

# Reporting of asset management practices by EDBs

A review of target areas for  
potential improvements



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# Executive Summary

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The asset management practices of Electricity Distribution Businesses (EDBs) underpin their investment and operational activities. Effective asset management facilitates the provision of a more reliable and efficient electricity network service and is an integral part of ensuring that EDBs provide services at a price and quality that reflects the demands of electricity consumers.

Our window into an EDB's asset management practices is through their asset management plan (AMP). AMPs are an important source of information for understanding and assessing EDB performance and asset management processes for a wide range of stakeholders. We use information contained within the AMP in setting price-quality paths, undertaking investigations of non-compliance with quality standards, performing summary and analysis and to inform our other programmes of work.

Accordingly, we have a focus on encouraging improvements to asset management reporting by EDBs (as disclosed in their AMPs) and the asset management practices that underpin this reporting. This focus is evidenced by our recent reviews relating to aspects of EDBs' asset management<sup>1</sup> and our recent open letters to industry.<sup>2,3</sup>

This paper focuses on:

- promoting a better understanding of EDBs' asset management practices through improving how they are currently reporting those asset management practices in their AMP disclosures; and
- encouraging EDBs, as part of their AMP disclosures, to acknowledge and explain adverse trends in asset performance and to detail the mitigating actions being taken.

Increasingly, good asset management involves exploring alternatives to infrastructure investment and anticipating the future demands placed on the electricity system by the move towards decarbonisation. This is likely to be a feature of future reports.

## ***Target areas and process for our review***

In 2019, we commenced a review which analysed seven years of EDBs' Information Disclosure (ID) data (2013-19 inclusive) in five key areas related to asset management practices (termed "target areas").<sup>4</sup>

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1. [Partna Consulting Group – Expert Report – AMP review of EDB risk preparedness – May 2019.](#)
  2. [Open Letter – our priorities for the electricity distribution sector for 2017/18 and beyond – November 2017.](#)
  3. [Open letter – our programme of work for reviewing electricity distribution businesses' asset management practices – June 2019.](#)
  4. Our analysis was limited to the current information disclosures (ID data and AMPs) available as at 2019. This review does not include subsequently published information disclosures.

These target areas were identified as being important contributors to EDBs' asset management practices relating to network reliability or the quality of their underlying asset information.

<p><b>Apparent deteriorating trends in reliability</b></p> <ul style="list-style-type: none"><li>→ Unknown interruptions</li><li>→ Extended duration interruptions</li><li>→ Vegetation-related interruptions</li><li>→ Defective equipment interruptions</li></ul>		<p><b>Apparent inconsistencies in asset information</b></p> <ul style="list-style-type: none"><li>→ Asset information</li></ul>
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All of the target areas cover matters that are important for consumers, either directly as in the case of the first four areas which relate to interruptions or indirectly as in the case of asset information.

The target areas are all areas that have:

- contributed to instances of non-compliance with quality standards (under the default price-quality path); and/or;
- been identified as part of customised price-quality path (CPP) applications as areas to be improved through the CPP.

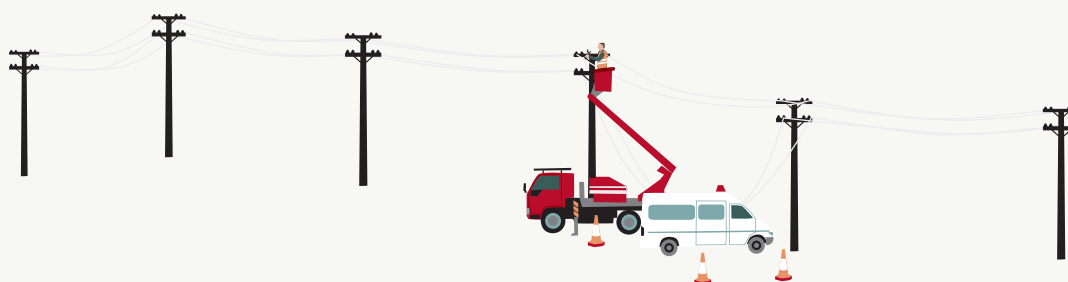
Where our analysis of the target areas identified areas requiring further investigation for a particular EDB, we reviewed information published in the EDB's 2019 AMP, or if the EDB had supplied a 2019 AMP 'update', then both the 2018 AMP (full version) and the 2019 AMP 'update' were reviewed.

Our review of the AMP was looking to see if the EDB had provided:

- a sufficient explanation for the trend; and/or
- the remedial actions (and related expenditure) planned or being undertaken.

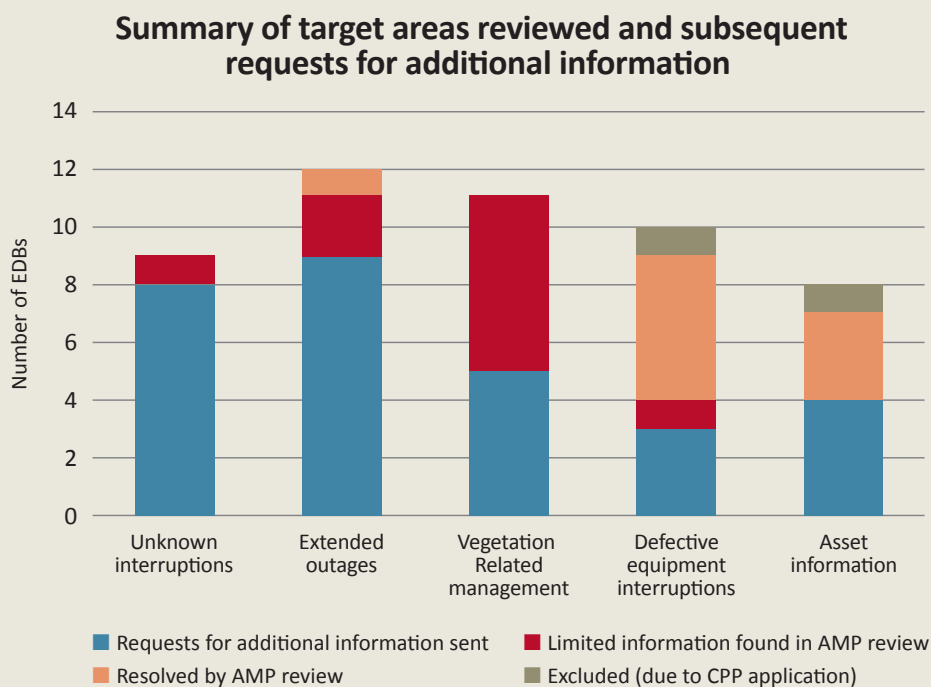
If we did not find an explanation in the AMP disclosures, we sought additional information from the relevant EDB on the specific target area. In asking for more information, we had not formed an opinion or come to the view that there was a concern about the relevant EDB's asset management practices in a particular area or more broadly.<sup>5</sup>

A total of 29 requests for additional information (across the five target areas) were sent to 17 of the 29 EDBs. Figure 1 below provides a summary of the number of AMPs which were identified for each target area, and ultimately the corresponding number of requests for additional information that were sent.



5. Refer to Chapter 2 for more information on the review process.

Figure 1: Summary of target areas and requests for additional information



The observations and potential improvements draw on relevant analysis and observations from ID data (2013-19 inclusive), AMPs and AMP updates and information we received in response to our requests for additional information.

## Observations from our review

Our review and analysis relate only to the set of target areas, and focus only on areas of deteriorating performance. They are not a fulsome set of recommendations for improvements to EDBs’ asset management practices and reporting. However, the areas that were targeted were chosen for their key influence on outcomes for electricity consumers, so we consider that the findings are important for the industry.

We have identified a number of common themes and potential improvements in the way asset management practices are reported. Recognising that it can be sometimes difficult to identify whether a potential improvement is an improvement in AMP disclosures or an improvement in the underlying asset management practices that sit behind those AMP disclosures (or both), we have grouped our observations under three categories:

- potential improvements in EDBs AMP disclosures; and
- potential improvements in EDBs’ asset management practices and related disclosures; and
- potential improvements related to information disclosure (ID) requirements.

## Potential improvements in AMP disclosures

- EDBs generally have the capability to effectively explain the deteriorations and related interventions in key reliability measures. However, such information should be reflected in their AMPs so that it is readily available to stakeholders, and not simply provided subsequently on request. We strongly encourage EDBs to continue to consider making ongoing **improvements to the way they present information in their AMPs** so that it is more accessible and enables effective understanding of underlying asset management practices.
- EDBs mainly rely on qualitative information to explain the causes of the apparent deteriorating reliability trends and the expected effect of interventions. However, **quantitative data and analysis could have been used to better explain and support the qualitative information provided** in EDBs' AMPs. Quantification could take the form of changes in SAIDI<sup>6</sup> and SAIFI<sup>7</sup> that are expected from an intervention, or the provision of more specific data such as the expected improvement in the time taken to repair a fault as a result of a particular intervention.
- **If an EDB changes its approach to interpreting or classifying interruptions or asset condition data, it should be clear in its disclosures that it has made that change.** The EDB should also be clear on the reasons for the change and the effects of the change. This was most relevant to the apparent deteriorating trends observed in unknown interruptions, which as a residual fault cause category, could be affected when a change is made to classifying interruptions into one of the other eight categories of unplanned interruptions.
- **EDBs should consider adopting more granular approaches** to recording and reporting of third-party interference to enable better insight into the causes of the interruptions. EDBs should also consider taking an industry-wide approach to developing strategies to address the rise in interruptions caused by third parties, particularly regarding vehicle to pole incidences.

## Potential improvements in EDBs' underlying asset management practices and related disclosures

### *Improving the level of reliability analysis for major events and storms*

- Given the significant effect attributed to storm events, especially associated high wind speeds on network reliability, EDBs should record and report, where relevant, more information in their AMPs on storm conditions. In particular, wind speed and wind direction data, and whether the wind speed actually exceeded the design tolerances of the network. The benefits of taking this approach are likely to be heightened for some EDBs because climate change is expected to lead to increased average wind speeds in some parts of New Zealand (eg, east coast of the South Island).<sup>8</sup>

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6. *SAIDI* is the System Average Interruption Duration Index and is the average electricity outage duration experienced by a customer on the network over a year.

7. *SAIFI* is the System Average Interruption Frequency Index and is the average number of interruptions that a customer would experience on the network over a year.

8. Climate Change Projections for New Zealand. Atmospheric projections based on simulations undertaken for the IPCC 5th Assessment, 2nd edition. 2018. Prepared for the Ministry for Environment by Mullan B, Sood A, Stuart S, Carey-Smith T, NIWA.

- EDBs have demonstrated through re-analysis of data that the apparent deteriorating trends in the reliability metrics were minimised or ceased to exist if interruptions from Major Event Days (MEDs) were reduced or removed. We note that **EDBs should be mindful that their internal reliability analyses considers both the unadjusted (raw) and adjusted reliability datasets (excluding MEDs)** as this can provide a broader range of insights into the network and effectiveness of asset management practices.
- **We suggest one-off events should not be excluded from all analysis of reliability trends where the events are foreseeable and within the reasonable control of the EDB** (ie, a weather event that does not result in conditions that exceed design standards). We also note that reporting on one-off events is valuable because:
  - the trend of the total (unadjusted) reliability performance is representative of the average customer experience; and
  - there is a link between the state and performance of a network and its ability to operate effectively in storm conditions; and
  - storm events can lead to latent damage which manifests itself later.

### ***Improvements to management and reporting of vegetation-related interruptions***

- EDBs could **extend their vegetation management processes to incorporate more critical review and causal analysis of vegetation-related interruptions**. The approaches currently being undertaken by EDBs could be extended to include:
  - modelling and analysis of vegetation clearance zones;
  - assignment of risk ratings to vegetation clearance zones;
  - vegetation growth modelling and strategies to target specific causal factors (the associated strategies may be preventative or corrective);
  - quantifying reliability benefits resulting from investments and enhancements in operating practices in vegetation management; and
  - considering cost-benefit analysis as part of the prioritisation of a vegetation works programmes.
- EDBs should consider adopting a **more granular approach to the recording and reporting of vegetation-related interruptions** (such as in-zone, out-of-zone, wind-borne debris, or related to an adverse weather event). Classifying these separately should provide valuable insight for the review and development of appropriate strategies by EDBs to improve the network's resilience to vegetation-related faults.
- A number of EDBs report that vegetation emanating from outside of the vegetation clearance zones prescribed in the Electricity (Hazards from Trees) Regulations 2003 are a major contributor to vegetation-related interruptions. However, **some EDBs do not appear to be as proactive as others in dealing with hazardous vegetation that is located out-of-zone**. Some EDBs are trialling, or had in place, practices to engage with out-of-zone tree owners and these were showing promising results. Their success in this area suggests that other EDBs could trial or adopt similar approaches.



### ***Improving asset information and management practices***

- There is an opportunity for EDBs to move towards adopting **more condition-based asset risk management** (CBARM) approaches involving an analysis of the probability of asset failure and the consequence of that asset failure. A CBARM approach would be used to inform maintenance and replacement programmes of work and would be especially useful for determining the prioritisation of renewal and replacement, providing for a more systemised and objective approach to the management of asset classes.
- Given the increasing reliance on data in asset management practices, EDBs should ensure that they have **robust data quality and governance standards**. We observed that many EDBs had or were planning to improve the robustness of their data quality and governance standards. We strongly encourage all EDBs to review data quality and governance.

### **Potential improvements related to information disclosure (ID) requirements**

- A number of EDBs have had different approaches over time to classifying interruption events and asset information. This divergence appeared most pronounced in relation to:
  - the degree of certainty required by EDBs to determine the categorisation of a fault into the ID interruption categories; and
  - interpreting and completing the ID schedules relating to data accuracy and asset condition.

These inconsistencies in ID data made comparative analysis of EDBs less effective. As such, we may consider how to prioritise these matters when we next review disclosure requirements.

