Submission to the Commerce Commission on initial observations of EDB forecasts

23 December 2013

Contents

Introduction

1. Vector welcomes the opportunity to respond to the Commerce Commission's (Commission) consultation paper *Initial observations on forecasts disclosed by 29 electricity distributors in March 2013*, dated 29 November 2013 (Initial Observations Paper).

2. We support the Commission's consultation at an early stage of its policy development and analysis. The short-time form for consultation, however, means that Vector's initial comments are formative only.

3. This submission is accompanied by an expert report from Castalia (the Castalia Report). No part of this submission, or the Castalia Report, is confidential and Vector is happy for these documents to be made publicly available.

4. Vector's contact person for this submission is:

Ian Ferguson
Senior Regulatory Advisor
09 978 8277
ian.fergusion@vector.co.nz

Executive Summary

Focus and content of summary and analysis

5. The Commission's summary and analysis workstream has the potential to make information regarding Electricity Distribution Businesses (EDBs) more easily accessible and understandable for EDBs themselves and other interested parties.

6. Overall, it is not clear at this stage whether high-level, top down, models are an optimal tool for summary and analysis. There will inevitably be a range of factors that it will be difficult, if not impossible, to accurately or robustly reflect within such models. The Commission should be explicit about the limitations and imperfections that inevitably arise from such analysis, particularly if the analysis is used to inform its DPP setting.

7. Vector believes the Commission should review EDBs' Asset Management Plans (AMPs) as part of its summary and analysis to further the understanding of the different EDBs' expenditure plans.

Expenditure drivers

8. The Commission's expenditure drivers are presently too high level to be very useful for EDBs and other interested parties. While there is some logic behind them, the three drivers identified by the Commission are more categories of expenditure drivers rather than expenditure drivers themselves.

9. An alternative approach, which we support consideration of, would be to start with the categories of capex and opex EDBs are required to disclose then identify drivers for each category. This would be the most straightforward and transparent way of aligning expenditure drivers to expenditure categories.

10. It is also important to recognise that no driver or group of drivers could entirely explain or perfectly forecast the expenditure of EDBs. The aim should be to identify the drivers that best explain expenditures and use them to model expenditure as accurately as possible, while recognising and addressing the uncertainty that will remain. Comparative analysis is and will be imprecise and care should be taken when interpreting the results of any such analysis.

11. Vector does not agree with all of the measures of expenditure drivers identified by the Commission. In this submission, we comment on those expenditure drivers and measures and provide our own suggestions. The process of identifying robust expenditure drivers is not straightforward. Vector would be happy to work with the Commission to develop a clear view on the drivers of capex and opex.

Opex and capex modelling

12. It is important to ensure, both for summary and analysis and also for DPP price setting, that the opex and capex models used by the Commission for forecasting are as accurate and robust as possible. They need to be sufficiently robust to accurately forecast and explain the expenditure of at least a large majority of EDBs. If such

robustness is not achievable, the Commission should consider whether alternative approaches would provide more accurate forecasts, including taking account of forecasts provided by EDBs.

13. The Commission's discussion of capex forecasting methods is at a high level, which is suitable for this early stage of the consultation process. Vector considers that the two approaches put forward are both worth considering, although much will depend on the detail and application of the approach that is chosen.

14. We expect there would be considerable subjectivity and debate regarding the capex input costs chosen under the "absolute calculation" approach. There is a risk that the results of this method will not relate closely to actual expenditure of EDBs. The "adjustment method" avoids this risk by being based on historic EDB expenditure, meaning it is more likely to reflect the investment needs of each EDB.

15. The Commission appears to have applied its DPP opex model to the data produced in disclosures by EDBs. In our view, this highlights the limitations of the previous DPP model. Our interpretation of the outcomes presented in the paper is that a price reset made based on the Commission's model would provide Vector with 11% opex less than our forecasts indicate we need. We query how the model could reasonably suggest our forecast expenditure is too high when were are already one of the EDBs with the lowest opex expenditure.

Other issues

16. Vector submits that the following factors should be considered as potential "out of model" adjustments for the next DPP reset:

    a) Insurance for catastrophic events.

    b) Replacement and maintenance of customer service lines.

    c) Seismic strengthening capex.

17. Vector also comments below on some Vector data as summarised by the Commission. In particular, the view that 50% of Vector's substations have peak demand in excess of capacity is misleading.

