable processes such as inspections and asset information management.

70. However, other categories of expenditure such as customer connections and system growth are more dependent on external variables and require more insight than simply applying a cap based on historical spend. With respect to categories of expenditure such as system growth and consumer connection, the Commission must consider the macro-environment and drivers such as technology when assessing these expenditure forecasts.

71. It is also important to consider the rigour applied in the EDB's AMP to capture appropriate information for making an informed forecast. Where an EDB has neglected relevant information such as user technology adoption and alternative network responses its forecasting methodology has greater risk of being out-of-step. This is especially important for growth related expenditure which provides insight both into the network needs and type of investment response needed.

Customer service lines

72. The general deterioration in customer service lines is creating a public safety issue of an unknown magnitude. Historically, in-fill urban developments resulted in previously dedicated assets being shared across properties with power poles and power lines extended to new properties across right-of-way (ROW) corridors. These assets are in declining health due to the uncertainty of their ownership. Under *the Electricity Act 1992* some of these ROW assets satisfy the requirements of being network assets as they are non-exclusive fittings.

73. For Vector, this is a significant challenge as ROW assets are disproportionately located in the Auckland region. The cost pressures for housing affordability are also

creating more incentives for lots to be further subdivided to facilitate more housing construction. This creates more challenges on monitoring the state of service lines where further subdivision of lots changes the status of an exclusive to a non-exclusive fitting (such as by adding second line span on a previously dedicated pole). We recommend the Commission recognise programs to address the state of CSL lines within forecast capex programs. This is because the risk of catastrophic consequences from such assets failing is real and will cause public scrutiny about the steps undertaken by industry including regulators to address the state of such assets.

Relocations – Auckland Light rail transit (LRT)

74. We are expecting our asset relocations program to be significantly affected by the LRT project expected to commence in DPP3. The LRT will dramatically increase the need for relocations in the very important commercial precinct. We anticipate the project will involve the relocation of up to 1500 electrical cables including underground cables rated at 110kV, 33kV and 22kV all requiring relocation. The costs anticipated for this increase in relocation activity is expected to reach $80 million over the five years. This will be a significant undertaking and further constraining resources that Vector has to execute all our vital network functions.

75. To ensure appropriate maintenance of assets following the construction of the LRT project, Vector expects to implement new redesigns of the network to reduce the impact of maintenance programs along the LRT corridor. This is a challenge we have not had to consider with other major infrastructure projects in Auckland such as the Waterview tunnel or City Rail Link which did not have permanent impacts on the access to network assets.

QUALITY STANDARDS

77. The DPP Issues Paper is proposing to retain the indices of system interruption duration (SAIDI) and interruption frequency (SAIFI) as its primary measure of quality. The Commission is considering a wider range of measures of service quality for the next DPP. However, the discussion on broadening the range of quality of service is limited and does not recognise the key emerging trends for the sector. These include a likelihood of increasing frequency of extreme events as a result of climate change (and the need for greater resilience), increasing accessibility of DG, digitalisation, decentralisation (e.g. distributed storage such as batteries) and the take up of EVs.

78. Each of these emerging trends creates new customer expectations for EDBs to deliver functions and activities not traditionally associated with distribution networks. Failing to recognise such activities within the price-quality framework risks EDBs not adequately adapting to meet new roles anticipated for networks such as seamlessly connecting and integrating new DG, DS and loads as well as facilitating bilateral flows of electricity in a safe and responsible manner all without impeding customer choice and innovation. This risk is discussed by FTI-CL in their *Regulatory Blueprint for meeting today's customer expectations*.

79. Accordingly, we anticipated some innovation in terms of the outputs and incentives proposed for DPP3 to assist with ensuring such a transition occurs. However, the Commission's proposals for broadening quality of service framework is limited and only suggests accretive regulation with limited insight into the innovations affecting energy customer choices.

Reliability - SAIDI / SAIFI statistics

80. The Commission proposes to retain SAIDI/SAIFI as its primary quality measure for reliability. The decision appears to be influenced by the international use of these indices in utility regulation.

81. This widespread use of SAIDI/SAIFI also reflects the historical development of electricity distribution networks which have grown over a period of decades to their current length and capacity. The starting presumption for these indices is that delivering electricity at low voltages across wide geographies intermingled with other modern civil and community infrastructure does not occur interruption free.

Establishing the material deterioration benchmark

82. The material deterioration benchmark recognises the distribution system should not materially depart from current expectations of reliability from the customer. There is a legitimate expectation from the customer for the distribution system to be managed in a manner that limits the duration and frequency of outages for customers to a level they anticipate. This involves asset management interventions to manage controllable outage causes such as asset failures and hazards to lines (such as vegetation) within the defined resource constraint.

83. A departure from the "no material deterioration" benchmark involves establishing a new price-quality trade-off. For example, if customers want a network that delivers a near zero interruption experience than this will involve a new price-quality trade-off. In that circumstance asset strategies may involve undergrounding the remaining 45 percent of Vector's network to improve reliability costing approximately $5.5 billion for Auckland more than doubling lines charges for the average customer.[22]

No material deterioration – limiting the risk of false positive breaches

84. It is important for the Commission to deliver on its intention to set SAIDI/SAIFI quality standard with the purpose of minimising the risk of "false positive" breaches. The Commission describes a "false positive" as when an EDB breaches the quality standard but material deterioration has not occurred.[23] We note the importance of having a robust framework which, to the extent possible, eliminates the risk of "false positive" breaches. "False positives" impose a high regulatory cost on the sector with time and resources preoccupied with demonstrating the "false positive" for legacy performance as opposed to managing distribution system needs.

Historically derived SAIDI / SAIFI limits

85. A fundamental element for reducing the risk of "false positive" breaches is ensuring the reliability limits set for SAIDI / SAIFI are fit for purpose.

86. The current approach for determining SAIDI/SAIFI looks purely at historical performance as the benchmark of material deterioration. While historical SAIDI/SAIFI results are a useful starting point for deriving SAIDI/SAIFI limits they do not account for material changes to the operating environment for EDBs. In some circumstances,

[22] See Vector's White Paper, *Working Together on Resilience* (September 2018)

[23] Commerce Commission, *Default price-quality paths for electricity distribution businesses from 1 April 2020: Issues paper* (15 November 2018) at C33

a breach of a historically defined SAIDI/SAIFI limit will be due to a more complicated operating environment as opposed to material deterioration in the system and assets involved with delivering the service.

Operating environment changes will influence SAIDI/SAIFI performance

87. Unplanned outages incorporate a combination of environmental and asset condition causes. There are varying levels to which asset management strategies can address such causes and, in some instances, the environment will have a significant and asymmetrical impact.

88. Vegetation contact with overhead lines tends correlates with high-wind weather. Vegetation trimming will assist with reducing the impact of this cause but is not expected to eliminate vegetation contact as a cause of outages. This is especially the case with the current restricted rights for EDBs to trim vegetation within defined perimeters to lines. Any other trimming or tree removal can only occur via negotiation with tree owners which can deliver an uncertain outcome of indeterminate cost. High wind gusts create more opportunity for debris to contact overhead lines.