- EDBs should ensure that there is a **clear linkage between their internal data and their ID data**. It was apparent from the responses, that for certain EDBs:
  - asset data that has been internally captured is driving renewal and replacement of assets but that this data is not the same as that which is reported in ID; and
  - different data sources are being used for related metrics. For example, asset condition data for ID purposes are based on age as a proxy, but asset renewal quantities are based on actual asset condition as determined through inspections.

Many of the EDBs recognised this improvement opportunity themselves and are working towards improving the linkage.





# Chapter 1 – Introduction

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## Purpose of this chapter

This chapter discusses:

- why we have published this paper
- what this paper contains; and
- the context in which we have published this paper.

## Why we have published this paper

This paper continues an ongoing conversation with electricity distribution businesses (EDBs) and other stakeholders about how EDBs are managing their assets for the long-term benefit of consumers.

We have published this paper to help interested persons to assess whether the purpose of Part 4 of the Commerce Act 1986 is being met regarding the way EDBs manage their networks in relation to five target areas, and also to:

- promote a better understanding of EDBs' asset management practices through improving how they are currently reporting those asset management practices in their Asset Management Plan (AMP) disclosures disclosures; and
- encourage EDBs, as part of their AMP disclosures, to acknowledge and explain adverse trends in asset performance and to detail the mitigating actions being taken.

One of the ways this paper looks to encourage EDBs to improve their asset management reporting is to highlight examples of asset management reporting and practices which other EDBs may want to consider.

We expect that, because asset management is a key driver of overall performance, if the potential improvements discussed in this paper are implemented by EDBs where needed, this should lift the overall performance of all EDBs, and promote the long-term benefits to consumers.

The paper also identifies areas where there may be potential improvements to EDBs' information disclosure.



## What this paper contains

**Chapter 1** (this chapter) introduces the paper and provides some context for the review. It also indicates future work we propose doing on asset management.

**Chapter 2** sets out the framework we have used for this review, the source material we have relied on, the scope of the review, and the process we followed in conducting our review.

**Chapters 3 – 6** detail our general observations from our review of each of the five target areas and identifies potential areas for improvements in how EDBs record and report on asset management in relation to these five target areas in their AMP disclosures, and the underlying asset management practices.

Throughout this report, where we have identified examples or practices we wish to ‘shine a light on’, these have been highlighted with a spotlight symbol.



## The context in which we have published this paper

### Why we are interested in EDBs’ asset management

The performance of the electricity distribution sector is important to all New Zealanders. This will be increasingly so, as New Zealand’s reliance on electricity is expected to grow with the “electrification of the economy” brought about by the introduction of new technologies (eg, electric vehicles, solar panels) and the drive to decarbonise New Zealand. Furthermore, the growing application of new technologies and business models at the distribution level is expected to increase the complexity of the distribution system.<sup>9</sup>

In this changing environment EDBs’ asset management practices, which are already a fundamental ingredient in ensuring distributors provide effective and cost-efficient services to consumers will become even more crucial.

EDBs’ asset management practices underpin the investment and operational activities that EDBs undertake. Effective asset management promotes the long-term benefits of consumers, in line with the central purpose of Part 4 that the Commerce Commission seeks to promote. Accordingly, we have had a focus on encouraging improvements to EDBs’ asset management, as evidenced by the recent open letters to industry that we have published<sup>10</sup> and other recent reviews relating to aspects of EDBs’ asset management.<sup>11</sup>

9. For further discussion on this issue see Section E: Improving transmission and distribution, pg 47, Electricity Price Review, HIKOHIKO TE UIRA, Final Report, 2019.

10. [Open letter – our programme of work for reviewing electricity distribution businesses’ asset management practices – June 2019.](#)

11. [Partna Consulting Group – Expert Report – AMP review of EDB risk preparedness – May 2019.](#)

Figure 2: What is asset management and why is it important?

## Asset management

Asset management is the combination of management, financial, economic, engineering, and other practices applied to an entity's assets with the objective of providing the best value level of service for the costs involved. It includes the management of the entire life cycle of assets —including design, construction, commissioning, operating, maintaining, repairing, modifying, replacing and decommissioning/disposal.



## The regulatory regime and EDBs' Asset Management Plans

Ultimately, our interest in how EDBs manage their assets comes from our statutory responsibility under Part 4 of the Commerce Act. The central purpose of Part 4 is to promote the long-term benefit of consumers in markets where there is little or no competition and little or no likelihood of a substantial increase in competition.<sup>12</sup>

Our role is to promote the interests of consumers in these markets by promoting outcomes that are consistent with outcomes produced in workably competitive markets. Section 52A(1) (a)-(d) of the Commerce Act specifies the following four outcomes produced in such markets that we must promote so that regulated suppliers, such as EDBs, respectively:

- have incentives to innovate and to invest, including in replacement, upgraded, and new assets;
- have incentives to improve efficiency and provide services at a quality that reflects consumer demands;
- share with consumers the benefits of efficiency gains in the supply of the regulated goods or services, including through lower prices; and
- are limited in their ability to extract excessive profits.

Sound asset management is an integral part of ensuring EDBs efficiently provide services at a price and quality that reflects the demands of electricity consumers.

We also have specific responsibilities as a regulator regarding asset management. The Commission regulates EDBs under Part 4 of the Commerce Act 1986, which provides for the regulation of the price and quality of EDBs' line services functions on the basis that in this market there is little or no competition and little or no likelihood of a substantial increase in competition.

12. Commerce Act 1986, section 52A(1).

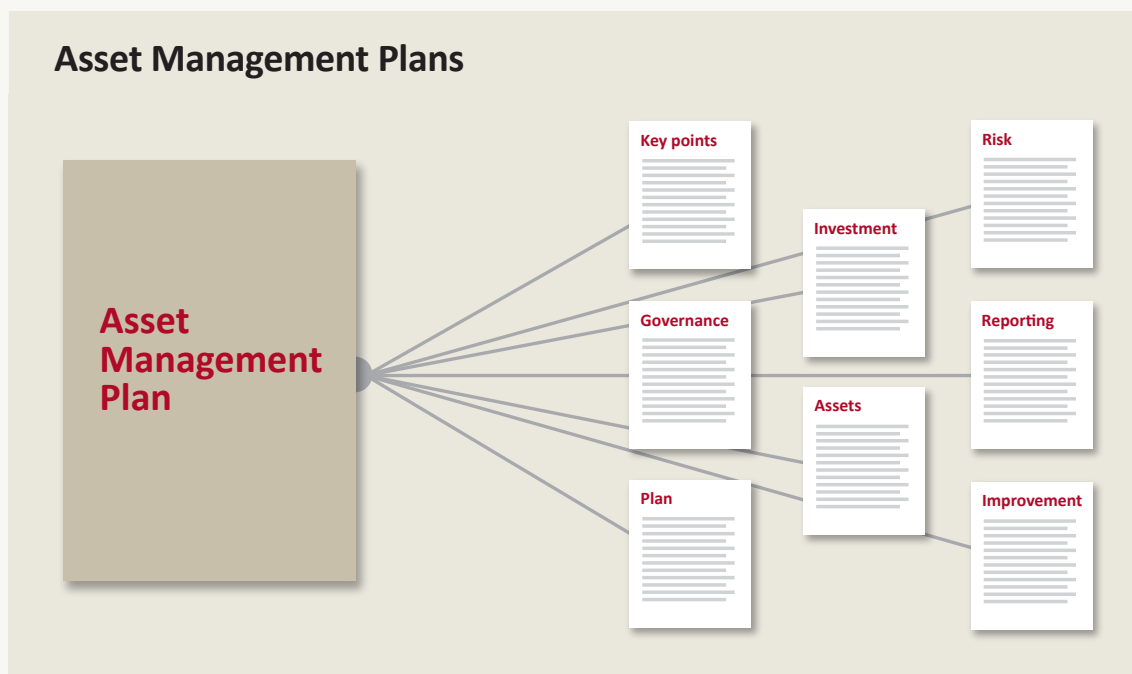
Under Part 4, the Commission sets requirements for EDBs to publicly disclose information relevant to their performance – called ‘information disclosure requirements’. The types of information an EDB must disclose includes data related to quality outcomes, price and revenues (typically referred to as information disclosure or ‘ID data’ for short). The purpose of information disclosure requirements is to ensure that sufficient information is readily available to interested persons to assess whether the purpose of Part 4 is being met.<sup>13</sup>

A key component of the current information disclosure requirements relates to EDBs asset management. Under the current requirements, each year all 29 EDBs must complete and publicly disclose an AMP<sup>14</sup> (or an AMP update), which provides detailed information regarding how the EDB plans to manage its assets.

Once EDBs publicly disclose their asset management plan, we are required to publish a summary and analysis of the information contained in that plan.<sup>15</sup> We may also, as part of that summary and analysis, include an analysis of how effective the information disclosure requirements imposed on the services are in promoting the purpose of Part 4.<sup>16</sup>

## The importance of asset management plans

Our window into an EDB’s asset management practices is through their AMP. Put simply, the AMP identifies how an EDB plans to manage its assets to continue to supply its consumers at an acceptable price and quality. Put simply, the AMP identifies how an EDB plans to manage its assets to continue to supply its consumers at an acceptable price and quality. The information disclosure requirement for EDBs to disclosure AMPs reflects this documents importance as a source of information for understanding and assessing EDBs’ performance and asset management practices for a wide range of stakeholders.



13. Commerce Act 1986, section 53A.

14. Commerce Commission Electricity Distribution Information Disclosure Determination 2012, clause 2.6.1(1) and (3).

15. Commerce Act 1986, section 53B(2)(b).

16. Commerce Act 1986, section 53B(3).

An EDB's AMP should contain sufficient information to enable an interested stakeholder to "make an informed judgement about the extent to which the EDB's asset management processes meet best practice and the outcomes are consistent with outcomes produced in competitive markets".<sup>17</sup> AMPs enable interested stakeholders to make informed judgements about the appropriateness of an EDB's approach to asset management, any change in practices that are being made and the expected effect of those changes.

We rely on EDBs' AMPs as a source of relevant information. In terms of our information disclosure requirements, we use the information disclosed in EDBs' AMPs to perform our summary and analysis role under Part 4 of the Commerce Act.<sup>18</sup> We also use AMPs to inform our setting of price-quality limits under our price-quality regulation and as part of our compliance investigations into potential EDB contraventions of price-quality paths.

The requirement to publish AMPs for EDBs have been in place for more than 20 years. This has given EDBs the opportunity to become experienced and proficient in completing their AMPs in a way that is focused on the fundamentals of managing key infrastructure assets.

EDBs' asset management plans have evolved as the sector has become more mature and increased its focus on service delivery.

As EDBs' asset management plans have evolved, so has our approach to them. Over recent years, we have shifted our focus to the value AMPs provide to consumers and other stakeholders. As we said in our 2017 open letter to the sector "shining a light" in a way that makes distributor performance more easily understandable, will likely bring more stakeholders into these conversations and create increased incentives for ongoing performance improvement."<sup>19</sup>

## Our future work on EDBs' asset management

We will continue to have a focus on encouraging improvements to EDBs' asset management practices. This focus will include encouraging ongoing improvements to EDBs' AMPs so that EDBs' asset management practices become more transparent and accessible to interested parties.

As a natural progression of our work over the last few years in relation to EDBs' asset management practices, we are continuing to develop our analysis and engagement with EDBs to better understand their circumstances and performance.

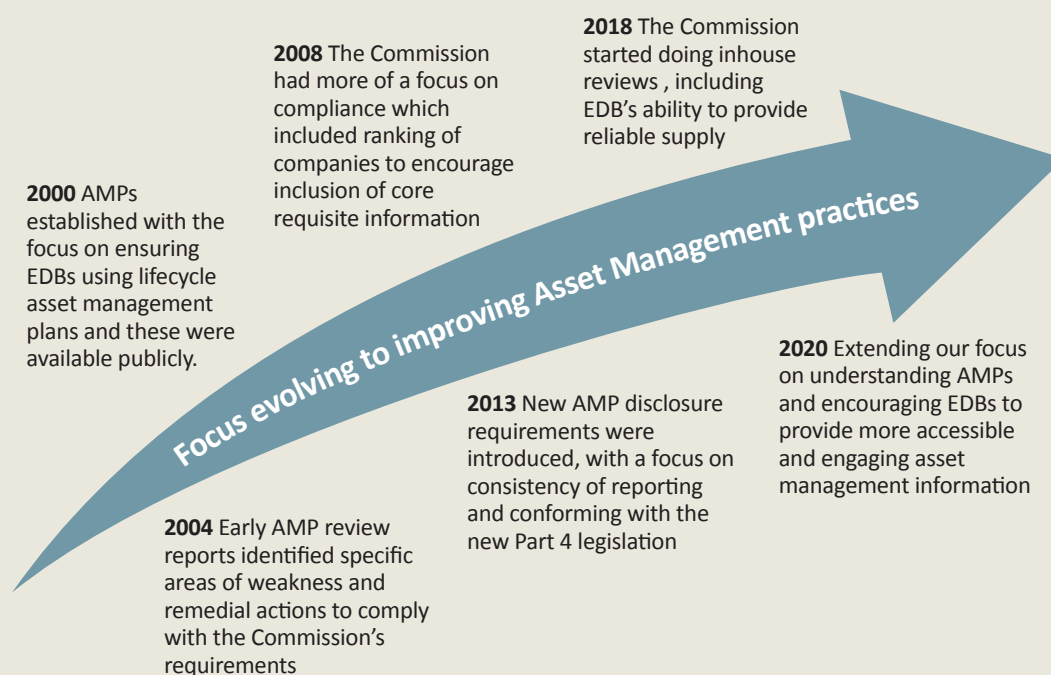


17. Commerce Commission *Electricity Distribution Information Disclosure Determination 2012*, Paragraph 2.3 of Attachment A.

18. The Commission has undertaken a number of separate analyses of AMPs in recent years with different focus areas.

19. Commerce Commission *Our priorities for the electricity distribution sector for 2017/18 and beyond*. November 2017, paragraph 25.