Focus and content of summary and analysis

Summary and analysis can add value

18. The Commission's summary and analysis workstream has the potential to help make information regarding regulated suppliers more easily accessible and understandable for EDBs and other interested parties. Summary and analysis can assist parties gain insight into how regulated suppliers are operating. In particular, having all disclosure information easily accessible and in one place is very helpful.

19. It also appears that the Commission intends the summary and analysis assessments to be used to inform price setting decisions. It is not entirely clear to Vector from the paper where the dividing line is between the two workstreams.

20. However, the summary and analysis workstream is at an early stage and stakeholders have been given only a short timeframe in which to respond to a consultation paper that addresses a range of important issues. The comments in this submission are, similar to the Commission's approach, intended to be Vector's initial observations. We may reconsider our current views as the detail of the summary and analysis and modelling approaches develops. Vector's views may also evolve based on the report of the ENA Forecasting Working Group, which is expected early next year.

Information contained in Asset Management Plans and other detail needs to be considered

21. The Commission's starting point is to use models to seek to interpret and explain the expenditure of EDBs. The Commission states that the evaluation of any differences between its model and EDB forecasts should "in the first instance consider specific details contained in the Asset Management Plans published by each distributor".[1]

22. Vector agrees that the Asset Management Plans (AMPs) should be reviewed in order to further the understanding of each EDB's expenditure plans. The Commission should not confine its analysis to the disclosed numbers and their statistical relationships. The Commission should also seek to understand the underlying issues. In our view, the summary and analysis should include consideration of the explanations and descriptions contained within the other disclosures, e.g. explanatory notes, AMPs, pricing methodologies. The Commission should consult with EDBs in advance of publishing its summary and analysis and statistical models. This would provide EDBs the opportunity to identify erroneous assumptions and explain outlying data.

Modelling may not be appropriate for summary and analysis

23. It is not clear to Vector that relatively high-level, top down, models are the optimal tool for summary and analysis. As there will inevitably be a range of factors it will be difficult, if not impossible, to accurately reflect within such models.[2] Vector shares

[1] Initial Observations Paper, paragraph X25.

[2] We recognise that models will most likely continue to be required for DPP price setting.

the ENA's concerns that such models may not be able to adequately explain expenditure requirements over time.

24. The Commission may be using models as a "first-cut" analytical tool in order to identify particular issues that require further analysis. If that is all they are used for, they may be appropriate. However, models should not be used for developing time-series forecasts without testing that they are robust and suitable for such a purpose.

25. If the Commission continues to rely on models, it should seek to improve them such that they can more accurately explain and forecast the expenditure trends of the different EDBs. We discuss our views on capex and opex modelling below.

Expenditure drivers

Commission's expenditure drivers are too high level; they should be better aligned to the expenditure categories

26. The Commission proposes three high-level drivers of expenditure: Ownership, Health and Capacity. It then seeks to allocate these drivers to categories of capex and opex that EDBs disclose against and to identify measures for each driver.

27. While there is some logic behind these expenditure drivers they are at too high a level to be very useful. As was discussed at the summary and analysis workshop on 12 December, the three drivers identified by the Commission are more categories of expenditure drivers rather than expenditure drivers themselves. The Commission then seeks (in Table 1 of the initial observations paper) to apply these drivers to the different categories of opex and capex.

28. In some cases, two or all three of the drivers are linked to individual expenditure categories, making it difficult to understand how they would be applied to those categories. For example, would each driver be weighted when applied to the categories that have multiple drivers? If so, on what basis would the weighting be determined? It is also unclear which of the measures of each driver would be applied to each expenditure category. Would this also be weighted?

29. An alternative approach, which we support consideration of, would be to start with the categories of capex and opex that EDBs disclose expenditure against and then identify drivers for each category. This would be the most straightforward and transparent way of aligning drivers to expenditure categories. It would avoid the need for an additional (and somewhat unnecessary step) of trying to then align the expenditure categories to the Commission's high level drivers, as Table 1 of the initial observations paper seeks to do. It would also remove the risk of semantic debates about the meaning of "ownership", as experienced at the Commission's recent summary and analysis workshop.

30. It is also important to recognise that no driver or group of drivers could entirely explain or perfectly forecast the expenditure of EDBs. The aim should be to identify the drivers that best explain expenditures and to model expenditure as accurately as possible, while recognising and addressing the uncertainty that will remain. Overall, comparative analysis is and will be imprecise and care should be taken when interpreting the results of any such analysis.