89. During periods of exceptional weather vegetation contact does increase from historic averages. Trees may be uprooted on the opposite side of the road outside of the cutting zone, taking out lines and poles. Multiple trees may be brought down over the same stretch of line meaning power cannot be restored until all vegetation is removed and lines repaired. To some extent exceptional weather is recognised in historic data but to the extent we anticipate greater variability in weather than this cause will become more of a challenge for managing outages. Auckland's April 2018 storm provides an example of significant damage caused by exceptional weather. This storm experienced wind gusts of 214 kilometres per hour and disrupted power supply to over 150,000 properties.[24]

90. Climate modelling suggests this type of extreme weather may become more frequent. In 2017, Vector commissioned a report by Ernst and Young which projected year-round wind speeds may increase significantly thereby increasing the risk of faults associated with high winds.

91. More complicated traffic conditions and greater volumes of congestion compared to historic levels are an operating environment change that will impact both SAIDI/SAIFI levels.

[24] See Vector, *2018 Annual Report* (August 2018) page 31

92. The most pressing example of material changes to the operating environment are modifications to health and safety (H&S) practices which impact forward looking performance and can create meaningful differences when contrasting SAIDI/SAIFI results to a historically derived limit.

93. H&S management is a process of continuous improvement derived from shared learnings and innovation. Vector continuously investigates ways to eliminate or otherwise mitigate risks to workers (both contractors and staff) and the public as part of operating procedures. There is an inherent tension in the current framework where risk elimination or risk reducing safety improvements can negatively impact SAIDI/SAIFI statistics when they are benchmarked on historical performance. Accordingly, the framework creates a challenge where financial penalties may over power incentives for safety of workers, contractors and the public. The tension is illustrated in the examples below.

Switch gear – modified safety procedure

94. In 2012, Vector issued a "do-not operate live" following a risk review of a type of small dimensioned switch gear. An investigation found contamination of oil which could not be identified prior to switching.

95. In 2015 in Western Australia, a Long and Crawford HV oil-insulated combined switch unit exploded resulting in two fatalities.[25] In response EnergySafety WA issued an order that these units must be completely disconnected from electricity supply before a person may open the switch lid.[26] To establish a baseline for the safe operation of these assets Vector undertook a review and accelerated maintenance cycle of similar assets on the Vector network.

96. As such, switching procedures now include additional isolation and stand down time between switching operations which use mechanical actuators.

[25] Western Australia Department of Mines, Industry Regulation and Safety, "EnergySafety issues Order following Morley Galleria Shopping Centre explosion" (13 February 2015) available: https://www.commerce.wa.gov.au/announcements/energysafety-issues-order-following-morley-galleria-shopping-centre-explosion

[26] Ibid

Visible earths for field work

97. In 2015 the New Zealand Electricity Engineer's Association (EEA) introduced changes to their Safety Manual Energy Industry (SMEI) manual before de-energising overhead lines, including changes to temporary earthing at switchgear with no visible breaks.[27]

98. This change means an additional set of temporary leads is required to be installed when a gas switch with no visible break is used. Approximately 41 percent of the overhead switches on Vector's network are affected by this change.

99. The change for visible earthing has impacted our outage response action which historically would have merely relied on the non-visible break to isolate without any additional external earthing needing to be established with the switch.

Restricted live-line work

100. The enactment of the the HWSA prompted a review of Vector's H&S standards including our policy towards working on energised lines. A significant part of the HSWA reform to workplace health and safety is the focus on businesses to "eliminate risks" to health and safety, to the extent it is reasonably practicable.

101. For businesses such as Vector the enactment of the HSWA prompted a top down review of appropriate measures to ensure employees and contractors can discharge their functions to minimise the risk of electric shock.

102. As a result, Vector modified its policy for live-line work which has been incorporated into our contactors justification matrix prescribing when works on the network can occur energised. This new policy has significantly increased the frequency and duration of outages – especially for planned works. The policy was progressively rolled out starting with Vector's 11kV voltage networks and then our low voltage 400V (LV) networks.

103. Application of the new policy to the LV network has also resulted in an increase in outages impacting SAIDI/SAIFI. LV lines are not included in the SAIDI/SAIFI calculation. However, to de-energise LV work areas it is sometimes necessary to first de-energise 11kV voltage lines thereby contributing to SAIDI/SAIFI statistics. This is

[27] Electricity Engineers Association, *Safety Manual - Electricity Industry (SM-EI)* available: https://www.eea.co.nz/Site/publications/sm-ei-2015/sm-ei-parts-1-2-and-part-3-2015.aspx#H159786-1

especially notable given LV works would not previously have had an impact on SAIDI/SAIFI indices.

104. De-energised work-sites require additional switching to isolate high-voltage circuits. This results in an increased outage area between isolation points to achieve de-energisation, and consequently, a greater number of customers affected.

105. The immediate impact of the policy has been a sudden and significant increase in planned outages, significantly increasing both planned SAIDI and SAIFI from the Reference Period data set used to calibrate the DPP2 limit. As an EDB that has transitioned to restricted live-line work there is risk of this being erroneously considered a material deterioration in reliability. However, this merely reflects new operating procedures and not a deterioration in the reliability of the distribution system. Rather, work that was previously carried out live is now captured as an outage.

De-energising for safety

106. In 2016 Vector also introduced the policy of remotely de-energising circuits that are reported by members of the public as posing imminent risk (e.g. due to low or downed lines). This approach considers the information received from the public and to remotely, at the first opportunity, assess the risk to public safety based on set criteria. Historically, Vector would have dispatched a field crew which would then make the first risk assessment for public safety.

107. The change was prompted by a review of the previous approach and an evaluation of whether it was an adequate response to minimise, so far as reasonably practical, the risks of public injury.

108. The Vector review is validated by the prosecution of UK Power Networks for failing to remotely de-energise a line that resulted in a fatality to a member of the public.[28] In that instance, UK Power Networks applied a similar policy to Vector's old policy of dispatching crews for risk assessment. In the facts of the fatality, the UK Power Networks field crew arrived at the reported site within 30 minutes of the reported incident.

109. The new policy of remotely de-energising high-risk circuits can only be effected at the 11kV feeder level and above. Therefore, each emergency shutdown generally affects between 500 to 1000 customers. This policy change has had a significant impact on SAIDI/SAIFI annual reporting principally due to the volume of public reporting of

[28] Health and Safety Executive UK, Case No. 4371004 (2016)

downed lines and the feeder isolation impact. The new policy also results in shutdowns where telecommunications and transport assets are mistaken by the public as being electricity network assets and are reported to Vector. Such de-energisation would have been avoided in the past with field technicians being able to identify communications and transport assets before localised isolations were established.

110. The new Vector de-energising for safety policy and restricted live-line works have materially increased SAIDI/SAIFI from the Reference Period data set. However, it is a misnomer to suggest the new policy has cause material deterioration to the distribution system. Rather, the increase in interruptions is purely driven by a more rigorous public safety approach to downed lines management and greater volumes of asset management work occurring de-energised than was adopted historically during the Reference Period used to calibrate DPP2.