*Figure 3: Evolution of our focus on encouraging EDBs to provide more accessible and engaging asset management information*



**Since 2017 the commission has been:**

- signalling our focus on encouraging improvements to EDB asset management
- gaining better understanding of EDB's asset management
- encouraging improved accessibility of EDBs asset management practices
- publishing positive reports highlighting asset management practices that EDBs could consider emulating
- encouraging EDBs to improve the accessibility of their AMPs.

**Specific activity has included:**

- **2017** Open letter to stakeholders. *"Our priorities for the electricity distribution sector for 2017/18 and beyond."* Highlighting that EDBs asset management is a key focus area for the Commission
- **2017–19** Commission staff visited EDBs to better understand their asset management practices in key areas
- **2018** Commission released *"Observations from our review of Electricity Distribution Businesses' 2016 and 2017 Asset Management Plans"*
- **2019** Open letter to stakeholders *"Our programme of work for reviewing electricity distribution business asset management practices"*
- **2019** Released *"AMP Review of EDB Risk Preparedness"* which assessed EDBs risk management practices, contingency and major event planning and their investment associated with network resilience.

## Chapter 2 – Framework and scope

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### Purpose of this chapter

This chapter sets out:

- the framework we have applied to reviewing asset management practices and reporting;
- the scope of our review; and
- the process we have followed.

### Review framework

This section sets out the framework we have applied to review EDBs asset management disclosures, and how this framework links to Part 4 of the Commerce Act 1986.

### Performance analysis under Part 4 of the Commerce Act

We are required to publish a summary and analysis of the information disclosed by EDBs under our regulations.<sup>20</sup> The purpose of summary and analysis is to promote greater understanding of the performance of EDBs, their relative performance, and the changes in performance over time.<sup>21</sup> Publishing summary and analysis therefore helps to ensure that sufficient information is readily available to interested persons to assess whether the purpose of Part 4 is being met.

The specific focus of this paper is on asset management. As discussed earlier in this paper, asset management practices underpin the range of investment and operational activities EDBs undertake. This means there are several ways in which publishing summary and analysis of EDBs asset management disclosures helps interested persons to assess whether the purpose of Part 4 is being met. These include better enabling interested persons to assess EDBs on several of the interdependent performance areas, including:

- operating and investing in assets efficiently, as observed in workably competitive markets;
- innovating where appropriate; and
- providing services at a quality that reflects consumer demand.

Helping interested persons to answer these questions in assessing the Part 4 purpose underpinned our original decision to include information on network management in the ID requirements.

### Points to consider when reading this paper

#### ***The review is intended to be a targeted review of certain AMP disclosures or EDBs' asset management practices***

The review focused on five key areas related to asset management practices (termed “target areas”). We did not undertake a fulsome review of all aspects of EDBs asset management practices or AMP disclosures.

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20. Commerce Act 1986, section 53B(2)(b).

21. Commerce Act 1986, section 53B(2)(b).

### ***Examples have been included that we wish to shine a light on***

Examples have been included to highlight practices and reporting that may promote the long-term benefit of EDB consumers, and which other EDBs may want to consider. There may be ways in which the practices we cite in this paper could be developed and improved, as asset management occurs within a framework of continuous improvement. We note that:



- on the one hand, the inclusion of a particular example does not imply that EDB demonstrates a good approach to all areas of its AMP disclosures; and
- on the other, the absence of an example from a particular EDB does not imply a poor approach to that AMP disclosure area.

### ***Our review does not draw conclusions or provide an assessment of EDBs performance***

Our expectation is that wherever there is an adverse trend in an important area of performance, it should be acknowledged, explained, and the mitigating actions should be detailed in the AMP. As such this review's focus was on understanding if EDBs had identified the apparent deteriorating trend in the target area(s), the current and future actions that are being taken or considered to address the adverse trend, and how these were reported. We did not draw conclusions or assess an EDBs' performance.

## **Materials we have relied on for this review**

As the purpose of this review is one that goes beyond simply a review of the quality and presentation of AMPs we have referenced a range of sources. These sources are:

- relevant analysis and observations from ID data;
- AMPs and AMP updates; and
- where we have engaged with an EDB for additional information regarding their asset management practices in one or more of the five target areas, we have relied on information gathered from that engagement.



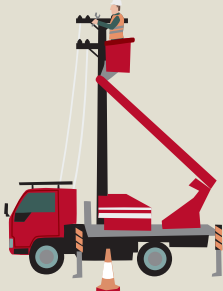
Our review was limited to the current information disclosures (ID data, AMPs and AMP updates) available as at 2019. This review did not consider published information disclosures after 2019.



## Scope of the review

### Our five target areas for this review

For this review, we analysed five key areas related to asset management practices (termed “target areas”).

<p><b>Apparent deteriorating trends in reliability</b></p> <ul style="list-style-type: none"> <li>→ Unknown interruptions</li> <li>→ Extended duration interruptions</li> <li>→ Vegetation-related interruptions</li> <li>→ Defective equipment interruptions</li> </ul>		<p><b>Apparent inconsistencies in asset information</b></p> <ul style="list-style-type: none"> <li>→ Asset information</li> </ul>
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We identified these target areas as being important contributors to an EDB’s asset management practices, relating to network reliability or the quality of their underlying asset information. These target areas have either:

- contributed to instances of non-compliance with quality standards (under the default price-quality path); and/or;
- been identified as part of customised price-quality path (CPP) applications as areas to be improved through the CPP.

As such, all of the target areas cover matters that are important for consumers, either directly in the four areas which relate to interruptions or indirectly as in the case of asset information.

The target areas, the data or metrics used, and the specific rationale for focussing on the target area are described in Table 1 below.

*Table 1: Target areas used for review*

Target areas	Description of the main metric/trend	Rationale for using target areas (what areas of potentially poor asset management practice can it identify)
Unknown interruptions (cause of interruption is unknown)	Trends in unknown interruptions related SAIDI, SAIFI and CAIDI. <sup>22</sup>	Deteriorating trends in unknown interruptions potentially indicate insufficient information/data, poor recording and other sub-optimal asset management practices.
Extended duration interruptions	Trends in the number of interruptions which exceed 3 hours in duration.	Deteriorating trends in long duration interruptions potentially indicate poor restoration practices, and potentially poor health of network assets.
Vegetation-related interruptions	Trends in vegetation-related SAIDI, SAIFI and CAIDI, along with trends in vegetation-related OPEX.	Deteriorating trends in vegetation-related interruptions potentially indicate poor vegetation management practices and insufficient OPEX spending on vegetation management.

22. For the descriptions of SAIDI, SAIFI and CAIDI, refer to the section ‘notes on metrics and information used in this review’ directly below this table.

Target areas	Description of the main metric/trend	Rationale for using target areas (what areas of potentially poor asset management practice can it identify)
Defective equipment interruptions	Trends in defective equipment related SAIDI, SAIFI and CAIDI.	Deteriorating trends in defective equipment interruptions potentially indicate old and/or poorly maintained assets. Adverse trends in this area imply performance may deteriorate in future.
Asset information	Examples of inconsistent reporting of ID data.	Inconsistent reporting makes data less valuable and raises concerns around data integrity – acquisition, recording and reporting practices.

As is evident from the rationale outlined in Table 1, the category of interruption experienced is important in understanding the drivers of reliability levels and so forms an important part of our target areas.

## Notes on the metrics and information used in our review

### **Reliability Data**

The interruption categories used for analysis were:

- Unknown interruptions;
- Extended duration interruptions;
- Vegetation-related interruptions; and
- Defective equipment interruptions.

EDBs are required to publish information on these interruption categories under the ID requirements.

*Unknown interruptions, Vegetation-related interruptions, and Defective equipment interruptions* are classified as causes under Class C (unplanned interruptions on the network). These are three of the nine categories available to an EDB to classify the ‘cause’ of an unplanned interruption.

For each unplanned interruption, figures for SAIDI, SAIFI are disclosed, these along with CAIDI (which we have also used as a metric in our assessment) are described below:

- *SAIDI* is the System Average Interruption Duration Index. This is the average duration (minutes) of electricity interruptions experienced by all customers on the network, for that year (ie, total annual duration of interruptions/total number customers).
- *SAIFI* is the System Average Interruption Frequency Index. This is the average number of electricity interruptions experienced by all customers on the network, for that year (ie, total annual number of interruptions/total number of customers).
- *CAIDI* is the Customer Average Interruption Duration Index. This is the average duration (minutes) of interruption for each customer affected by an interruption, for that a year (ie, total annual duration of outages/number of customers affected by interruptions).

*Extended duration interruptions* are the number of unplanned interruptions on the network that are longer than 3 hours.

## Asset Information

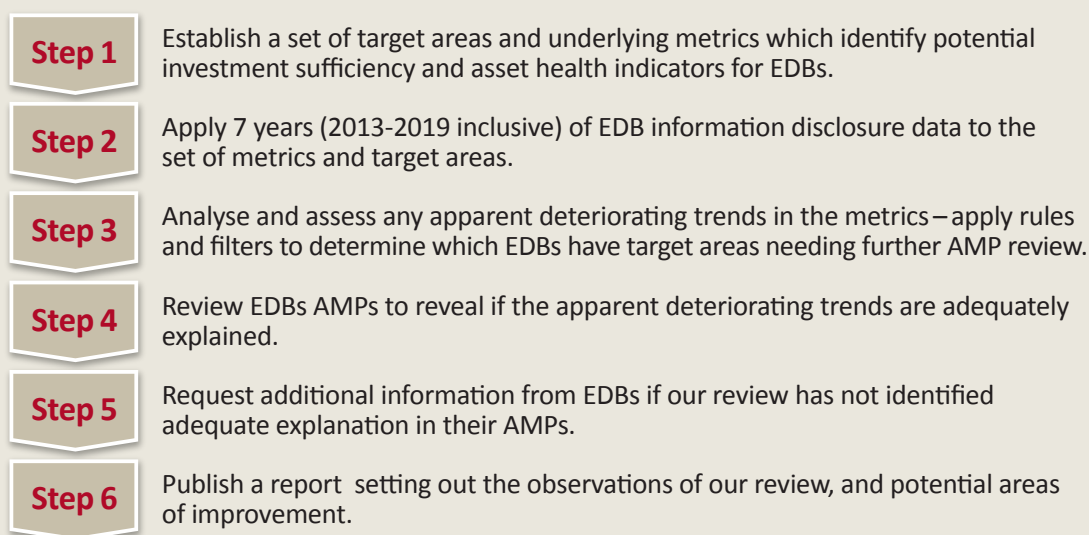
For the target area of ‘asset information’, our analysis looked at the range of asset data available from ID, such as: asset age, condition, and forecast replacement rate as reported by the EDB.

For all the reliability related target areas we also looked at related expenditure information disclosed under ID.

## The process steps we followed in this review

Below is a summary of the process steps we undertook in completing this review of EDBs asset management practices and reporting.

Figure 4: Process summary



### Steps 1-3: Initial Analysis

Table 2: Initial analysis	No. of Areas	No. of EDBs
<b>Total areas reviewed (5 target areas @ 29 EDBs)</b>	<b>145</b>	<b>29</b>
Total identified for further review	50	22

We reviewed our target areas for apparent deteriorating trends analysing seven years of Information Disclosure data (2013-2019 inclusive). Our analysis applied metrics and filters to focus our review on items which needed further review and explanation.

Our review identified 50 out of a possible 145 areas (5 target areas x 29 EDBs) required further review, relating to 22 of the 29 EDBs.<sup>23</sup>

23. Aurora was excluded from further review and receiving requests for additional information as they were already working towards a CPP application.

#### Step 4: Further Review

Table 3: Further review	No. of Areas	No. of EDBs
<b>Total identified for further review</b>	<b>50</b>	<b>22</b>
Excluded (due to CPP application)	2	1
Resolved by AMP review (sufficient info found)	9	8
Limited information found in AMP review	10	9

Where we had found apparent deteriorating trends (in interruption related target areas), or potentially inconsistent asset information (asset age, condition and replacement), we subsequently reviewed the EDB's Asset Management Plans to identify if sufficient explanation or supporting information was provided.

The EDBs' 2019 AMPs were reviewed, or if the EDB had supplied a 2019 AMP 'update', then both the 2018 AMP (full version) and the 2019 AMP 'update' were reviewed.

This further review of AMPs identified that of the 50 areas for review, for 29 of those areas, relating to 17 EDBs, the relevant AMP lacked sufficient explanation or supporting information.

#### Step 5: Additional Information

Where we were unable to find sufficient explanation by an EDB, we requested additional information from that EDB on a voluntary basis.

By requesting further information from EDBs, we had not formed an opinion or come to the view that there was a concern about an EDB's asset management practices in a particular area or more broadly.

A breakdown of each target area reviewed is provided below in Figure 5, summarising the number of EDBs which were identified for each target area, and ultimately the corresponding number of requests for additional information sent. The issues and findings are discussed in the relevant target area section of this report.