31. Vector also agrees with the Commission's view at paragraph 60 of the initial observations paper that the amount EDBs spend on particular activities varies by network topology, network topography and the composition of consumer connections. Expenditure models, and summary and analysis more broadly, also need to take these factors into account.

Comments on the Commission's driver measures

32. The comments below are prefaced by the qualification that the validity of any potential drivers, be they proposed by the Commission, Vector or any other interested party, ultimately needs to be tested empirically e.g. through econometric analysis.

Ownership driver measures

33. The Commission suggests seven potential measures that relate to the Ownership driver. We make the following comments on them:

    a) Energy delivered: this is not closely related to expenditure as expenditure is driven by peak demand on the assets rather than the volume of electricity transported by the assets.

    b) Maximum coincident system demand: this does not usefully describe adjustments in expenditure as it is constraints or new capacity requirements at a localised level rather than at the network-wide level that drive expenditure. A better, although still imperfect, measure would be non-coincident system peak demand (measured at zone substation level) as this will better reflect growth in demand spread across the network over time.

    c) Distribution transformer capacity: this does not reflect the efficiency of the EDB and may also disadvantage EDBs with a higher proportion of sub-transmission assets. It also highlights that ownership is too broad a driver because vegetation management, which features in the Commission's ownership driver description, would not be related to distribution transformers in any way.

    d) Number of assets: we agree this is a suitable measure, but it should be weighted by asset category and average cost of assets in each category.

    e) Total circuit length: this does not take into account substation and transformer assets and is not a good driver for urban networks that have substantial infill growth (which adds assets, but not circuit length).

    f) Opening RAB: more assets on a network leads to more preventative maintenance (which is independent of age). However, as capital contributions are netted off the value of the RAB, this driver will be affected by the capital contributions policy of the EDB and the balance between investments that do and do not attract contributions in each year – adjustments would need to be made to account for this if RAB value were to be used as a driver.

    g) Number of connections in a year: this is only relevant for network growth and connection expenditure, it does not materially affect replacement expenditure.

Health driver measures

34. The Commission suggests five Health driver measures (asset condition at start of planning period, percentage of assets to be replaced over the next 5 years, SAIDI, SAIFI and asset age profile). In our view, these are more closely related to renewal

expenditure and are reasonable drivers, although they should be linked more closely to expenditure categories than to an overall "Health" driver. Also, in the short term SAIDI and SAIFI are more indicators of weather patterns rather than underlying network condition. Identifying the assets to be replaced is useful in forecasting replacement costs provided the assets are grouped so they have similar average costs.

Capacity driver measures

35. We make the following comments on the Commission's suggested capacity measures:

    a) Forecast customer connections: a good measure if it is forecast accurately.

    b) Forecast total energy delivered to ICPs: this does not offer any insight into how much to spend on demand reinforcements.

    c) Forecast maximum coincident system demand: same comment as above for the Ownership driver.

    d) Current utilisation of firm capacity: a reasonable measure provided it is assessed correctly (as discussed in paragraphs 58-59 below, the Commission has not correctly assessed utilisation of capacity as disclosed by Vector in Schedule 12b):

        i. This identifies when zone substations need to be reinforced but says nothing about distribution asset utilisation or reinforcement requirements.

        ii. This does not identify what expenditure is required to address the constraints; e.g. upgrade transformers, new zone substation, etc.

    e) Expected utilisation of installed firm capacity: less useful than (d) above.

Alternative sources of information regarding expenditure drivers

36. The Commission also identifies potential alternative drivers that do not rely on data provided in disclosures by EDBs. These include Modern Equivalent Asset Value, GDP and population growth measures. These could be useful, but in order to successfully forecast and explain the reasons for expenditure changes, there will still be a need to use data disclosed by EDBs.

37. We note that these drivers are not relevant to all expenditure categories. For example, an increase in population will affect connection and growth expenditure but will not have any impact on replacement and renewal expenditure.