ABS Load Break Switch (ABS) and Air Break Isolators (ABI)

111. Vector is preparing to undertake a full maintenance cycle of our ABS and ABI under the new de-energised works policy. These assets are an integral part of our network and help to limit the outage area experienced by customers from any interruption. The forecasted maintenance schedule on this fleet will limit the possibility of safety hazards such as arc flashing or mechanical failure from the operation of this asset. However, the outage and outage area necessary to complete works will materially increase our planned outages over the next 24 months. Therefore, practical measures are needed for ensuring this work can occur and avoid being considered as evidence of "material deterioration". Deferring works for this type of asset is not in the public interest.

112. We plan to undertake measures such as adding more isolation points to reduce the number of customers without supply while repairs are implemented. Our intervention with the ABIs will allow Vector to use the asset safely in areas where load has grown beyond capacity. This will limit the additional operational steps needed to be undertaken due to the larger loads on the line.

Treatment of HSWA related changes

113. The Commission has articulated three possible options for addressing the impact of health and safety changes:

a) Making an explicit 'step change' adjustment;

b) Using a shorter reference period; or

c) Not making any allowance.

114. To date the Commission has provided conflicting guidance to industry on how to manage their maintenance and reactive works with the responsibility to eliminate to the extent practicable the hazards of working on or near energised assets. The suggestion EDBs (such as Vector) are adopting a "more risk-averse approach" to their public safety, maintenance and reactive responsibilities[29] is undermined by statements by the Commission, that "where [an EDB] had legitimately and efficiently de-energised lines for safety reasons" it would not prosecute the EDB for exceeding the reliability limits.[30] This suggests the Commission itself considers health and safety related interruptions causing SAIDI or SAIFI statistics to exceed their historic limit are indicative of a "false positive" event.

115. However, by suggesting EDBs are taking a "more risk-averse approach" the Commission is taking an active role in articulating the appropriate safety precautions to execute tasks on or near energised assets. We believe EDBs are the best judge as to when different hazard prevention approaches should be adopted. Accordingly, the regulatory framework should not limit the judgement of EDBs to make safety related decisions for their staff, contractors and public safety. This includes financial such as the Service Quality Incentive mechanisms encouraging safety precautions to be lowered.

116. Recent safety alerts from incidents in Victoria and New South Wales for incidents occurring in November 2018 highlight the risks of working on or near electricity assets.

    1) In Victoria (on 22 November), an employee was fatally injured while racking a 6.6kV circuit breaker. [31]

    2) In metropolitan Sydney (8 November) two electrical contractors were seriously injured from an arc flash while working on a customer switchboard.[32]

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[29] Commerce Commission, *Default price-quality paths for electricity distribution businesses from 1 April 2020: Issues paper* (15 November 2018) C125.3

[30] Commerce Commission, "Commission responds on Vector's reopener request due to live lines practice" (6 September 2018) available: https://comcom.govt.nz/news-and-media/media-releases/2018/commission-responds-on-vectors-reopener-request-due-to-live-lines-practices

[31] Worksafe Victoria, "Employee fatally injured while reinstating 6600V circuit breaker" (22 November 2018) available: https://www.worksafe.vic.gov.au/safety-alerts/employee-fatally-injured-while-reinstating-6600v-circuit-breaker

[32] Ausgrid Safety Alert, "SA16_18: Electrical Contractors Injured" (22 November 2018) available: https://www.ausgrid.com.au/-/media/Documents/ASP/Safety-Alerts/2018/SA16_18-Electrical-Contractors-Injured.pdf

117. Vector is monitoring both incidents to consider any learnings and possible procedural modifications for any similar assets operated on our network. Indeed, the Ausgrid Safety Alert noted:

> *Clients and some electrical contractors often don't fully appreciate the risk and catastrophic consequences associated with working live.*[33]

118. Given the inherent danger with managing electricity supply, Vector strongly recommends the Commission limit the influence ill specified SAIDI/SAIFI limits have on operational decisions for managing maintenance, reactive work and public safety.

119. The Commission must consider most recent H&S practices for SAIDI/SAIFI limits to ensure new safety processes can be implemented without erroneous conclusions being drawn about material deterioration.

120. The H&S changes undertaken by Vector to eliminate risks to staff and contractors and the public through greater restrictions on live-line work and remote isolations for public safety are practices that have community endorsement. For example, around 3 in 5 respondents to Vector's FY18 engagement survey supported increased planned outages for safety reasons.

Reference Period data set

121. The Commission has proposed three alternative approaches for its Reference Period data set. They include:

a) Retaining a 10-year span to include the most recent five-year regulatory period;

b) Continuing with the current reliability limits for the next DPP period; or

c) Expanding the Reference Period to a 15-year span.

122. The reference period data set is an important tool to define a material deterioration threshold.

123. As discussed above, there are some instances where a historic limit is unable to capture changes to the operating environment. As discussed above, for DPP2 there were significant changes to the operating environment that are under-represented or not at all accommodated in the historically derived limits set for the period. Indeed, even subtle changes such as more rigorous traffic management conditions for operating in the road corridor will be under-represented in a longer Reference Period.

[33] Ibid

124. Vector cautions against a 15-year span as this will systematically underweight operating environmental conditions.

Traffic congestion

125. Peak time traffic congestion in Auckland has risen year-on-year since 2013 to 2016. This has affected response times for technicians to respond to network incidents, especially where faults occur during peak-time traffic.

126. According to TomTom manoeuvring around Auckland city during the evening peak will increase travel time by up 80 percent and an average additional travel time of up to 40 percent.[34] The rise in congestion over the period appears to have been the result of major works occurring on major arterial roads such as State Highway 16 (with the Waterview Tunnel project), City Rail Link and a sustained increase in Auckland's vehicle traffic fleet.

127. We anticipate DPP3 will continue the trend of greater traffic congestion as works continue along Auckland's main arterial road State Highway 1. We also note the forecast Light Rail Transit (LRT) projects for Auckland will create more challenging traffic conditions on significant traffic corridors over DPP3. We anticipate LRT on will have a much more significant impact on congestion than recent projects.

Third party damage

128. Over the most recent DPP Vector's SAIDI/SAIFI from third-party damage cause was consistently greater than over the preceding 10-year period which set quality limits for DPP2. For 2018 the SAIDI attributed to third-party damage which includes causes such as underground cable strikes and car v pole incidents as almost double the 10-year average for this outage cause. Indeed, the SAIDI attributed to car v pole incidents for 2018 eclipses the 10-year reference period data-set for the third-party damage cause. Since 2016 the volume of incidents attributed to this cause is considerably higher which appears to be correlated with the larger traffic fleet on Auckland's roads. We do not support an extended Reference Period where the impact of this cause will not reflect current operating environment. The nature of car v pole collisions mean it is very difficult to effectively control this cause.