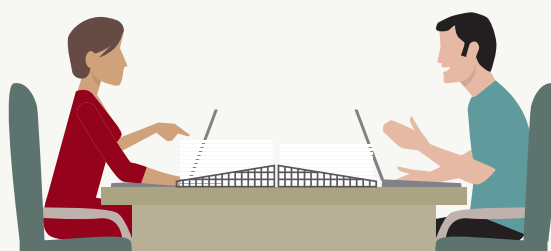


Figure 5: Summary of target areas and requests for additional information

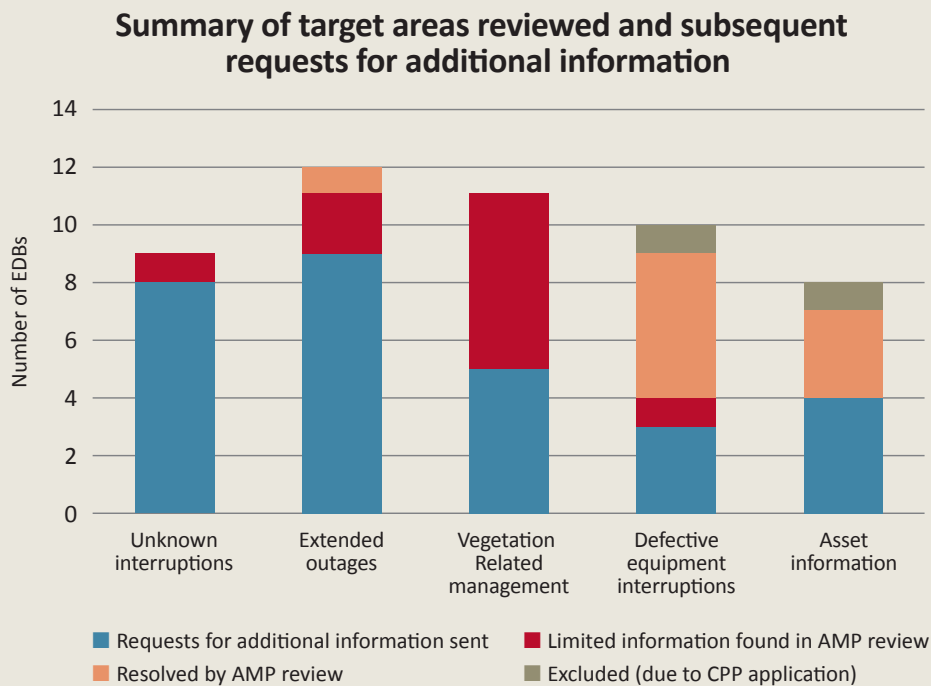


Figure 5 above shows that the level of additional information requests required varied between target areas – ie, some target areas had more information available in AMPs. For example:

- Defective Equipment had 10 EDBs identified for further review, but only 3 EDBs were ultimately sent requests; whereas
- Unknown Interruptions had 9 EDBs identified for further review, with 8 EDBs sent requests.

## Chapter 3 – Observations relating to unknown interruptions

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### Purpose of this chapter

Unknown interruptions (ie, where the cause of interruption is unknown) is one of the target areas of our review. In this chapter we:

- introduce this target area and related industry trends;
- set out the observations we made from our review of the AMPs and additional information we received from EDBs that relate to this target area; and
- identify potential improvements for how EDBs record and report unknown interruptions in their AMP disclosures, and potential improvements in the relevant underlying asset management practices for this target area. We have also identified an area of our existing ID requirements where further guidance for EDBs on how to approach the relevant disclosure may be needed or may be an area we should consider as part of our next review of the ID requirements.

### Introduction to unknown interruptions

Unknown interruptions are unplanned interruptions where the cause has not been identified. In practice, this means that the EDB has not been able to identify the cause of the interruption as one of the eight other categories of unplanned interruptions provided for in ID.<sup>24</sup> Therefore, unknown interruptions are a residual category of interruptions – interruptions are classified into one of the identified areas except where the cause cannot be identified.

Categorising interruptions as ‘unknown’ is sometimes necessary when no distinct reason for the interruption can be found. However, persistently high or increasing unknown cause SAIDI and SAIFI, may indicate that the EDB should address its data recording and/or fault-finding processes and procedures, in order that the cause of unknown interruptions can be determined, and appropriately targeted asset repairs and/or mitigations implemented.

The following metrics (based on 2013-19 ID data) were analysed to identify any apparent deteriorating trends in unknown interruptions, which may indicate a deterioration or change in an EDB’s practices in relation to recording and managing unknown interruptions.

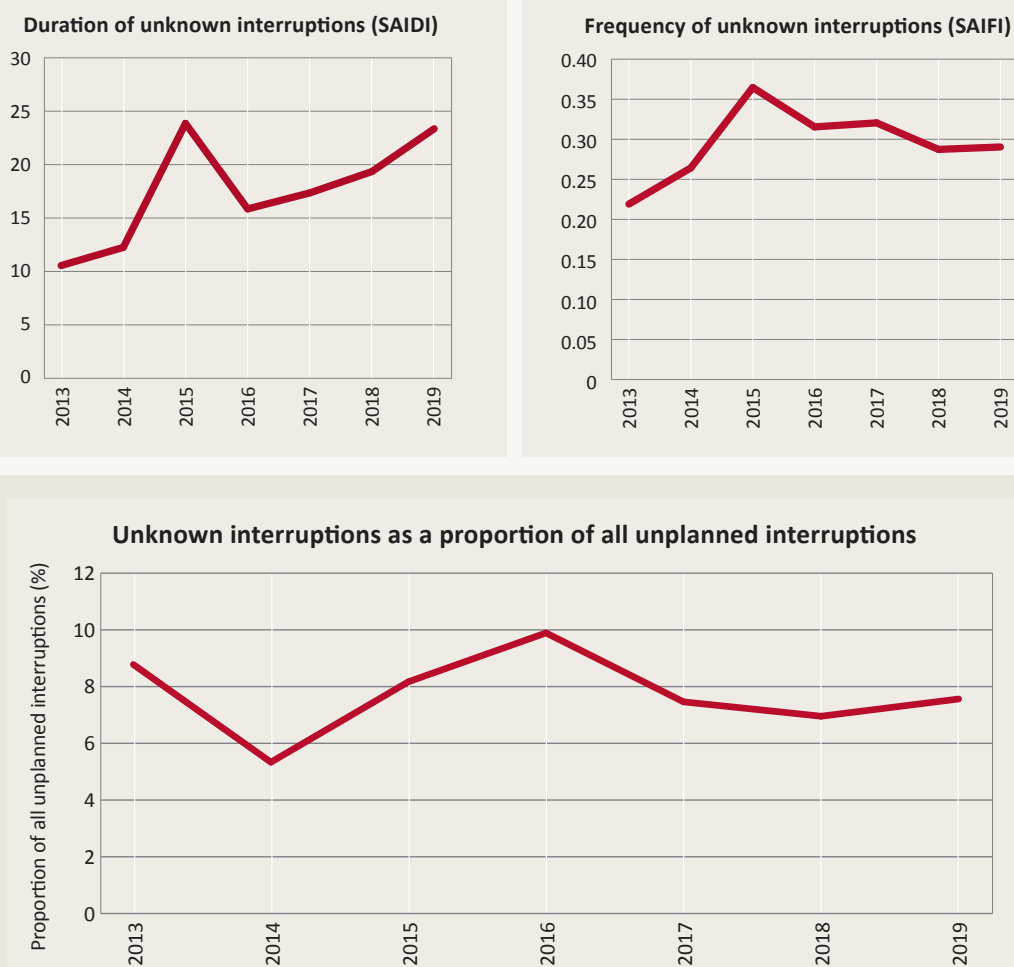
- Unknown related SAIDI;
- Unknown related SAIFI; and
- Unknown CAIDI.

---

24. Clause unknown 10(ii): Class C Interruptions and Duration by Cause.

At an industry level, total unknown interruption SAIDI and SAIFI metrics have increased over the period reviewed but have remained relatively stable as a proportion of total unplanned interruptions. This is shown in the following figures.

Figure 6: Trends in Unknown Interruptions across all EDBs



## General observations

We identified four key themes related to the unknown interruptions target area:

**Some EDBs challenged our view that there was a deteriorating trend and the extent to which the trend was deteriorating.** Several EDBs provided analysis that their trend for unknown interruptions was not deteriorating after account was made for one-off events (eg, storms) or statistical significance. Some EDBs also raised the issue that even if their apparent trend in unknown interruption SAIDI and SAIFI was deteriorating, their trend in unknown interruption SAIDI and SAIFI as a proportion of their total unplanned SAIDI and SAIFI had not deteriorated to the same extent. This implies that for some EDBs, their increase over time in unknown interruptions (SAIDI and SAIFI) is a function of their overall increase in the duration and number of interruptions, and therefore did not reflect a real decline in the EDB’s ability to detect or record the true cause of an interruption.

**Storm events typically led to the occurrence of unknown interruptions.** Many EDBs indicated that storm events typically led to the occurrence of unknown interruptions. There were two main reasons put forward for this relationship:

- Storm events can create a large number of interruptions across a network and the sheer volume and time taken to attend to, and restore the network, meant that there were more interruptions where the true cause could not be identified; and
- Storm conditions often remove the evidence of the cause of the interruption. For example, a branch from a tree which struck and damaged a conductor causing an interruption, could be blown some distance from where it struck the conductor, effectively removing the evidence.

**Unknown interruptions and fault categorisation.** Several EDBs attributed their deteriorating trends in unknown interruptions to a tightening of their interruption categorisation processes in recent years. These EDBs had adopted more stringent practices to categorising interruptions so that they no longer assigned the cause of an interruption to a category cause other than unknown unless the cause could be assigned to that category with a great deal of confidence. This was particularly relevant for the interruption category cause “Adverse weather”, which appeared to have been overly used in the past by some EDBs to assign interruptions during storm events. As unknown interruptions is a residual fault category, a reduction in the proportion of interruptions assigned to other categories meant that the number of interruptions assigned to unknown interruptions had increased.

**Transient faults and new practices.** Some EDBs attributed deteriorating trends in unknown interruptions on their network to recent changes (last five years) in their practices associated with transient interruptions (also called transient faults). There were two relevant practice changes:

- New industry practices introduced in recent years meant that when a network’s protection system automatically activated to de-energise a portion of the network, it would not be re-energised in urban areas until an inspection was undertaken. Frequently, when an inspection was undertaken there was no evidence of the cause of the interruption as the “fault had cleared”. This practice change had therefore resulted in an increase in unknown interruption SAIDI.
- Increased automation of line re-livening. When a “transient fault” occurred in rural areas, a line could be re-energised automatically after a period of time. In this situation the cause of the interruption was often not found. This practice had led to increase in unknown interruptions, especially in unknown interruption SAIFI.

**EDBs were generally acting to reduce the number of interruptions classified as unknown.**

EDBs detailed several initiatives they were taking, or planning to take, to better identify the true cause of an interruption and classify it correctly.



*Figure 7: Example – Highlighting EDB practices to better identify the true cause of a fault and classify it correctly*

EDBs detailed several practices they were taking or planning to adopt to better identify the true cause of an interruption and classify it correctly. These included:

- Using mobile ‘Apps’ in the field which digitise the recording processes, making recording data for interruptions easier, less subjective and more uniform across the EDB;
- Greater use of line patrols (including using drones) to inspect a line after an interruption, to attempt to identify the cause of the interruption;
- Greater training, guidance and questioning of staff to improve their ability (and accountability) to identify the true cause of interruptions and classify them correctly;
- The use of more sophisticated root cause analysis programmes; and
- Using centralised data (eg waveform) analysis to assist in finding the cause of an interruption efficiently and reduce the time taken to restore the interruption.



*Source: Items from various EDB responses to requests for additional information.*

As well as reducing the number of interruptions classified as unknown, EDBs also indicated that they were taking measures to reduce the overall number of unplanned interruptions, which were expected to flow-through to lowering the number of unknown interruptions.

Some EDBs noted that practices taken to address unknown interruptions take time to show effect, because the true cause of an unknown interruption cannot often be targeted with confidence as it is inherently unknown.

## Potential areas for improvement

We have identified potential areas for improvements in how EDBs record and report unknown interruptions in their AMP disclosures. We have also identified some potential improvements in the relevant underlying asset management practices, and an area of our existing ID requirements where further guidance for EDBs on how to approach the relevant disclosure may be needed or may be an area we should consider as part of our next review of the ID requirements.

### Improvements to recording and classifying interruptions

Some EDBs have made changes over time to their recording of unplanned interruptions and their associated categorisation processes. This in turn has flowed through and affected unknown interruption SAIDI and SAIFI because unknown interruptions are a residual category of unplanned interruptions. Invariably these changes were made by an EDB to tighten up their categorisation processes by only categorising an interruption into one of the other eight unplanned interruption categories when the cause was very clear.

Whilst this is a valid change to the process of fault categorisation, it is important that EDBs make such changes very clear and obvious in their disclosures so that interested parties can understand the change, especially the reasons for it and the effect it is having on reported interruptions, including any impacts on trends. This includes EDBs being transparent in their disclosures where changes to definitions may have a bearing on how historical information may be interpreted and used for comparative purposes.

## Consistency of EDBs approach to categorising interruptions

As several EDBs have attributed, in part, the apparent trend in their unknown interruptions to a change in their categorisation processes (especially in relation to adverse weather) it raises the issue of whether there is consistency in categorising interruptions across EDBs. In particular, whether there is consistency across EDBs in the degree of certainty that is required before an interruption is classified into one of the other eight (especially adverse weather) unplanned interruption cause categories.

Ideally, there should be a standard approach across EDBs to categorising interruptions, particularly in relation to the degree of certainty required before an interruption is classified into an interruption cause category. The unknown interruption category should be used where the cause cannot be identified after a review of the interruption has been undertaken.

We may consider this matter when we review the information disclosure requirements or may separately provide guidance to EDBs.

## More information on storm conditions would assist with categorising interruptions

The apparent uncertainty and potential inconsistency as to how some EDBs are categorising interruptions into the adverse weather category heightens the need for EDBs to record and report more information on storm event conditions – especially wind speeds. Such information would assist EDBs understand the true cause of an interruption. For example, the occurrence in a storm of wind speeds above the network’s design limitations means that the EDB can have more confidence to attribute interruptions at the time and location of the storm event to the adverse weather category, not the unknown category.

## Re-categorisation of interruptions is sound practice if the true cause is discovered

EDBs approaches vary to re-categorising interruptions initially categorised as unknown interruptions, when the true cause was later found. Some EDBs re-categorise, but some do not.

Whilst an investigation into the cause of an interruption may take some time to conclude, there should be no time limit on when the data can be re-categorised. Accurate categorisation of interruptions provides EDBs with the correct source data, which they can use to adjust and hone their asset management practices to improve the efficiency and safety of their operations.

Figure 8 contains extracts from Top Energy’s response to our information request on Unknown Interruptions.