Vector's suggested expenditure drivers

38. Vector considers the following are significant drivers of various categories of capex and opex (which does not mean they apply to all expenditure categories or, necessarily, that they are straightforward to model):

    a) Growth in customer numbers: this drives growth in network demand, which in turn drives system growth expenditure; although demand is also heavily

influenced by variable factors such as weather that can hide longer-term trends on a year-by-year basis.

b) Risk appetite of the supplier (as expressed through security standards): even small changes in the security standards of a supplier can have significant influence over expenditure; we note this will generally remain static over time with occasional step-changes so will be a good predictor of appropriate expenditure, but may be less relevant for forecasting expenditure changes over a regulatory period.

c) Asset health (or asset age as a proxy for asset health): this influences replacement expenditure.[3] In general, assets should be replaced when it becomes more expensive to repair than to replace and the main factor influencing this is the condition of assets. There is a reasonably strong correlation between asset age and condition, but many assets can be efficiently used beyond their useful life so age alone is not a preferred replacement criterion.

d) Network scale (expressed as a basket of assets, such as overhead and underground circuit length and transformer capacity): this influences replacement expenditure[4] as a larger asset base, all else being equal, will require more asset replacement than a smaller one.

39. Other drivers that also apply to particular expenditure categories include:

a) Network topography and topology.

b) The asset condition and investment programmes of other utilities (as a driver of relocation expenditure – although this information is challenging to source).

c) Overhead line length and network environment (as drivers of vegetation management expenditure).

Conclusion

40. The discussion above shows that the process of identifying robust expenditure drivers is not straightforward. Vector would be happy to work with the Commission to develop a clear view on the drivers of capex and opex.

[3] Also service interruptions and emergencies opex.

[4] Also service interruptions and emergencies and routine and corrective maintenance opex.

Opex and Capex forecasting

Introduction

41. It is important to ensure, both for summary and analysis and DPP price setting, that the opex and capex models used by the Commission for forecasting are as accurate and robust as possible. They need to be sufficiently robust to accurately forecast and explain the expenditure of at least a large majority of EDBs. If such robustness is not achievable, the Commission should consider whether alternative approaches would provide more accurate forecasts, including utilisation of EDBs' forecasts, and should also consider options for mitigating the risk of regulatory errors.

42. Vector agrees with Castalia that, to improve confidence in the results of its modelling, the Commission should:[5]

    a) Focus on explaining how EDB forecasts reflect changes in the relative efficiency of EDBs.

    b) Clearly explain the intuition behind the modelling, and the range of modelling results that would be consistent with the institution. The Commission should also explain where the modelling results deviate from the intuition.

43. Vector would support the development of different models for different types of EDB, e.g. based on ICP density. The Commission suggests using different models for different EDB types[6] in relation to its capex modelling. We submit that this approach would be equally appropriate for opex modelling.

44. A key challenge in developing these expenditure models is to ensure the data being used is comparable across the industry. Unfortunately, it is clear that different EDBs have interpreted the new information disclosure requirements in different ways in some areas (an example being the variety of approaches taken to reporting the percentage of overhead lines subject to vegetation management). We acknowledge the Commission is aware of this issue and will work with the industry to improve consistency of disclosures over time. However, for the moment, the comparability of the data is uncertain and this will affect the accuracy of any model outputs. This is also the case where disclosure definitions have changed from the previous disclosure regulations, impacting on the time series that is available.

Model errors remains even with improved forecasting techniques

45. Even with improvements to the Commission's forecasting models, we emphasise that econometric techniques produce outcomes that are going to be inaccurate to a certain degree (and this inaccuracy will be exacerbated by any variations in the data, as discussed above). Vector recommends the Commission bear this inaccuracy in mind when determining how much weight to place on the forecast outcomes. The Commission should also consider how it can use supplier-provided forecasts, at least as a check of the accuracy of its models.

[5] Castalia Report, page 1.

[6] Initial Observations Paper, paragraph 130.

Capex models

46. The Commission's discussion of capex forecasting methods is at a high level, which is suitable for this early stage of the consultation process. Vector considers that the two approaches put forward are worth considering, although much will depend on the detail and application of the approach that is chosen.

47. Vector agrees with Castalia that the development of top down capex forecasts is challenging, as top-down models struggle to reflect the judgements involved in asset management. This is reflected by the wide range of forecasts across the industry.[7] EDB forecasts should therefore at least be considered as they will provide the best information on expected capex within the industry.

48. If the Commission were to utilise the "absolute calculation" approach, basing its cost of a particular input on an industry average cost, this could assist to drive efficiencies for all regulated suppliers. However, we expect there would be considerable subjectivity and debate regarding the input costs chosen and there is a risk the amounts derived from this method will not relate closely to actual expenditure of EDBs. The "adjustment method" avoids this risk by being based on historic EDB expenditure, meaning it is more likely to reflect the investment needs of each EDB.