The reference period data set

129. An extended Reference Period will significantly underweight the impact third-party damage is having on networks such as Vector. The Commission needs to set

[34] TomTom Traffic Index, *Auckland Congestion Statistics: Based on TomTom's historical database for 2016* (accessed 18 December 2018) available: https://www.tomtom.com/en_gb/trafficindex/city/auckland

reliability limits using most recent SAIDI/SAIFI data as it will ensure the operating environment is appropriately reflected in the reliability limit.

130. There are significant trends in causes such as third-party damage which are having a dramatic effect on annual SAIDI/SAIFI data. We are strongly of the view that such information needs to be reflected in any updated SAIDI/SAIFI statistics.

Removal of the highest and lowest years from the Reference Period

131. The Commission has proposed removing the "highest" and "lowest" extreme years from its Reference Period data set.

132. The proposal of removing the "highest" and "lowest" is based on achieving symmetry:[35]

> *"to strike a good balance between not rewarding recent poor performance with more lenient reliability parameters, and not penalising recent good performance with strict reliability parameters."*

133. This logic suffers from the basis that reliability metrics such as SAIDI and SAIFI have a right tail shape to their distribution, despite normalisation efforts being applied to outages in data sets. This feature of SAIDI/SAIFI statistics holds true for most distribution networks.

134. This characteristic of SAIDI/SAIFI reflects the nature of interruptions where unplanned outages will materially increase in any one period due to causes such as storms, hurricanes, earthquakes, blizzards and flooding. The impacts of such events are limited by normalising the impact of these outages. However, there is no countervailing trend that fully eliminates the "right skew". The Commission's approach to normalisation also further limits the opportunity of correcting the skew.

135. Given the nature of the causes driving reliability statistic distribution it is not possible to "symmetrically" remove data points from the Reference Period. This will in fact create more opportunity for "false positive" breaches of the reliability limit as legitimate and likely causes for unplanned outages will be excluded from the data population.

Inclusion of breach years within Reference Period data set

136. We do not support the exclusion of breach years from the Reference Period data set. The prevailing practice of the Commission is to use the most recent information as it reflects the current operating environment for EDBs. The most recent DPP included a change to H&S legislation which has had a profound impact on the work practices

[35] Commerce Commission, *Default price-quality paths for electricity distribution businesses from 1 April 2020: Issues paper* (15 November 2018) C43

adopted by EDBs. To exclude such information from a recalibrated SAIDI/SAIFI limit will eliminate valid information necessary to establish a material deterioration benchmark. Vector recommends the Commission use most recent data as it provides meaningful insight into the operating environment of EDBs.

Expected "trade-offs" to demonstrate false positive data points – addressed through Enforcement Guidelines

137. Including breach years within limits has been Commission practice for DPP1 and DPP2. We also note the absence of Enforcement Guidelines provides no insight into the "trade-offs" anticipated by the Commission when assessing a breach of the quality standard. Without a guide into the "trade-offs" expected then it is not reasonable to determine whether a breach of the quality standard was caused or contributed to by environmental factors and should be treated as a "false positive" as community expectations have not been breached. Therefore, breaches should be considered with future SAIDI/SAIFI limit settings.

138. There are engineering solutions to mitigate SAIDI/SAIFI beyond the outage limits established by the quality standard. However, some of these solutions are not reasonable within the resource constraint set. Therefore, it is important to understand what is expected to be within the limits. Without Enforcement Guidelines, there is no clear expectation set. When an EDB exceeds the limit, it is prejudicial to retrospectively suggest actions which were not anticipated to be trade-offs expected within the limits. However, after Enforcement Guidelines are set then clear expectations about trade-offs and model behaviours are available for EDBs and the Commission can assess breaches in accordance with the expectations created by the Enforcement Guideline..

Setting the Quality Standard Limit

139. We recommend the Quality Standard Limit is retained one standard deviation. The Commission has proposed extending the range of its service-quality incentive scheme and by extension the reliability limits for SAIDI/SAIFI to two standard deviations.

140. This approach can only have merit where the reliability levels are calibrated to achieve no material deterioration and are appropriately set for the operating environment. We do not have confidence the approach being considered by the Commission will in fact achieve this. The proposal of limiting data points and not recognising operating environment changes will create perverse incentives that are not consistent with the responsible management of the network.

The two-out-of-three rule for non-compliance

141. The Commission has sought feedback on whether the current two-out-of-three rule is appropriate for determining quality standard contravention. The alternatives for establishing a quality contravention in the Issues Paper include:

a) An annual limit in any given year;

b) An annual limit in consecutive years;

c) An annual limit in two-out-of-three years; or

d) A regulatory period limit.

142. The multi-year standard for compliance with the annual limit is a legitimate safeguard for reducing but not eliminating the likelihood of a "false positive" event. An annual limit in any given year is not a sufficiently robust model for eliminating "false positive" breach of the no material deterioration standard. We recommend continuing with a multi-year breach model. This may be either the current two-out-of-three rule or an annual limit breached in consecutive years. We believe an annual limit breached in consecutive years is a better benchmark.

Normalisation for unplanned SAIDI/SAIFI

143. Normalising SAIDI/SAIFI ensures the statistics reported for any one period limits the impact of extreme conditions on outage performance. Normalisation of reliability statistics provides better visibility of performance in expected normal operating conditions. This approach limits the impact of the "right skew" in the statistics. Indeed, the price-quality trade-offs are not calibrated for EDBs to improve reliability to meet non-normal operating conditions.

Identifying a major event day (MED)

144. The Commission is reconsidering its approach to identifying an MED from the commencement of a calendar day to a "rolling 24-hour period". We support this change. It allows the sensible identification of when EDBs are operating in emergency response conditions for outages which may reach their maximum in a period between calendar days.

Multi-day MED

145. The Commission is also considering allowing a MED to apply across multiple days instead of the current approach of limiting the MED to a calendar day. We support the proposed change as it reflects the nature of emergency response conditions to events such as storms which tend not to be limited to 24 hour periods.

146. A key element to emergency response is maximising resources to respond to the event. The resource constraint from being in emergency conditions limits the availability of field crew resources for reactive work – this includes continuing to adhere to fatigue management policies.

147. The clean-up period post storm is also relevant, as temporary repairs made during the storm to quickly restore power need to be followed up with a permanent repair. Remedial repairs can take weeks to restore, particularly given H&S practices and public notification requirements.

148. In this respect, it is important for the Commission to understand the length and duration the EDB is in emergency response, the number of faults occurring over the period and emergency resourcing occurring over the MED period.

Treatment of MEDs

149. The Commission is proposing a range of options for how to account for MED in annual reliability reporting. The options include:

a) Retaining the current approach of substituting the SAIDI/SAIFI boundary value for the MED;

b) Weighting the proportion of a SAIDI value (not as relevant for SAIFI) in exceed of the boundary value by a fixed or decreasing percentage;

c) Removing the major event from the assessment period; or

d) Replacing the major event with the average daily SAIDI/SAIFI for the year.