### *Figure 8: Example – Top Energy’s approach to reclassification of interruptions*

“In cases where normal restoration procedures are employed, and the line is restored without a definitive fault site/event being found, Top Energy initiates follow up patrols to attempt to identify the actual cause. The follow-up patrol can often be performed in more favourable conditions such as daylight when visibility is improved, or after extreme weather has past, and where access to heavily forested areas or rough off-road terrain is safer.

During these patrols evidence of the cause, such as burnt vegetation, dead birds or other animals (commonly possums) can be more easily found. When a definite cause is found the original outage is reclassified to the appropriate cause classification.”

*Source: Extract from Top Energy’s response to our requests for additional information.*



# Chapter 4 – Observations relating to extended duration interruptions

## Purpose of this chapter

Extended duration interruptions is one of the target areas of our review. In this chapter we:

- introduce this target area and related industry trends;
- set out the observations we made from our review of the AMPs and additional information we received from EDBs that relate to this target area; and
- identify potential improvements for how EDBs record and report extended duration interruptions in their AMP disclosures, and potential improvements in the relevant underlying asset management practices for this target area.

## Introduction to extended duration interruptions

Extended duration interruptions are unplanned interruptions that are longer than three hours. Extended power cuts of this duration generally cause more harm to consumers than shorter interruptions because consumers' business or home activities are affected for longer.

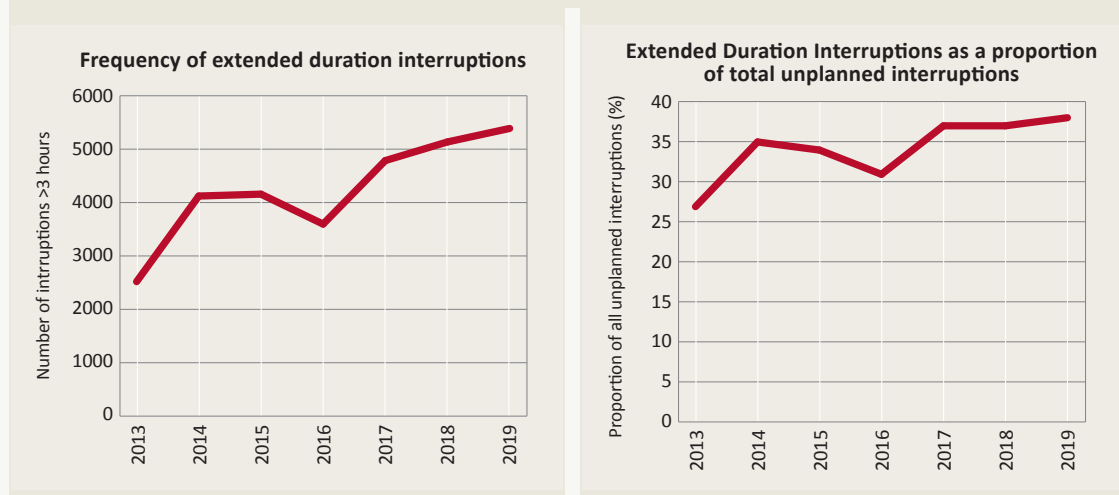
Deteriorating trends in extended duration interruptions may indicate a deterioration in restoration practices, declining network asset health, or a reduction in available post-contingent network capacity.

The following metrics (based on 2013-19 ID data) were analysed to identify any apparent deteriorating trends in extended duration interruptions which may justify further review:

- Interruption duration; and
- Emergency expenditure.

There has been an increasing trend in the number of extended duration interruptions across all EDBs, and the trend in the number of extended interruptions as a proportion of the total number of interruptions has also increased over the 2013-19 period, as can be seen in Figure 9 below.

Figure 9: Industry Trend in Extended Duration Interruptions



## General observations

We identified four key themes related to the extended duration interruptions target area:

→ **The extent to which the trend in extended duration interruptions is actually deteriorating.**

Several EDBs provided analysis that the apparent trend was not deteriorating after account was made for one off events (eg, storms) and/or statistical significance.

Some EDBs provided information which showed that the trend in extended duration interruptions as a proportion of the total number of unplanned interruptions had not deteriorated as much as the absolute trend. This suggested that a contributing factor to the increase in the number of extended duration interruptions for some EDBs was an increase in the number of unplanned interruptions.

→ **Major interruption categories causing extended duration interruptions.** EDBs typically showed that the major cause categories of extended duration interruptions were:

- Adverse weather-related interruptions;
- Vegetation-related interruptions (mainly related to storm events);
- Defective equipment related interruptions; and
- Third party interference – especially motor vehicle incidents.

As with other target areas, storm events were identified by EDBs as a major underlying cause of extended duration interruptions. There were three main reasons identified for this:

- The damage to network assets could be more severe in storm events and required a longer period of time to repair;
- The weather conditions in the storm event delayed the identification of the interruption and especially the repair of the network; and
- Storm events could create a large number of interruptions across the network, and in such situations not all of the repairs to restore power could be completed within three hours.

→ **Effect of new health and safety requirements.** Many EDBs attributed, in part, the deteriorating trend in extended duration interruptions to changes to their work practices to:

- improve safety outcomes including meeting the requirements under health and safety regulations; and
- align with industry standards for restoration following an interruption.

The changes made to practices in this regard meant that interruptions were generally taking longer to identify, and the associated network restoration was taking longer.

Specific examples provided by some EDBs of changes to their practices which have extended the time taken to repair a network following an interruption included:

- having two staff attend the site of an interruption rather than one – has increased outage durations especially in multi-interruption event situations;
- having staff attend to some interruptions only when weather permits a safe working environment for staff;
- restricting ladder use in some situations with greater use of bucket trucks. In multi-interruption event situations this could increase outage durations further;
- ceasing or restricting live-line work; and
- adopting a more cautious and extended approach to re-livening once an interruption had been repaired, especially on 33 kV lines. eg, For urban lines some EDBs have changed their practices so that urban lines are not re-energised until after an inspection of the affected line.

- **Interventions to reduce the number of extended duration interruptions.** EDBs outlined a large number of strategies and interventions that were being taken or planned to be taken, which were expected to reduce the number and duration of extended duration interruptions. These are summarised in Figure 10.

*Figure 10: Example – Strategies and interventions by EDBs to reduce extended duration interruptions*

EDBs indicated a number of interventions to reduce the occurrence and extent of extended duration interruptions. These included:

- Improved network automation
- Installation of network sectionalisers to minimise effect of outages with network switching
- Locating spares at strategic locations in the network
- Use of mobile generation, mobile substations and regulators and construction of mobile generation connection points at strategic network locations
- Implementation of improved “fault management” processes
- Improved control room procedures including structure, processes and hazardous weather dispatch
- Improved network design standards that enhance network resilience
- Increased spending on vegetation management
- Improved data collection tools to facilitate better collection of network condition data and identifying opportunities for efficiencies



*Source: Information sourced from EDB responses to requests for additional information.*

## Potential areas for improvement

We have identified potential areas for improvements in how EDBs record and report extended duration interruptions in their AMP disclosures. We have also identified some potential improvements in the relevant underlying asset management practices.

### More granular breakdown of extended duration interruptions

Recording and reporting on the causes of extended duration interruptions, especially when there appears to be a deteriorating trend in this metrics, provides granular information that should assist the EDB develop appropriate interventions. We would encourage other EDBs to record the causes of extended duration interruptions and to consider reporting them in their AMPs, especially when the trend in this metrics appears to be deteriorating.

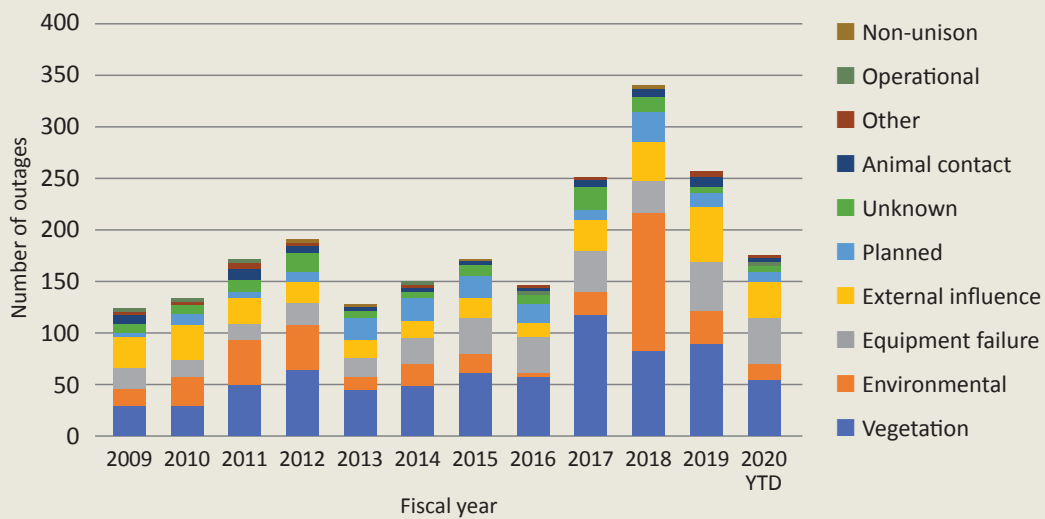
For example, Unison provided a breakdown of the number of unplanned outages into causes contained in Figure 11.

Figure 11: Example – Unison’s breakdown of extended duration interruptions

Unison’s fault reporting includes a detailed breakdown of all the fault causes as illustrated below.



### Number of unplanned outages > 3 hours duration by cause



Source: Information sourced from Unison’s response to our requests for additional information.

### More granular recording and reporting of interruptions due to third party interference and potential for industry wide response

It was apparent that interruptions due to third party interference were one of the major causes of extended duration interruptions. Moreover, these appear to be increasing across many networks. The major contributor to the increase in third party interference was an increasing number of vehicles impacting poles, which often leads to extended duration interruptions due to the time taken to restore power in such incidences.

A detailed breakdown of third-party interference was not commonly found in EDBs' AMPs. EDBs should consider recording this information and providing it in their AMPs as it would likely provide important insights into potential mitigation strategies. For example, the strategies for motor vehicle impact are likely to differ from the strategies for other types of third party interference causes – including those caused by other forms of vehicles.

Some EDBs referred to initiatives underway to reduce the incidence of vehicles impacting poles, however, these appeared to be focussed on local areas only. Subject to a broader review of the cause and associated community impact, it may be appropriate to consider development of a wider community strategy and/or whole of industry approach as a response to the rise in interruptions caused by vehicle impacts.

### **Potential for more EDB engagement with customers regarding trade-offs between reliability and prices**

As mentioned at the outset of this section extended power cuts, especially unplanned, generally cause more harm and inconvenience to consumers than shorter power cuts. Therefore, there should be strong incentives for network consumers to engage on possible interventions to reduce the number and duration of extended duration interruptions including engaging on the costs and allocation of costs of interventions. This is an area where there appears to be scope for some EDBs to take further action within their customer engagement related to service levels.



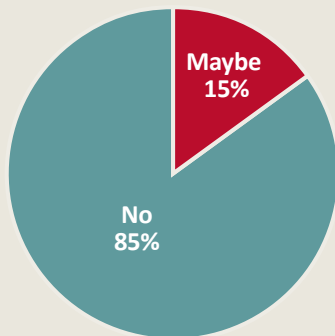
Figure 12: Example – Wellington Electricity’s customer engagement on service levels

In Wellington Electricity’s (WELL) 2018 AMP, they outline their customer engagement and results for the trade-off between topic of price and quality. While this does not specifically relate to extended duration outages, it provides an example of customer engagement around valuing service levels.

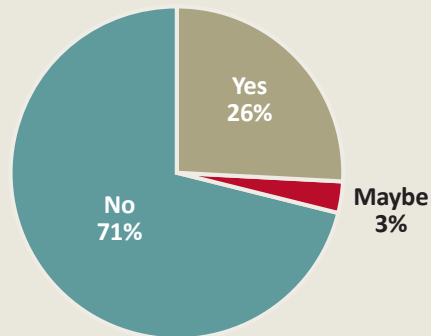


“It is important that WELL balances services that customers require, and what value they place on these, now and into the future. WELL has used the insights received from customer engagements to test the service levels provided and to inform investment plans for the planning period. In addition to good reliability and appropriate prices, customers increasingly expect good, timely information on their service and its status. Most customers accept occasional power cuts, and the ability to keep them informed when these events occur is most important. Ensuring good customer service and reliable, effective information flow is therefore a priority. To continue providing effective information to customers, WELL sets and tracks a set of performance targets for the contact centre. WELL conducts regular surveys with those who have recently had an outage to understand whether the price-quality trade-off they receive is appropriately balanced. Customers who have recently had an outage are more engaged on the issue and are better positioned to provide a considered response to queries. The charts below set out the most recent results (November 2017) for two core questions that focussed on the reliability of WELL’s service and the cost to customers.

Would you be prepared to pay a bit more for your power if it meant fewer power cuts?