49. In paragraph 125 of the Initial Observations Paper, the Commission identified potential drivers to use for modelling capex under the adjustment method. We refer the Commission to our discussion above regarding driver measures as the points made there apply equally to the suggestions made in paragraph 125.

Opex models

50. The Commission appears to have applied its DPP opex model to the data produced in disclosures by EDBs. In our view, this highlights the limitations of the previous DPP model. Specifically, on the face of it, a price reset made based on the Commission's model would provide Vector with 11% opex less than our forecasts indicate that we need. We query how this can be justified.

51. The analytical ratios disclosed in schedule 1 of EDBs' August 2013 disclosures show Vector has the lowest opex per energy delivered and the third lowest opex per ICP and per maximum coincident demand. Vector is already highly efficient compared to other EDBs, indicating that we have less room for cost savings than other EDBs as we have already achieved significant efficiencies. Thus, a model outcome that implies Vector should receive substantially less opex than we forecast to need does not align well with other available data.

52. Additionally, the variances between EDB forecasts and the Commission's model range from +46% to -73%. Assuming the forecasts are broadly accurate, this does not support a view that the Commission's model is an appropriate means of forecasting the expenditure needs of EDBs. Vector submits the Commission needs to develop models that can better explain the variances between EDBs than the

[7] Castalia Report, pages 1 and 5.

models used thus far. As Castalia notes, the Commission has not yet incorporated EDB forecasts of scale variables into its models and this may be a step that would remove some of the remaining variation between the EDB forecasts and the Commission's model.[8]

53. In particular, the focus of the Commission's model on line length as a key driver of opex is increasingly inappropriate for Vector. For example, the Auckland Council is forecasting significant growth in housing in Auckland and the majority of this new housing is intended to be through intensification. If this plan eventuates, Vector's line length will barely change but the number of customers / electricity supplied and hence the number of transfomers, switchgear, substations etc will have increased. As discussed above, the development different opex models for different types of network may be helpful in this regard. In particular, indicators of network density are relevant for ascertaining differences in forecasting expenditure across different networks.

54. Vector also agrees with Castalia that the Commission should:[9]

a) Describe its expectations of the model results and the intuition behind the modelling.

b) Explain any areas where the model results differ from the Commission's expectations.

[8] Castalia Report, page 3.
[9] Castalia Report, page 4.

Industry-wide factors to consider for next reset

55. In paragraphs 104-105 of the Initial Observations Paper, the Commission sought views on whether industry-wide adjustments should be made to the opex allowance to provide for costs that are not likely to be well captured in models based on historic expenditure. The changes reflect significant and industry-wide changes in expenditure profiles. Vector submits the following factors should be considered:

    a) Insurance for catastrophic events. Following the Orion CPP consultation process, it has become clear that regulated suppliers and the Commission had very different understandings of the risk and insurance settings under the Part 4 regulatory regime. Following the final CPP decision, regulated suppliers are now aware their risk profile is higher than they had previously understood to be the case. They are therefore likely to seek higher levels of insurance than they have in the past. This is a legitimate business expense that may not be covered in full in the disclosed base year opex. Vector recommends the Commission allows for increased insurance to cover catastrophic event risk as part of the DPP. It would be useful if the Commission provides advance guidance as to how it will deal with this in the DPP reset.

    b) Replacing and maintaining customer service lines. There is discussion within the industry regarding customer service lines, which are not treated as regulated assets and are generally not owned or maintained by EDBs. However, consumers are also not maintaining these lines and the industry is concerned there may be safety risks associated with them. If the industry were to take a role in maintaining or replacing such lines, in order to address the public safety risks, the costs of doing so would not be reflected in historic expenditure and additional adjustments would need to be made. At this stage, detailed cost forecasts are not available but it is an area where discussions between the industry, the Commission and central government are likely to be required.

56. For capex, a recent Health and Safety obligation is the requirement[10] to seismically strengthen a number of existing sub-stations and other buildings, retrospectively strengthening them to meet new minimum seismic design criteria over the course of the next 15 years. Dependant on the supplier's risk appetite and size of the problem, there may be a driver to shorten this time period for some EDBs. Some of this expenditure may be reflected in recent years' capex but the full costs are unlikely to be reflected in historical expenditure at the time of the reset.

[10] http://www.dbh.govt.nz/epb-policy-review

Comments on the data as summarised by the Commission

Introduction

57. The Initial Observations Paper contains some data and information relating to Vector that we would like to take this opportunity to provide further detail on, to aid understanding of the information.