150. We do not believe the current methodology for normalising SAIDI/SAIFI data of re-populating the "boundary value" for a MED is consistent with the principle of normalisation. The purpose of the normalised data set is to identify the performance of the distribution system in normal operating conditions. In this respect, re-populating boundary value SAIDI minutes and SAIFI interruptions when an MED is established contaminates the data series with non-normal operating condition information. The current approach adopted by the Commission limits the purpose of normalisation and is at odds with the IEEE method of excluding major events from unplanned outages.

151. The Commission is concerned MEDs will include events within EDB control and nominates vegetation contact and defective equipment as examples of outages that have occurred on MEDs. This reservation is misguided as faults such as vegetation contacts and overhead assets occurring on MEDs have a correlation with the environmental conditions at the time.

152. More importantly the resourcing to respond to a new outage when the network is in emergency response mode is materially constrained from the conditions of the MED. We appreciate the circumstances of an MED should be subject to greater scrutiny when they are excluded from the annual reliability statistics.

153. There should be consistent treatment of the MED for annual reporting and in the Reference Period data set used to set the reliability limits. We note this should also apply to the second option of a "declining SAIDI value" being apportioned to minutes occurred more than the boundary value.

154. In considering this issue it is important the Commission consider the cumulative impact of the current MED re-population has on annual SAIDI/SAIFI reliability reporting. Indeed, it is this impact that is of greater significance for reducing "false positive" breaches.

Treatment of planned works

155. Our chief concern with planned outages within a single SAIDI/SAIFI benchmark is that the limit is set at a level which compromises the execution of the proposed works program for the period.

156. The Commission acknowledges its reasons for retaining SAIDI and SAIFI as its primary quality metrics is influenced by the international use of these indices by utilities and regulators as the benchmark of reliability.

157. However, the more common approach to SAIDI and SAIFI are to separate planned outages which are caused from the execution of scheduled maintenance and replacement programs from forced outages resulting from equipment failure and environmental conditions. Indeed, this is the approach adopted by the Australian Energy Regulator (AER) for its Service Target Performance Incentive Scheme (STPIS). Under STPIS, only unplanned interruptions are taken into account for the reliability of supply component.[36] It also reflects the inclusion of safety as a guiding principle within the National Electricity Objective for deciding "trade-offs". The approach of separating forced and scheduled outages is the more common approach internationally. Indeed, our exploration of public utility commissions in the United States found the dominant approach to reliability reporting is to separate outage

[36] See Australian Energy Regulator, *Electricity distribution network service providers: Service target performance incentive scheme* (November 2018).

categories. For example, utilities in Texas provide an annual service quality report classifying interruptions by 'forced,' 'scheduled,' 'outside causes' and 'major events.'[37]

158. The co-mingling of planned and unplanned outages limits the Commission's ability to effectively measure "material deterioration" in the network. Deferring works programs is a lever to reduce the likelihood of exceeding the co-mingled reliability limit.

159. In the long-run this approach to the planned works program is not in the long-term benefit of end-users as it undermines appropriately timed asset maintenance scheduling and interventions which increases the risk of faults occurring.

Service Quality Incentive Scheme

160. The Commission has proposed three alternative options for the S-factor scheme:

a) Keep the total revenue at risk at one percent

b) Raise the total revenue at risk up to five percent or

c) Removing the scheme.

161. Should the Commission wish to retain the S-factor then it needs to ensure the SAIDI/SAIFI incentive is defined appropriately to reflect the current operating environment and does not militate against safe operating procedures from being adopted by EDBs.

162. If the Commission is persisting with the scheme then we recommend the revenue at risk be retained at one percent of revenue.

SAIDI/SAIFI incentive – asymmetric incentive between SAIDI/SAIFI

163. The Commission has suggested an asymmetric incentive rate for SAIDI/SAIFI. We recommend any changes to the level of incentive rate attributed to SAIDI or SAIFI should have an evidential basis.

164. An increasing SAIFI provides more direct evidence of "material deterioration" occurring than SAIDI as it can reveal a growing volume of interruptions being experienced by customers.

165. SAIDI, on the other hand, is contaminated by a range of variables impacting the duration of an outage. Factors such as high-speed winds limit the ability of field crews to respond to outages, given the equipment necessary to remediate damage include

[37] Public Utilities Commission of Texas, §25.52 and §25.81 *Electric Substantive Rules* available: https://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/Electric.aspx

equipment working at height that may only be operated in certain wind conditions. This invariably extends the length of some outages.

166. We recommend the Commission not depart from the current equal weighting between SAIDI and SAIFI without an evidential basis for doing so.

SAIDI/SAIFI incentive – asymmetric weightings between "cap and collar"

167. We are concerned about an incentive in any one year that will capture significant natural variation around the "historic average" benchmark. Any asymmetric design should limit penalties that have greater association with prevailing conditions than they do with management of the distribution system.

168. The risk of setting an asymmetric weighting between the "cap and collar" is that it will magnify the consequences of the "right skew" to the statistics.

Automatic Compliance Contravention Reporting

169. The Commission is proposing to include within the DPP "automatic" reporting requirements for when an EDB has contravened the quality standard. We recommend the Commission include such detail in its Enforcement Guideline for non-compliance as opposed to the DPP Determination.

170. At present EDBs do not have any clear guidance as to how non-compliance will be assessed by the Commission. The quality investigations precedents set by Eastlands, Aurora, Wellington Electricity and Vector illustrate a range of possible compliance outcomes with no clear explanations as to the differences in circumstances.

171. This is one area where guidance is necessary. This will provide insight for EDBs as to the expected trade-offs and model behaviours anticipated by the Commission. At the most fundamental level there should be some understanding of whether a breach of SAIFI or SAIDI is considered on par or whether there is more harm from exceeding SAIFI versus SAIDI.

172. There is a significant level of unknowns in the compliance framework that undermine the certainty needed. EDBs should know how matters such as planned outages, abnormal weather or car v pole incidents are expected to be treated in a breach event. This type of information helps illuminate trade off expectations and the sufficiency of the resource constraint.

173. It is important to ensure there is symmetry with model behaviours when establishing the DPP resource constraint and the culpability when investigating DPP non-compliance.

Guaranteed Service Level scheme for reliability metrics in Part 4 and clear delineation with Electricity Industry Act responsibilities

174. The Commission has requested views on the proposal by the Electricity Networks Association (ENA) Quality of Service Working Group (QoS) for a minimum guaranteed service level (GSL) for reliability to be established for service exceeding a threshold of poor quality of service.

175. The Commission has sought views on:

a) How such a scheme would sit within a framework that already includes a quality service incentive scheme; and

b) How such a scheme and its funding as part of the regulatory cost base would affect incentives for EDBs to offer a quality of service that reflects what consumers want.

176. The Commission has also sought views on the effectiveness of Use of System Agreements (UoSA) in supporting service quality, and whether there would be additional benefits from including such measures in the quality standard under the DPP. Vector recognises the relationship between the UoSA and giving effect to obligations under the DPP.