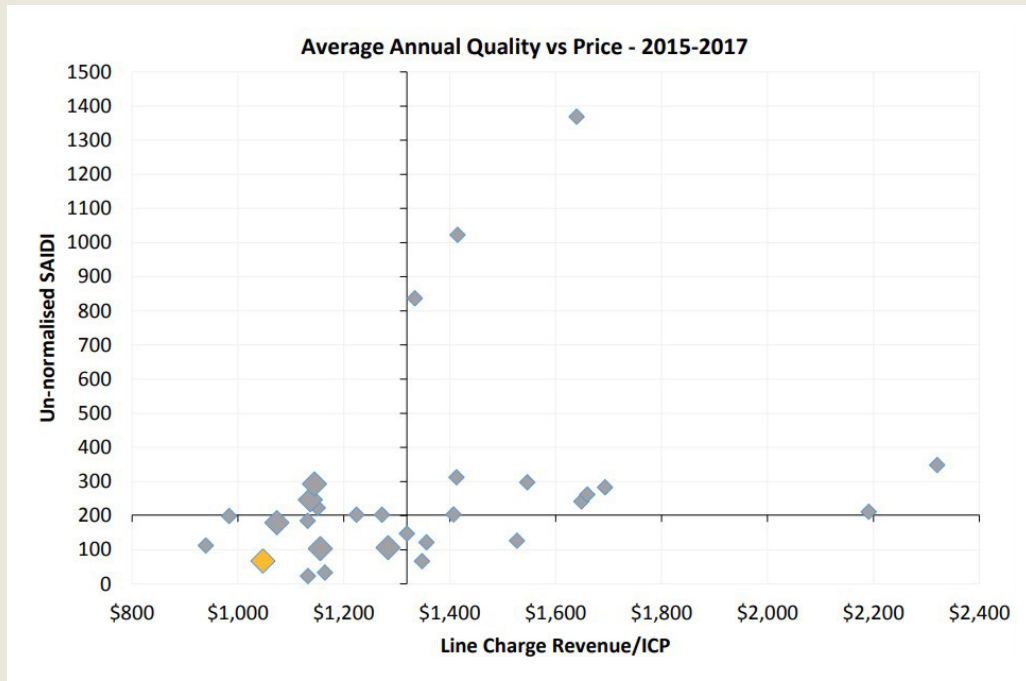


Would you be prepared to have slightly more power cuts if it meant your electricity bill was a bit lower?





These results suggest that customers are broadly satisfied with their current level of reliability and the price of delivering that service. This view is supported by WELL's position (yellow diamond) in the low SAIDI / low price quadrant of the benchmarking analysis in Figure 5-4.



This surveying and stakeholder engagement will continue and be expanded in 2018. Further customer segmentation of the surveys is also underway to ensure the price-quality balance is appropriate for individual customer groups.”

*Source: Information sourced from Wellington Electricity's AMP 2018, section 5.3 Customer Experience Service Levels.*

## Quantification of improvements from smart metering, automation and technology

We recognise that precise quantification of reliability improvements is complex and difficult due to the large number of variables involved, including the time taken for reliability benefits to be realised. Nonetheless, data can be used to model expected outcomes and reliability improvements be forecast based on specific interventions (such as greater use of automation technologies).



Examples of how improvements from use of smart technologies are being analysed and quantified were provided by Counties Power and Unison, as shown below in Figure 13 and Figure 14 respectively.

*Figure 13: Example – Counties Power’s improvement in dispatch times through smart metering information*

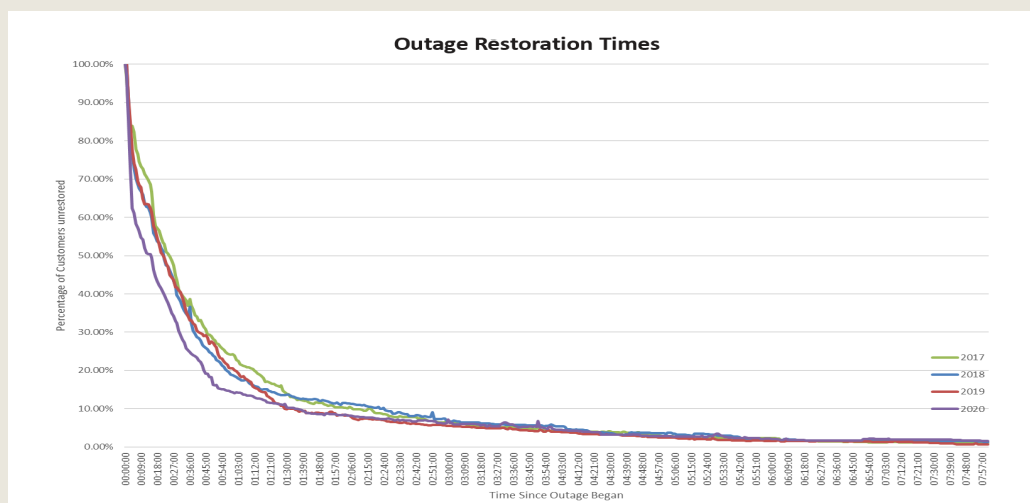
“With access to our incoming smart meter data, we are now able to dispatch for large scale events in advance of the control room requesting any action. Prior to smart meters, ticket creation and allocation would have occurred after resources had been identified following a SCADA notified outage. Over the last two-year period, we have noticed a 3% improvement in dispatching within 15 minutes of a customer’s loss of power.”



*Source: Extract from Counties Power’s response to our request(s) for additional information.*

*Figure 14: Example – Unison’s improvements in restoration time for unplanned outages*

“The following graph illustrates how Unison has been proactive and implemented a new Outage Management standard and practices. Coupled with deployment of smart technologies, this shows we have clearly improved in our response to unplanned outages. The data for 2020 YTD illustrates clearly prior to 15-minutes we conduct substantial remote restoration, resulting from the strong focus of deploying automation through the Unison network. The curve also shows the manual restoration that occurs approx. at 30-minutes when first response field resource arrives at the faulted area. Focusing on the 3-hour interval, it is apparent that most customers have been restored and on average only 7% remain without supply. The restoration of customers from this point is attributed to repair time before remaining customers can have their supply restored.”



*Source: Information sourced from Unison’s response to our request(s) for additional information*

# Chapter 5 – Observations related to vegetation-related interruptions

## Purpose of this chapter

Vegetation-related interruptions is one of the target areas of our review. In this chapter we:

- introduce this target area and related industry trends;
- set out the observations we made from our review of the AMPs and additional information we received from EDBs that relate to this target area; and
- identify potential improvements for how EDBs record and report vegetation-related interruptions in their AMP disclosures, and potential improvements in the relevant underlying asset management practices for this target area.

## Introduction to vegetation-related interruptions

Vegetation management refers to an EDB's practices of controlling vegetation (primarily trees) in the proximity of distribution lines and other assets, to reduce the potential for service interruptions caused by vegetation coming into contact with network assets (primarily overhead lines).

To a large extent the occurrence and severity of vegetation-related interruptions on a network can be influenced by an EDB's asset management practices – more so than for some other categories of interruptions, eg, lightning and third-party damage. Deteriorating trends in vegetation-related interruptions can indicate that an EDB's vegetation management practices including expenditure levels, may need to be reviewed and changed to be more effective.

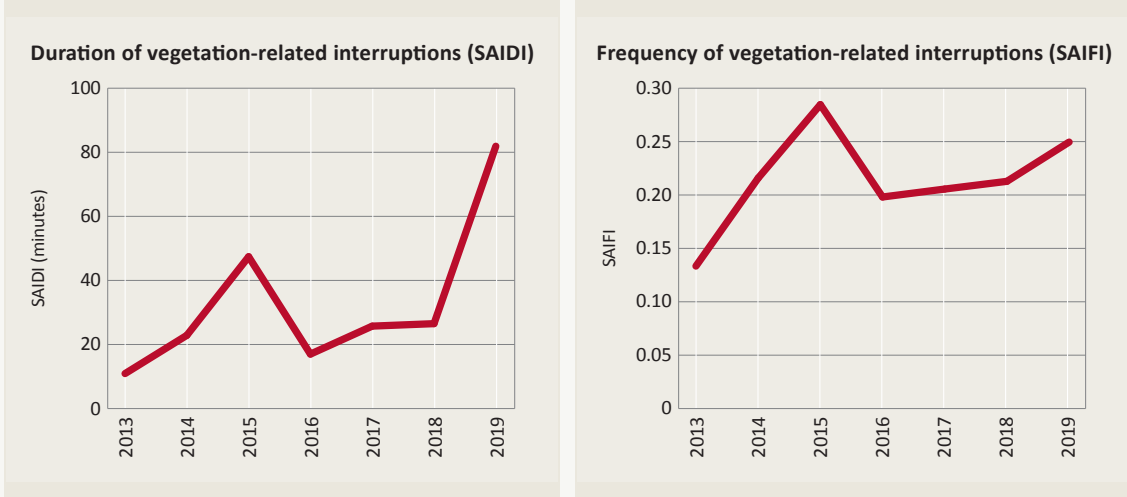
In the last five years there have been several quality standard contraventions by EDB's where vegetation-related interruptions have been a significant causal factor—including Vector, Aurora, and Alpine.<sup>25</sup>



25. Further information on our findings on these contraventions is provided in our online [case register](#).

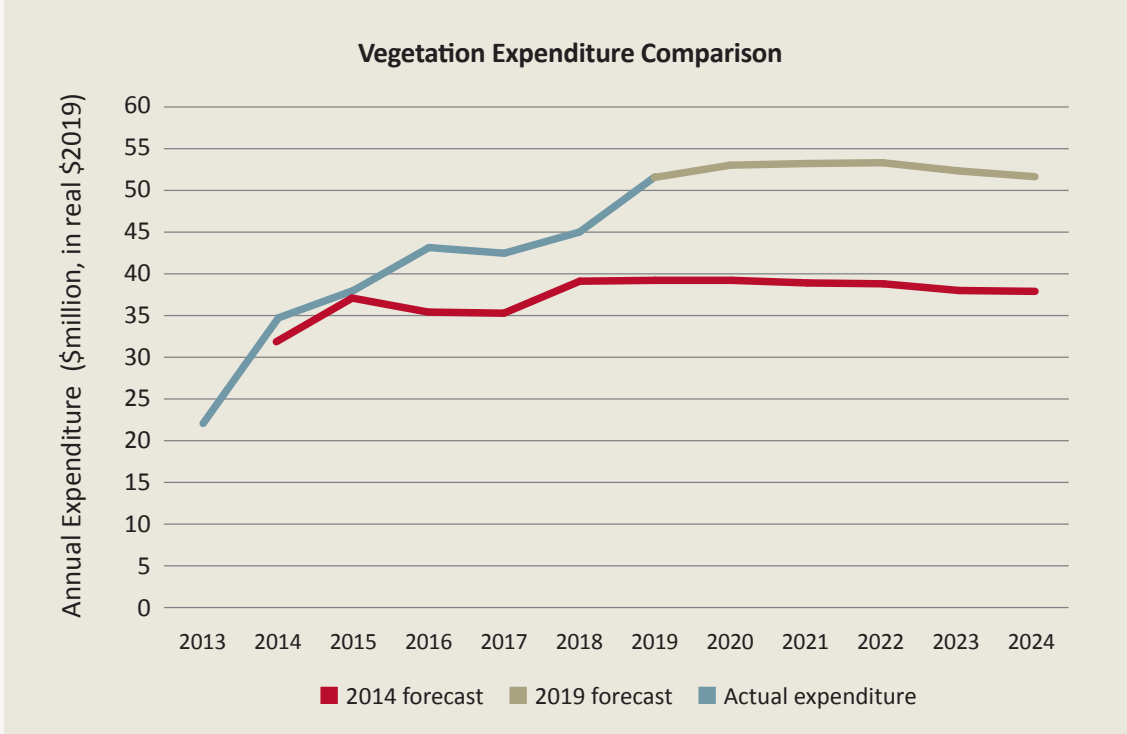
Vegetation-related interruptions are generally responsible for a considerable portion of an EDB’s unplanned outages. From 2013-2019 (inclusive) vegetation outages made up 18.4% and 13.1% of all unplanned SAIDI and SAIFI respectively. It is also important to note that vegetation-related SAIDI and SAIFI has increased on average across the industry during this period. These trends are illustrated in Figure 15 below.

Figure 15: Trend in vegetation-related interruptions (SAIDI and SAIFI)



Similarly, EDBs’ spend on vegetation management has increased markedly over the last seven years. Significantly, the actual spend over the period being reviewed has far exceeded the levels that had been forecasted in 2014. This increase reflects the changes in EDBs’ approaches to vegetation since 2014, with a comparison provided in Figure 16 below.

Figure 16: Increasing expenditure on vegetation management



The following metrics (based on ID data 2013-19 (inclusive)) were analysed to identify any potential issues with EDBs' vegetation management practices that may justify further review:

- Vegetation-related SAIDI;
- Vegetation-related SAIFI; and
- Vegetation management related expenditure.

## General observations

We identified four key themes relating to the vegetation-related interruptions target area:

- **Formal vegetation management plans are the norm.** EDBs report that they had formal vegetation management plans in place, often including stakeholder engagement plans, and had clear approaches for delivering their plans. In some cases, EDBs provided more detailed information on their vegetation management practices, including the processes they adopted for executing their plans.
- **EDBs are increasing their focus on vegetation management.** Most EDBs have increased their focus on vegetation management in recent years, revising their vegetation management plans, and some adopting new approaches to vegetation management within their network. These developments mainly related to process improvements, such as reducing the time taken to notify landowners of trees on their properties that were hazardous to the network, and reducing the time taken to follow-up with remedial action. There were also examples showing EDBs willingness to adopt new technologies to assist with vegetation management. These technologies included mobile apps for reporting and categorising vegetation hazards, use of drones for identifying vegetation hazards, and aerial surveys such as LiDAR (Light Detection And Ranging). Another noticeable feature in some EDBs was the increased level of expenditure on vegetation management seen in the previous one to two years, as well as an increasing forecast in expenditure. This trend is mirrored amongst the wider industry, where vegetation management expenditure has increased by 235% over the period 2013-2019.
- **Storms overwhelmingly responsible for vegetation-related interruptions.** Vegetation-related interruptions were, almost ubiquitously, related to severe weather events, especially storm events with high wind speeds. Some EDBs showed that if storm events were removed the apparent deteriorating trend in vegetation-related interruptions reduced or did not exist.
- **“Out-of-zone” trees cause many interruptions.** A high number of EDBs noted that a significant proportion, in some cases most, of the vegetation-related damage to the networks arose from vegetation “strikes” emanating from trees located outside of the area that EDBs are able to enforce under the *Electricity (Hazardous from Trees) Regulations* – termed “out-of-zone”.

## Potential areas for improvement

We have identified potential areas for improvements in how EDBs record and report vegetation management practices in their AMP disclosures. We have also identified some potential improvements in the underlying vegetation management practices themselves.