Substations operating in excess of capacity

58. According to the disclosures and reported in the Initial Observations Paper, 50% of Vector's substations have peak demand in excess of 100% of capacity. However, this is misleading as it is driven by the requirements of Schedule 12b on how to disclose the capacity information. Section 5 of Vector's AMP[11] explained this and the summary and analysis should be broad enough to capture such explanations.

59. Specifically, Schedule 12b seeks information on firm capacity of substations and compares that to the maximum load of the substations. However, we do not believe the data disclosed in 12b provides the answer to the following question that an interested person may ask: "what level of security are you providing to customers and how much spare capacity is available before security standards are breached?" Vector operates its substations in excess of firm capacity because:

    a) Vector's security standards provide n-1 security for 95% of the year for residential customers (98% for commercial customers). Thus, it is anticipated (and deliberate) that substation firm capacity, if measured in terms of conventional n-1 redundancy levels, may be exceeded during peak demand times.

    b) The firm capacity is based on the maximum continuous rating (MCR) of the equipment but Vector's load varies over a daily cycle. As the equipment rating is determined by its maximum operating temperature, we can exceed the MCR provided we allow the equipment to cool down. This maximum rating is known as the cyclic rating. We operate to cyclic ratings rather than MCR.

    c) We have the capability of transferring load between substations via the 11kV network (or 22kV network in the Auckland CBD). This spare capacity is taken into consideration when we evaluate substations for reinforcement. However, it is not factored in as part of the "n-1 firm capacity" assessment in Schedule 12b.

Capex expenditure by asset category in CY

60. Tables 4 to 7 of the Initial Observations Paper record that Vector estimated capex of $0 on distribution and low-voltage lines, zone substations and sub-transmission lines in 2013. Vector, of course, spent more than $0 on such investments in 2013. However, for CY disclosures in Schedule 11a, Vector was only able to provide total capex per expenditure category and not break it down by sub-category. This is because there was insufficient time between the publication of the final Information Disclosure Determination on 1 October 2012 and the publication of the AMP in March

[11] Vector, Electricity Asset Management Plan 2013-20203, section 5.3.3.

2013 to adjust our systems to reflect the new expenditure categories. This will be addressed in the next round of forecasts disclosed by Vector.

Expenditure on energy efficiency, demand-side management and reducing energy losses

61. Figure 14 of the Initial Observations Paper reports that only six EDBs[12] (not including Vector) forecast any expenditure in energy efficiency, demand-side management and reducing energy losses. If the Commission were to provide incentives and remove disincentives (such as the overly high average life applied to energy efficiency investments under a DPP)[13], planned expenditure in this area would be likely to increase. From 2014 Vector is likely to forecast some expenditure in this category as a project that was part of our R&D programme in 2013 has now been approved by the Vector Board for a wider roll-out. However, we would be likely to invest more were the incentives aligned to promote such investments. We are optimistic that the work of the ENA working group on energy efficiency incentives will assist the Commission to better meet its obligations under section 54Q.

Forecast non-network operating expenditure

62. Table 12 records that Vector forecast an increase of 241% in average annual expenditure of the Initial Observations Paper on system operations and network support opex over 2014-2018, compared to 2010-2013. This table also records that Vector forecasts a decrease of 27% in business support opex over the same period. We note five other EDBs also forecast greater than 100% increases in expenditure in this category and all of them forecast reductions in business support opex. The main reason for these substantial-looking swings in expenditure is likely to be recategorisation of expenditure between the two non-network opex categories by some EDBs, when compared to the previous disclosure definitions. Cost allocation rules have also changed from previous disclosure requirements, leading to changes in allocations between categories. Given such variances, it is not clear that comparing current forecasts to previous actual expenditures disclosed under different regulations is particularly useful.

Forecast of declining capex over the period to 2023

63. Figure 8 of the Initial Observations Paper suggests capex is expected to decline towards the later years of the ten-year planning period. In Vector's case, this is due to a lack of visibility of future customer growth and connection projects, or relocation projects, towards the end of the planning period, rather than an expected decline in capex. We expect this would be true for other EDBs also.

[12] Paragraph 197 says there were five, but this appears to be an error.

[13] Energy efficiency investments typically involve short-lived assets. Thus an application of a 45 year average life assumption to new investments in these assets under a DPP means EDBs will be worse off investing in short-life energy efficiency assets rather than longer-life traditional network assets. In our view this is a key matter to address in the next DPP reset.