177. However, we see their being significant uncertainty with the additional layer of regulation of a Default Distributor Agreement (DDA) where the Electricity Authority (the Authority) is proposing to prescribe all terms for the regulated service. Such prescription extends beyond the intention of the Electricity Industry Act and undermines the responsibilities of Part 4 of the Act for determining both the resources, outputs and trade-offs to be made by EDBs on behalf of customers. An example of the overreach is the potential prescription of “minimum” or “guaranteed” service levels for attributes of the regulated service. The inclusion of such service responsibilities within a DDA that are not reflected in the price-quality trade-offs used to set DPP/CPPs undermines the purpose of the Part 4 process.

178. The responsibility for EDBs to comply with a GSL for reliability is a decision that is appropriately addressed within the regulation of goods or services under Part 4 of the Act. The current quality incentive scheme and quality standards have established a price-quality trade-off for the anticipated performance of the distribution network service overall. Specification of a minimum standard, if considered necessary, is a power relevant to applying Part 4.

179. Consideration of a GSL scheme necessarily lends itself to a price-quality discussion. This is because the cost of improving reliability for customers (residing on a high

SAIDI/SAIFI incurring circuit) and entitled to receive GSL payments encourages investment to reduce the GSL exposure. The investment to otherwise upgrade the circuit may not otherwise considered economically efficient (i.e. the cost of improving reliability is significant). However, the indeterminate exposure to GSL may encourage the investment to occur despite the high investment cost. Such investments will be reflected in all customer prices.

180. This problem is acknowledged by the AER when it assesses expenditures for National Electricity Market (NEM) jurisdictions with GSL schemes. The AER addresses this problem by funding the GSL through allowable revenues. This allows the distribution network to determine whether it is more financially prudent to compensate customers for the outage exceeding the GSL specification or to upgrade assets to reduce outages.

181. Were a GSL scheme considered a quality measure necessary for inclusion within Part 4, we consider it appropriate for similar trade-offs to be made when assessing the prudent response for new service quality obligations.

Electricity Information Disclosure – Proposed changes

182. The Commission's Issues Paper has proposed a range of new reporting measures. We understand some of the new reporting measures were suggested by the ENA QoS. Vector recommends the Commission refrain from accretive regulation which increases compliance costs and require additional investment to deliver the reporting capability to meet auditing standards.

Low voltage faults

183. To that end, the Commission's advice that interruption data for low voltage lines is accessible is not completely accurate. The Commission has suggested it has advice that customer notifications of low voltage faults is a source of information for LV faults. Whilst it is correct that inbound contact does inform LV faults, this is a second-hand source of information and generally considered unreliable for reporting and auditing purposes. The information is unlikely to meet the quality expected by auditors and be subject to a range of spurious causes such as in-home wiring and false claims all within the information set.

184. This is an area where access to real time consumption data from retailers is important for network management purposes. The alternative would require duplication of cost for EDBs putting additional sensing and metering infrastructure in place. Given the range of development activity at the LV level and reconfiguration network structure

needs to change regularly. As such, the Commission should support EDB access to smart metering data before imposing regulatory requirements. We recommend the Commission to work with the Electricity Authority and industry bodies such as the ENA Smart Technology Working Group to ensure access to data by parties who need it for more efficient network management and to deliver improved services to customers.

185. In requesting this type of information there is a risk that the quality of information produced for EID is degraded. Accordingly, we recommend the Commission have regard to the following when specifying low quality information: degrading the quality of information of EID, increasing the challenges for auditors to certify information, the cost of developing more reliable forms of information capture and the reason for requesting more reporting (i.e. the part of the community wanting more information on this topic).

Momentary average interruption frequency index (MAIFI)

186. We recommend reporting that is proportionate and for the benefit of consumers. The effort involved to collate the information to create a MAIFI report is not insignificant. It will require investment in systems to ensure information is captured to a standard expected for public consumption. Such information systems will need to be funded. The Commission should identify where the public benefit is from having this information being publicly reported upon.

Electricity losses – unserved energy

187. The Commission is asking for EDBs to supply information about electricity unserved due to outages. We do not believe such information can be collected in a cost-efficient manner. There is considerable time and effort involved with correlating information at the distribution transformer to the expected downstream consumption. Therefore, the systems and processes required to collect this information will involve additional personnel given the considerable time and expense to match imperfect information sources. However, ultimately the output will be to create an imperfect forecast of electricity losses. We expect any imposition of such an obligation is assigned with dedicated funding as the undertaking of delivering the information is not insignificant.

NEW QUALITY MEASURES

188. Regulation must provide a framework that supports meeting societal and customer objectives. Legacy regulation, by nature, was prescriptive and was developed in an

era when change was incremental and personalisation was not possible. Today's customer values experience, personalisation, choice and innovation. To support these expectations, regulation should be redefined to provide a principles-based and output-based approach.

189. The addition of new quality measures must not increase the risk of non-compliance under the Act, as this is imposing accretive regulation and not in the long-term interests of customers. We recommend the innovations to quality frameworks should be within the current financial parameters of the service-quality incentive scheme which is limited to one percent of revenue.

190. The Commission has recognised that customer expectations for EDBs extend beyond reliability. EDBs undertake a range of functions that are not expressly linked to their reliability function but are expected by customers to be executed to a high standard. Therefore, such functions need to be expressly recognised in the "trade-offs" for setting the resource constraint otherwise neglecting these functions will result in sub-optimal outcomes.

191. As consumer expectations and adoption for new energy technologies increase, the "traditional" roles of EDBs will also need to change to meet prevailing customer expectations. Failure to recognise new customer expectations will result in customers exercising choices that undermine their dependence on the distribution network for their energy needs.

192. In supporting the transition and development of new roles we believe the new roles and functions as an active network manager expected of EDBs requires a more flexible and dynamic regulatory framework. There is a risk that the regulatory response to change is to adopt accretive regulation. Increasing the regulatory cost of business with more compliance is not the best method to increase the capability of EDBs. It is appropriate to recognise changing customer expectations for both existing functions and new roles demanded by EDBs. Such changes will require the development of new skills and functions that are not currently associated with the sector. We recommend the use of flexible regulatory tools to manage the transition.

New quality standards versus incentive regulation

193. The alternatives of specifying new quality measures in the DPP quality standard versus creating quality incentives highlights the tension between accretive regulation versus flexible regulatory tools.

194. The absolute burden of meeting a specified standard is creating a compliance cost. The risk of breaching the standard creates the need to limit the opportunity of

breaching the specification. The magnitude of this risk is exacerbated when consequences of exceeding the standard are not clearly defined. Therefore, customers may see other parts of their service experience declining as they are not subject to specific quality compliance measures.

195. We support the adoption of flexible regulatory tools which create the appropriate framework for EDBs to adapt to the new roles.

New connections

196. This is a function that is expected to have greater emphasis going forward. The ENA QoS has suggested this function is not adequately represented in the current price-quality framework.