### Increasing the granularity for capturing and reporting of vegetation-related interruptions

From reading EDBs' vegetation related information, it is often unclear if the interruption causes are captured differently for vegetation-related interruptions where the vegetation was in-zone, out-of-zone, wind-borne debris, or related to an adverse weather event. Classifying these separately should provide valuable insight for the review and development of appropriate strategies by EDBs to improve their reliability performance associated with vegetation-related interruptions.

Similarly, this could also assist with discussions with customers and stakeholders as to the cause of vegetation-related interruptions, trends in performance, and the improvement initiatives being deployed to address them.

For example, separately accounting for interruptions caused by:

- wind-borne debris – which may indicate that changes to operating procedures, changes to protection schemes, and/or installation of covered conductor may be effective strategies; whereas
- “out of zone” trees or large debris – resulting from hazardous trees or major branches falling into/onto lines, suggests that proactive engagement with tree owners to achieve targeted tree trimming or removals may be beneficial.

### Providing more information on storm conditions – especially wind speeds

As we have said elsewhere in this report, EDBs attribute storm events to be responsible for many of the apparent deteriorating trends observed. This was especially the case for vegetation-related interruptions. However, information about the conditions in the storm event(s), especially wind speeds and wind directions were generally not reported by EDBs.

Recording and providing this information would be useful for EDBs and their stakeholders as it could provide evidence for future investment and operating decisions to reduce vegetation-related interruptions.

## Critical review and causal analysis of vegetation-related interruptions

While some of the AMPs showed evidence of the emergence of risk-based decision making for prioritising vegetation management activities, we did not consistently see evidence of a critical review and causal analysis of vegetation-related interruptions on networks and the associated impact on reliability indices, especially in quantitative terms. The approaches currently being undertaken by EDBs could be extended to include:

- modelling and analysis of vegetation clearance zones;
- assignment of risk ratings to vegetation clearance zones;
- vegetation growth modelling and strategies to target specific causal factors—the associated strategies may be preventative or corrective;
- quantifying reliability benefits resulting from investments and enhancements in operating practices in vegetation management; and
- considering cost-benefit analysis as part of the prioritisation of a vegetation works programmes.

*Figure 17: Example – Wellington Electricity’s (WELL) risk-based approach for vegetation management*

Wellington Electricity details in their AMP how they have integrated a risk-based approach to vegetation management, as outlined below:

“The number of vegetation faults experienced in 2016/17 resulted in a further review of vegetation management processes and adoption of a more risk-based approach being undertaken by WELL and its vegetation management contractor, Treescape.

WELL’s vegetation management up to 2017 had been based on a five-yearly inspection cycle across the network. WELL increased its vegetation management budget from May 2017 so that Treescape could return to the most affected feeders for an out-of-cycle round of vegetation survey and cutting, while continuing with the five-yearly surveys that had been scheduled for the year...”

“...In conjunction with this approach, WELL and Treescape developed a risk-based approach to managing vegetation outside the regulated zones, which was implemented in 2017. All parts of the network are now assigned a potential reliability consequence, which establishes the level of detail required for tree assessments in that area. Each tree is then assessed for its likelihood of failure, with the level of detail required for this assessment being determined by the potential consequence. The likelihood and consequence are combined to determine the reliability risk the tree poses, and the cost-benefit of cutting it to reduce that risk. Even though the regulations do not give WELL a right to manage vegetation outside of the regulated zones, the risk-based approach has provided WELL with a tool for engaging with tree owners about the potential impact of their trees on the reliability of the power supply.”

*Source: Information sourced from Wellington Electricity’s 2019 AMP (section 6.5.1.3 Vegetation).*



## Proactive treatment of out-of-zone hazardous vegetation

There is variation in the approach taken by EDBs to the treatment of out-of-zone hazardous vegetation. While some EDBs appeared resigned to the fact that they had limited control of out-of-zone vegetation, there were other EDBs that were proactively liaising with the owners of vegetation to address these issues outside of the Tree Regulations.

An example of a proactive approach which also involves a higher level of stakeholder engagement is shown below. There may be benefits for other EDBs to adopt a similar approach.

*Figure 18: Example – Westpower’s approach to managing hazardous trees, including those “out-of-zone”*

In Westpower’s response to our information request, they detail their approach to vegetation management of hazardous trees:

“...Westpower has recognised that given the increasing number of extreme weather events, more focus needs be placed on removing trees that pose a threat, outside of the zones specified in the Regulations.

As part of our vegetation threat identification process, any tree(s) that may cause damage to Westpower equipment are included, regardless of the ‘zone’ they occupy. A ‘Future Hazard Tree’ notice has also been adopted, in addition to the regulatory notifications already issued. This allows Westpower to inform landowners about any troublesome tree(s) on their land and opens the lines of communication to ultimately have these threat(s) removed...”

“...Furthermore, we have engaged with the Harihari community in South Westland on a pilot project to address Future Hazard Trees and have the support of the local council and local Member of Parliament when engaging with landowners to encourage them to allow future hazard trees to be removed.

A cooperative approach based upon an equitable cost sharing methodology has Westpower offering to fell future hazard trees on private land at no charge if the landowner is prepared to deal with the subsequent removal process. We have found that this is quite appealing to farmers, who are often not prepared to fell such trees in case they are held liable for any consequential damage to our line. However, they are quite happy to chop the trees up for firewood when on the ground and dispose of any remaining debris.

If this pilot project proves successful, we will look to roll it out across Westpower’s network.”

*Source: Information sourced from Westpower’s response to our request(s) for additional information.*





### ***Impact on EDBs from MBIE review of the 'Tree Regulations'***

We note that Ministry of Business Innovation & Employment (MBIE) is currently reviewing the Electricity (Hazards from Trees) Regulations 2003, and this may impact on EDBs future vegetation management programmes, systems and initiatives. Several points to note from MBIE's latest update on their website<sup>26</sup> (June 2020) are as follows:

- MBIE has commenced a review of the Tree Regulations and a stakeholder workshop was held in December 2019.
- a number of electricity industry stakeholders are interested in developing the idea of a "risk-based" approach to managing the interaction of powerlines and trees (and other vegetation).
- MBIE intends to work with industry and other stakeholders on this approach, as part of preparing a number of possible options for its proposed Discussion Document.
- MBIE will provide further updates on the Review as it progresses.

26. <https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-generation-and-markets/electricity-market/electricity-industry-regulatory-framework/electricity-hazards-from-trees-regulations-2003/>

# Chapter 6 – Observations related to defective equipment interruptions

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## Purpose of this chapter

Defective equipment interruptions is one of the target areas of our review. In this chapter we:

- introduce this target area and related industry trends;
- set out the observations we made from our review of the AMPs and additional information we received from EDBs that relate to this target area; and
- identify potential improvements for how EDBs record and report defective equipment interruptions in their AMP disclosures, and potential improvements in the relevant underlying asset management practices for this target area.

## Introduction to defective equipment interruptions

Defective equipment interruptions are unplanned interruptions caused by failures of network assets. We would generally expect EDBs to exclude equipment failures that occur due to a force beyond the design tolerances of the equipment, such as an overhead conductor breaking in extreme wind, which would be classified in line with the external force.

Deteriorating trends in defective equipment interruptions may be the result of declining asset health, indicating that an increased focus on asset management interventions and asset renewals may be required.

The following metrics (based on 2013-19 ID data) were analysed to identify potential issues with EDBs' practices in relation to defective equipment and asset renewal that may justify further review:

- Defective equipment SAIDI
- Defective equipment SAIFI
- Asset age
- Asset condition
- Asset renewal and replacement expenditure
- Depreciation

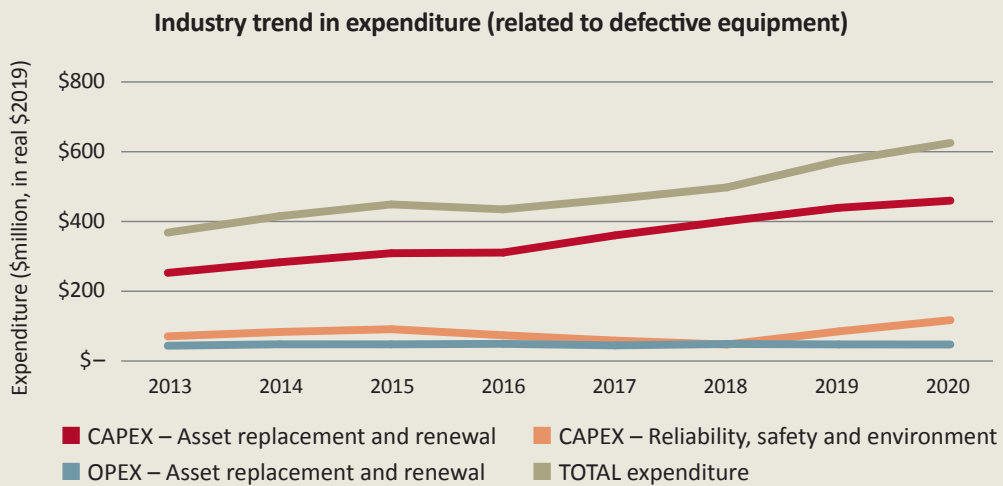
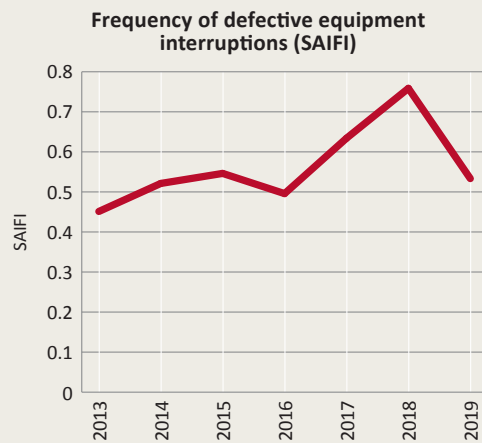
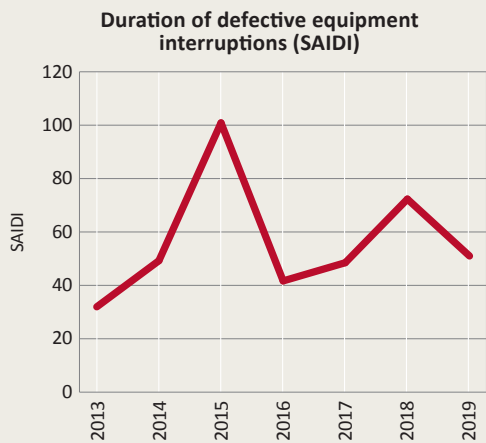
In the last five years, defective equipment failures and the insufficient replacement of deteriorating assets have been causal factors in a number of contraventions of EDB quality standards, including those by Aurora, Vector, and Alpine.<sup>27</sup>

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27. Information on all contraventions is provided in our online case register: <https://comcom.govt.nz/case-register>

From 2013-2019 (inclusive) defective equipment interruptions made up 31% and 34% of all unplanned SAIDI and SAIFI, respectively. Defective equipment SAIDI and SAIFI shows a modest upward trend, on average, across the EDB sector during this period. Over the same period as an industry expenditure related to asset replacement has increased significantly. This is shown below in Figure 19.

*Figure 19: Trends in defective equipment related interruptions, across all EDBs 2013-2019*



## General observations

We identified several themes relating to the defective equipment interruptions target area:

→ **EDBs generally explained in detail trends in defective equipment.** Most of the EDBs were able to provide detailed explanations for the apparent deteriorating trends, including detailing the assets, especially the classes of assets that were contributing to defective equipment interruptions. Two of the EDBs also provided comprehensive breakdowns of the SAIDI and SAIFI impacts by asset class, focusing on those that had predominantly contributed to the trends observed.

The main reasons given for the apparent trends in defective equipment interruptions were:

- One off events – eg, substation or major cable failure. Some EDBs went on to show that if these one-off events were removed from the analysis there was no underlying systematic trend in defective equipment interruptions; and
- Type failures of equipment—certain types of insulators, protection relays, switchgear (including ring main units) and copper conductors.

→ **EDBs identified a range of initiatives to address asset health issues and reduce deteriorating trends in defective equipment interruptions.** EDBs identified several current and proposed initiatives they were undertaking to address declines in asset health and thus arrest deteriorating trends in defective equipment interruptions. These included:

- Programmes to replace those asset types or models that have been identified as primarily responsible for increases in defective equipment interruptions – eg, certain types of insulators, protection relays, and copper conductors;
- A move away from age-based condition assessment approaches to one based on asset inspections, including inspections based on new technologies such as scanning for pole integrity, LiDAR and drone surveys for pole/insulator health; and
- Upgrades to asset management systems to improve data capture and utilisation of asset health data, with an emphasis on making it more reliable and consistent.

## Potential areas for improvement

We have identified potential areas for improvements in the recording and reporting of defective equipment interruptions in EDBs AMP disclosures. We have also identified potential improvements in the underlying asset management practices that affect defective equipment interruptions.

### Enhancing the reporting and underlying practices as they relate to defective equipment interruptions

We observed that EDBs generally have a good understanding and reporting of the factors that lead to defective equipment interruptions and the interventions to address these. In particular, there was effective reporting of emerging asset issues that were leading, or could lead, to interruptions and associated asset management strategies. These matters were typically presented in asset class plans and usually resided in the fleet management sections of EDBs AMPs. These plans invariably identify the class of asset in question, the causes and modes of failures and asset condition. The plans also have a degree of qualitative information on the impact of equipment failures on network performance and safety overtime.

We specifically identified two areas for potential improvements, as outline below.

### **(a) Opportunity for greater use of condition-based risk management**

We saw evidence of EDBs moving towards a risk-based approach in some of the EDBs' AMPs. Some of the EDBs' responses also signalled that they were intending to move to more of a condition-based risk management approach to the management and reporting of asset health, however some were not<sup>28</sup>. This approach would be used to inform maintenance and replacement programmes of work and would be especially useful for determining the prioritisation of asset renewal and replacement. We welcome this approach as it provides for a more systemised and objective approach to the management of assets.