197. Vector has substantially increased our resourcing with processing new connection requests in the current DPP given the rapid growth in Auckland experienced over recent years. We anticipate the quality standard will require this aspect of the business to grow significantly to mitigate the risk of quality non-compliance. In this regard, we anticipate such needs are anticipated by the Commission when it creates new standards for compliance.

198. In considering the role EDBs undertake the with new connections, the Commission note the time to quote for a new connection is different to the time to physically provision the new connection, and that the latter is likely to be more important to customers.[38]

199. Each of these functions are important to customers. Timely quoting for new connections is important for ensuring projects can proceed with certainty and limits the risk of unanticipated costs – such as the terrain or cost per circuit length for new infrastructure which is typically assessed at the quote stage. For developments exceeding certain sizes the time and effort to provide an accurate quote is resource intensive and will be bespoke for the project. In that respect, a standard timeframe which does not delineate between connection size will impose the same requirements for a suburban developer to that for an urban development authority. The connection requirements are fundamentally different between these customers. It will also fail to differentiate the differing needs of customers, for example, some customers want multiple supply options.

[38] Commerce Commission, *Default price-quality paths for electricity distribution businesses from 1 April 2020: Issues Paper* (15 November 2018), D32

200. A specification of a time to “provision” a new connection materially increases the costs to EDBs. This will create a real cost with field technician resource. There is less opportunity to re-allocate responsibilities across different functions between field technician resources with greater risk of breaching the quality standard. The time to respond to new connection field work will also be dictated by outside influences such as town planning and resource management rules with limited opportunity to influence the outcome. Therefore, maintaining resources to meet a “provisioning” standard will impose a cost that will need to be reflected in the trade-offs created in a newly calibrated DPP.

Planned outage notifications

201. We support the rigour for the planned outage notification process. This is an area where EDBs have a significant role in managing the expectations of customers. Effective planned notifications allow works to occur in a manner that limits the disruption. The notification is only one aspect of the planned outage experience. It is also important that works occur in a manner that limits the need for multiple shutdowns for the same members of the community. There is a responsibility for EDBs to maintain a direct connection with the public to inform them of outages and the type of works occurring on electricity supply assets. This responsibility cannot be executed effectively by third parties. We recognise the importance of elevating the focus on this element to ensure planned works are occurring in a responsible manner that limits the impact of the disruption.

Power quality

202. The Commission notes power quality is measured by smart meters and could be considered for quality regulation. It suggests consumers would benefit from greater transparency over how EDBs are monitoring and managing voltage stability which is particularly relevant for emerging technologies.

203. The more pressing need is for the technical regulations to be updated to reflect the operating needs of customers and the technical challenges new technology will impose on voltage quality. Vector does not support the setting of power-quality DPP quality standards especially given the technical standards currently in place lag behind the flexibility necessary to meet the needs of new technologies.

INCENTIVES AND INCENTIVE REGULATION

204. Part 4 of the Act is premised on achieving the outcomes in section 52A by applying incentive regulation. Incentive regulation uses levers such as financial incentives to encourage activities in a way that delivers long term benefits to consumers.

205. Accordingly, features of the current regulatory framework such as the multi-year regulatory control period and IRIS are designed to encourage EDBs to reveal their efficient expenditure levels to achieve specified outputs.

206. Performance based regulation (PBR) is an extension of principles underpinning incentive regulation. PBR creates performance measures that are desirable and verifiable and rewards utilities for improving their capability in such areas.

207. As discussed earlier in the section on service quality, changing customer expectations resulting from digitalisation of the broader economy and enabling new energy technologies are creating the need for EDBs to adopt new roles. However, the capability of EDBs to explicitly support the development of these new roles is limited by the flexibility of the regulatory framework. We recommend flexible regulatory tools that deal with the current uncertainty, facilitate new capability and preserve the optionality that enable regulated businesses to better respond to the challenges and opportunities presented by emerging technologies and rapid changes in customer preferences.

Incremental rolling incentive scheme (IRIS)

The capex IRIS retention factor

208. At the time of settling DPP2 the Commission adopted a retention factor of 15 percent for the capex IRIS. The capex retention factor is one element of the IRIS which is not specified by the Input Methodologies (IMs). The Commission is required to set the capex IRIS retention factor at the time of setting the DPP. For DPP2 the Commission set a retention factor at 15 percent for DPP2.

209. The Commission is proposing to raise the capex retention factor for DPP3 to align with the implied retention factor in the opex IRIS.[39] It has suggested this will reduce the bias with EDBs preferring capex solutions. There is great risk with increasing the capex retention factor at a time when many EDBs are increasing the volume of their

[39] The opex IRIS retention factor is implied from estimating the present value of the permanent saving using the DPP WACC – for DPP3 this will change the retention benefit assumed in the current DPP of 34 percent for opex savings

replacement and renewal of asset fleets. The higher retention factor may result in the unsafe deferral of such programs to meet the incentive provided by the higher retention factor. This is especially relevant for the capex programs which do not have meaningful opex substitutes but are a core part of EDB responsibility.

Section 54Q – reduction of energy losses

210. Section 54Q of the Act imposes an obligation on the Commission to promote incentives and avoid imposing disincentives to invest in energy efficiency and demand side management and to reduce energy losses in Part 4.

211. The Commission has raised reconciliation losses as a possible regulatory tool it could implement to reduce energy losses and give effect to section 54Q of the Act. The losses quantified by the Commission in GWh include both the technical losses and non-technical losses resulting from the financial reconciliation process.

212. The Commission's suggestion of a PBR tool for a more optimal reconciliation loss appears to be based on potential system investments that could assist with reducing technical losses. The Commission provides three examples of investments that could assist with improving the technical losses on the system:

    a) Capacitors – as a means of improving reducing current;
    b) Reducing resistance with larger sized conductors; and
    c) Transformer replacements as a means of reducing losses associated with transformers.

213. We do not believe the technical solutions provided by the Commission are a reasonable basis for designing a scheme for improving the reconciliation loss on the network.

214. Of the three examples provided by the Commission, the use of capacitors was the only investment that was discussed with the specific purpose of reducing losses by correcting reducing current. However, a fixed capacitor is not a common investment on distribution feeders and, can in fact, increase losses in light load conditions. There is also the risk of voltage level increases.

215. The other examples of reducing technical losses by reducing resistance suggested by the Commission related to conductor and transformer replacements. Indeed, the Commission noted the consideration of a loss factor scheme would be an additional consideration for an investment case to replace a conductor or transformer.

216. However, we consider there are also unintended consequences from these suggestions. For example, replacing conductors/cables with larger sized cables does increase the risk of changing the power factor on the distribution system. Such investment may create the further need for additional voltage correction equipment to correct for the change. Encouraging this investment would not be in the long-term benefit of end-users as the resultant costs are likely to be higher than the losses avoided.

217. We also have reservations about transformer replacements being a means of reducing technical losses. Our concern around the principle that new transformers could be considered for reducing technical losses in mind is that the incentive will involve a much higher cost solution than otherwise would be considered efficient for the circumstance. Loss reducing transformers are generally much more expensive than typical modern equivalent transformers for asset replacement. In this respect, the introduction of the scheme will encourage an investment strategy that would be considered "gold-plated" otherwise.

218. Further, the benefits of making the suggested investments would only serve to reduce technical losses while reconciliation losses include both technical and non-technical, as quantified by the Commission. Non-technical losses can occur from faulty meter readings and meter installations and from electricity theft. Given meter equipment providers (MEP) and not distribution networks are responsible for meter readings in New Zealand, the opportunity to improve this non-technical source of losses is limited.

219. The Brattle Report for the Electricity Networks Association (ENA) *Incentive Mechanisms in Regulation of Electricity Distribution: Innovation and Evolving Business Models* (the Brattle Report) also discusses in a case study the adoption of a similar scheme around reconciliation losses adopted by Ofgem. The Brattle Report notes the adoption of the electricity losses scheme did reduce the percentage of electricity loss through the distribution system by one percent. However, it was not clear the extent to which this could be attributed to the incentive imposed by the scheme and could result in windfalls or penalties of a significant value.

220. Given the experience of Ofgem, we recommend the Commission not adopt this solution as the Ofgem abandoned the approach as it was not very effective. We recommend the Commission undertake a cost-benefit analysis for the introduction of such a program to show that it is in customer interests.

Section 54Q – non-wire alternatives

221. Given the Commission's consideration of raising the capex IRIS retention factor to be equivalent to the opex IRIS. We recommend a complementary program is needed to give effect to section 54Q for encouraging "non-wire alternative" (NWA) solutions. Such a scheme will ensure EDBs are able to better consider non-capex alternatives for investment needs – such as demand growth.

222. The Brattle Report notes in its case studies that utility regulators are recognising the need for developing non-wire alternative incentives to complement the existing regulatory design. We believe such a scheme should be considered for EDBs to assist with achieving the balance of increasing the capex IRIS retention factor. This is because the conditions for adopting NWA are limited by factors such as:

a) The opex IRIS which encourages year-on-year efficiency from current opex bases; and

b) Periodic calibrations of opex when setting DPPs limit the certainty of the opex solution versus implementing an augmentation design which will be recovered over the life of the asset.

223. We recommend a transparent tool for adopting NWA would ensure EDBs have the confidence of adopting the alternative will in fact achieve the same system security as a capex alternative and will not compromise future "trade-offs" as such solutions may need to be procured over spans longer than the DPP or CPP and compete with alternative opex needs. The New York Reforming the Energy Vision (REV) program provides a compelling example of successfully fostering NWA from a facilitative regulatory framework.[40] The Brooklyn Queens Demand Management (BDQM) program by utility ConEdison avoided a $1 billion traditional substation upgrade to meet a forecast 69MW projected shortfall in system security by leveraging NWA solutions complemented by innovative investment.[41] The success of programs like the BDQM is that the original direction to seek out NWA was due to a positive incentive for NWA and not merely trying to create agnostic conditions.

[40] See State of New York Public Service Commission, *Order Adopting a Ratemaking and Utility Revenue Model Policy Framework* (19 May 2016)

[41] See State of New York Public Service Commission, *Order Establishing Brooklyn/Queens Demand Management Program* (12 December 2014)

Incentives for supporting EV take-up

224. To meet the government target forecast for EV growth of 64,000 vehicles by 2021[42], the expected growth rate for EVs is expected to increase exponentially within the next seven years to reach this milestone. This will mean each successive year of EV growth is expected to increase at a rate faster than the last five years combined.

225. The forecast electrification and de-carbonisation of transport is anticipated to make an important contribution to New Zealand's de-carbonisation strategy. For this trajectory of EV take up to occur EDBs need to be facilitators of this new load growth.

226. In Vector's EV Green Paper[43] we note the risks of rapid take-up of EVs from modelling different scenarios on the network. In that paper, it was observed that even at low penetrations of 10-20 percent on a network feeder low voltage capacity constraints will occur depending on load imposed by the EV charging and behaviour adopted by customers. Accordingly, it is important for networks to have an engaged program for meeting EV take-up and integration.

227. There is significant uncertainty about how this take-up will occur and the potential constraints it may pose for networks. The FTI-CL *Regulatory Blueprint for meeting Today's Customers expectations* recommends innovative regulatory tools to deal with uncertainty such as EV take-up. The use of an "uncertainty mechanism" for concentrated EV growth will ensure any unanticipated connections and system needs are able to be funded through such a mechanism. This is especially the case given the proposed increase to the capex IRIS retention factor for DPP3. The increase in the capex retention factor will penalise any overspending of capex allowances in DPP3 potentially needed to meet EV load growth needs. This penalty will be a magnitude more significant than is the case for the current DPP2.

228. Therefore, an uncertainty mechanism that rewards take-up milestones of EVs being integrated onto the network would ensure EDBs are not actively obstructing EV growth given the potential capex risk they pose in a revenue cap environment. Such an uncertainty mechanism could also be used as a source of funding within

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[42] Minister of Transport Hon Simon Bridges, *Govt driving the switch to Electric Vehicles* (6 May 2016) available: https://www.beehive.govt.nz/release/govt-driving-switch-electric-vehicles

[43] Vector, *EV Network Integration: Green Paper*, 7 March 2018

which augmentation needs (which may occur at the local level) can be executed from.

IMPLEMENTING CHANGES FROM THE IM REVIEW

229. During the 2016 IM review the Commission made several changes relevant for DPPs such as changing the form of control for prices from a weighted average price cap (WAPC) to a "pure" revenue cap. At the time of making this change the Commission considered it necessary to include an additional mechanism to limit the opportunity from "price shock" from year on year revenue changes.

Limit on forecast allowable revenue as a function of demand mechanism to limit price shock

230. At the time of the IMs the Commission considered a mechanism was necessary to limit price shocks resulting from inaccurate forecasting of volume for a pricing year. The Commission now recognises there are other sources of volatility in annual gross revenues. These include recoverable costs resulting from IRIS balances from DPP2, and if the Electricity Authority continues to pursue its much-maligned reform of the transmission pricing methodology (TPM), a significant increase the quantum of Transpower's annual revenues recovered from users via EDBs.

231. Vector notes TPM is not the only issue for Transpower's recoverable costs. Variability in Transpower revenue is a major source of revenue instability in the current environment and must also be considered a cause for price-shock. To this end, the design of Transpower's incentive schemes for RCP3 introduces a source of revenue instability as they entitle Transpower to periodically recover performance incentives through prices. To limit volatility Vector recommends the restraints imposed on EDB price changes should also be symmetrically applied to Transpower as this will ensure the balance between the recovery of recoverable costs and net lines revenues is maintained year on year.

232. We also recommend any limits on price changes not frustrate recoverable costs being recovered as they are first recognised in years following the reset. For example, the Commission note it intends to smooth revenues for the recovery of opex IRIS balances (rather than mirror the five-year retention holding benefit) commencing from the second pricing year in the DPP. To this end we suggest any mechanism to limit year-on-year price changes should not frustrate the timing of the recovery.