#### *Figure 20: Example – Vector's move to more condition based asset risk management (CBARM)*

Vector outlines their approach to condition-based asset risk management in their 2019 AMP.

"...Asset health is a measure of the condition of an asset and the proximity to the end of its useful life. As the health of an asset deteriorates the likelihood that it will fail due to condition increases. Presently our process to determine the risk and associated weighting for prioritisation of works is rather ad-hoc.

To this end Vector is developing Condition Based Asset Risk Management (CBARM) models for its major asset classes to inform our replacement and refurbishment programmes of work and strategies. The key outputs from the CBARM models are evaluation of the probability of failure and the consequence of failure. This will provide a current health score as well as a future health score which is capped at 10 – the higher the score the poorer the asset health and the higher the probability of failure. Any asset with a score higher than 8 requires replacement as soon as possible.

The models will enable us to plan and forecast programmes of work to be undertaken on the assets with planning horizons of 1 to 2 year schedules and 2 to 5 year options. The CBARM models provide a bottom up risk priorities plan which allows assessment of investments on a common basis and tests decisions of deferrals as well as expediting work on a risk versus cost basis. Our CBARM models for OH 11 kV conductors, 11 kV ring main units and distribution transformers are mature and we plan to complete CBARM models for other major asset, eg, power transformers, subtransmission switchgear, poles and crossarms, 11 kV cables, and subtransmission cables – a total of 12 CBARM models will be developed. As we move forward in time our CBARM models will be extended to other smaller asset classes eg, protection relays, RTUs, PQM meters, and the like..."

*Source: Information sourced from Vector's AMP 2019.*



28. Consistent with ISO 55001, which some EDBs have been certified under.

**(b) Increasing the quantification of the impact of asset failures on reliability in terms of SAIDI and SAIFI impacts**

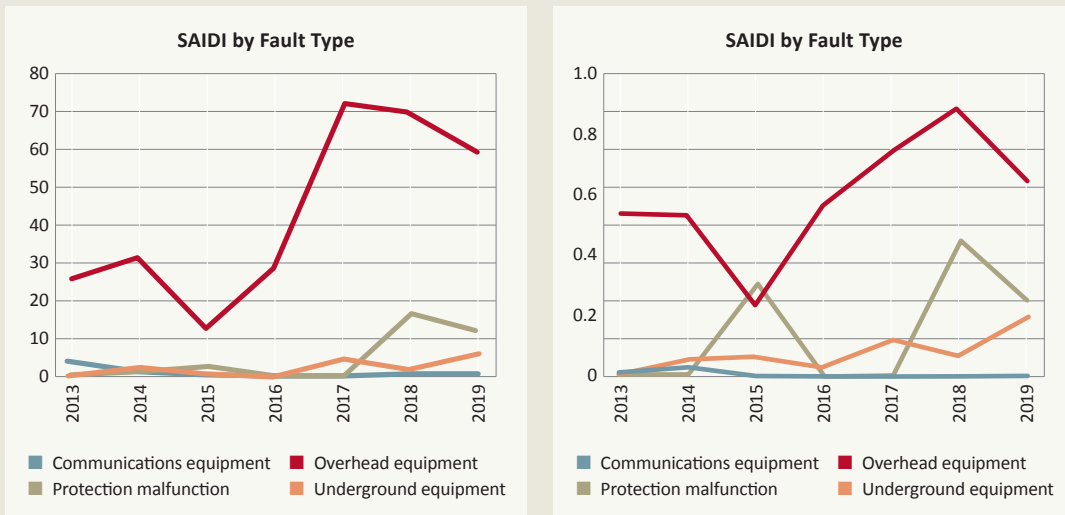
Some of the EDBs provided information on the defective equipment SAIDI and SAIFI contributions of the specific classes of assets types that have predominantly contributed to the increasing defective equipment SAIDI and SAIFI, though not all did. Counties Power’s response in this regard is highlighted in Figure 21.

*Figure 21: Example – Counties Power’s breakdown of defective equipment interruptions*

Counties Power illustrated how they record and report the equipment types associated with defective equipment interruptions.



**SHINING A LIGHT**



*Source: Information sourced from Counties Power’s response to our request(s) for additional information.*

The reporting of the SAIDI and SAIFI contributions for those classes of assets that are predominantly contributing to deteriorating trends in defective equipment interruptions provides useful information to interested parties. In our review of EDBs’ AMPs as part of this project, we noticed that while most EDBs identify the asset classes that are contributing to defective equipment interruptions, they generally do not show a breakdown of the SAIDI and SAIFI contributions.

This is an area where EDBs could consider enhanced recording and reporting, especially in cases where there is an apparent deteriorating trend. This can help EDBs prioritise their work programmes, and it also demonstrates to all interested persons that the EDB is actively managing issues and working to reverse or improve the deteriorating trend.

## **EDBs reporting of asset health reinforces the need for them to consider and account for storm events**

Whilst we did not identify EDBs reporting any systemic asset related performance trends, it is likely that some latent defects within a distribution network will become faults during storm events. This feature emphasises the desirability of EDBs considering and publishing the trends of interruption information (especially defective equipment) for storm and non-storm related events.

Moreover, greater recording of storm conditions, especially wind speeds would assist EDBs to classify their interruptions correctly, especially in terms of the demarcation between the cause categories of adverse weather and defective equipment. This in turn would provide insights into the health and performance of their assets which would be useful as inputs into future asset class plans.

# Chapter 7 – Observations relating to asset Information

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## Purpose of this chapter

Asset information is one of the target areas of our review. In this chapter we:

- introduce this target area;
- set out the observations we made from our review of the AMPs and additional information we received from EDBs that relate to this target area; and
- identify potential improvements for how EDBs record and report asset information in their AMP disclosures, and potential improvements in the relevant underlying asset management practices for this target area. We have also identified an area of our existing ID requirements where further guidance for EDBs on how to approach the relevant disclosure may be helpful or may be an area we should consider as part of our next review of the EDB ID requirements.

## Introduction to asset information

Quality data is integral to effective asset management because this data underpins nearly all facets of asset management - eg, network growth and network development forecasts, asset health and replacement forecasts, fault identification and recording, and operational programmes such as vegetation management strategies and assessing the effectiveness of asset management plans and strategies.

Inconsistent recording and reporting of data makes the data less valuable, and raises questions around an EDB's data acquisition, recording and reporting practices.

Metrics (based on ID data) were analysed to identify potentially inconsistent reporting of reliability data by EDBs that may justify further review.

Unlike the other target areas, we were not analysing data to identify apparent deteriorating trends, but instead analysed the following areas of reported data from EDBs' ID to identify potential inconsistencies:

- **Asset condition grade** – identifying whether an EDB had few grade H1 and H2 asset condition grades which could indicate that the asset conditions were unrealistically good.<sup>29</sup>
- **Knowledge of asset condition grade and data accuracy level** – identifying EDBs with extended periods of low scoring levels for data accuracy and with extended period of unknown grades for asset condition which could indicate the EDB has made limited progress on improving data management (especially recording) systems.<sup>30</sup>

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29. The Electricity Distribution Information Disclosure Determination 2012 (consolidated April 2018) sets five disclosure categories for asset condition grades: H1 (lowest asset condition grade) – H5 (highest asset condition grade). H1 means asset replacement recommended. H2 means end of life driver for replacement are present, high asset related risk. H3 means end of life drivers for replacement present, increasing asset related risk. H4 means asset serviceable – no drivers for replacement, normal in service deterioration. H5 means as new condition – no drivers for replacement.

30. The Electricity Distribution Information Disclosure Determination 2012 (consolidated April 2018) sets four disclosure categories for the accuracy of the data provided in the EDB's disclosure: 1 (lowest data accuracy) – 4 (highest data accuracy). Category (or level) 1 means that good quality data is not available for any of the assets in the category and estimates are likely to contain significant error.



- **Asset condition and data accuracy** – investigating the relationship between an EDB’s reported data accuracy levels and reported unknown assets grade. The assumption being that there should be a link. For example, if an EDB scored data accuracy as level 1 because it had no good quality data available for that asset, then that EDB probably also did not know the asset condition either and therefore it would be expected to grade assets as unknown.
- **Asset forecast replacement volumes** – identifying whether an EDB was forecasting to replace assets with condition grades H3 and better, which could imply that assets of average to good quality will be replaced.

## General observations

We identified five key themes relating to asset information:

- Explanations for the apparent inconsistencies in data reporting. EDBs provided explanations as to apparent inconsistencies in reported data, including the following:
  - Having an asset class with a very high percentage of assets with unknown condition does not necessarily satisfy a level 1 data accuracy score because the definition of a level 1 data accuracy is that there is no good asset data for any of the assets.
  - Having forecast replacement volumes greater than the volume of assets with a condition grade of H1 or H2 (implying forecasting to replace assets with average to good condition) is not necessarily inconsistent because:
    - The definition of grade H3 implies replacement of assets in this condition can be appropriate if “end of life drivers are present”. The forecasts are for 5 years and some assets in grades H3 and above maybe replaced because they will deteriorate over 5 years;
    - Some assets in grades H3 and above may need to be replaced for criticality reasons; and
    - Some assets grades with H3 and above may need to be replaced for staff or public safety reasons, independently of their current condition. For example, an asset in average to good condition may need to be replaced because a design flaw means that it poses a safety risk.
- **Uncertainty as to how to interpret asset data accuracy levels and asset condition grades.** There were differences in the approach some EDBs applied in completing the ID schedule relating to data accuracy and asset health. Furthermore, there was some uncertainty on how to interpret the data accuracy grades (in particular level 1 data accuracy category). One EDB indicated that they would appreciate guidance from the us on the appropriate interpretation of the level 1 data accuracy category.
- **EDBs still transitioning to the new asset condition grading system.** It was apparent that some EDBs are still transitioning from the previous Grade 1-4 asset condition grading system to the new H1-H5 asset health index system, which came into effect in 2018. In one case, the condition of the EDB’s assets were not reported in the H1-H5 categories as per the new classifications. In another case, the conversion of asset condition data to the new classification system was not completed correctly resulting in incorrect reporting of asset condition data under the new system.

→ **Differences between EDBs' internal asset data and ID data.** It was apparent that for some EDBs the asset data internally captured and used for driving renewal and replacement of assets differs from the data being used for reporting in ID.

Similarly, some EDBs use different data sources for related metrics. ie, asset condition data for ID purposes based on age as a proxy, but asset renewal quantities are based on actual asset condition as determined through inspections.

→ **EDBs recognised that there was scope to improve asset information management practices.** Most EDBs acknowledged that there was scope to improve asset information (data) management practices, and identified several initiatives they were taking to do this:

- The adoption of new asset condition assessment models and software to improve the accuracy and consistency of reporting;
- The development of asset fleet plans to highlight the critical information required to manage assets; and
- Improved and additional staff training so that there is more accurate recording and consistency in asset condition and data quality assessments.

*Figure 22: Example – Eastland Network – adopting an Enterprise resource planning system to assist in the management of data*

Eastland Network is making improvements to address shortcomings in their asset information management, as outlined in their response to our information request:

“In December 2019 management requested the Board of Eastland Group approve the implementation of a company-wide ERP system (SAP) that will incorporate key asset data and workflows to support Eastland Network’s asset management activities.

The target “go-live” date is October 2020. Amongst other things, the project will result in the creation of a new asset register that will contain key asset attribute information, including asset installation/manufacture date, age, and condition.

Detailed planning for the data transfer and quality assurance processes has not yet been undertaken, however, it is contemplated that a data quality auditing process will be undertaken in respect of asset age data to support the population of the quality related meta-data.

Our expectation is that following this process we will update the data accuracy assessment in ID schedule 9a and 9b. As part of the implementation of the new system we intend to implement revised asset condition/health assessment processes aligned to the EEA AHI guidelines.”

*Source: Information sourced from Eastland Network’s response to our request(s) for additional information.*



## Potential areas for improvement

We have identified potential areas for improvements in how EDB's record, analysis and report asset management information.

### Improving the consistency of how EDBs' interpret and complete the ID schedules

We observed different approaches being applied by EDBs in interpreting and completing the ID schedules relating to data accuracy and asset condition. This discrepancy has at least two ramifications. First, there is the substantive issue, that some EDBs' categorisation approaches could be leading to suboptimal asset management practices, such as assets being replaced too early or too late. Second, inconsistent approaches across EDBs makes comparative analysis of EDB ID data less effective and means that it could be harder to identify the underlying asset management practices of an EDB.

We recognise the value in improving the consistency applied by EDB's in interpreting and completing the ID schedules relating to data accuracy and asset condition. As such, we may consider how to prioritise these matters when we next review disclosure requirements.

### Improving the linkage between EDBs' asset data and ID data

There is the opportunity for EDBs to improve the linkage between the asset data they collect and use for various internal purposes and that which they disclose under ID. For example, asset condition data, that is obtained through inspections, should be used to drive an EDBs strategy for renewal and replacement of assets, and be incorporated appropriately into ID data related to asset condition and data accuracy. Some EDBs have identified this improvement opportunity themselves and have, or plan to instigate, actions to improve the linkage.

### Robust data quality and governance standards should be established by EDBs

Given the reliance on data (and specifically asset attribute and condition data) in modern electricity businesses, it is essential that EDBs have robust data quality and governance standards. This could include a summary of the processes required to manage asset data as an asset – following each of the stages of an asset lifecycle – and the level to which the asset data is integrated with asset management decisions. Important asset data metrics could include asset data completeness, accuracy, and timeliness.

The importance of data quality and governance standards are increasing as more data is available to EDBs, including the greater availability of meter data from end-consumers.

We observed that many EDBs had or were planning to improve the robustness of their data quality and governance standards – an example of this was Eastland Network in Figure 22 above. We strongly encourage EDBs to improve data quality and governance and expect to continue to see ongoing improvements in this regard.

Figure 23: Example – Vector – Governance and Enterprise information management

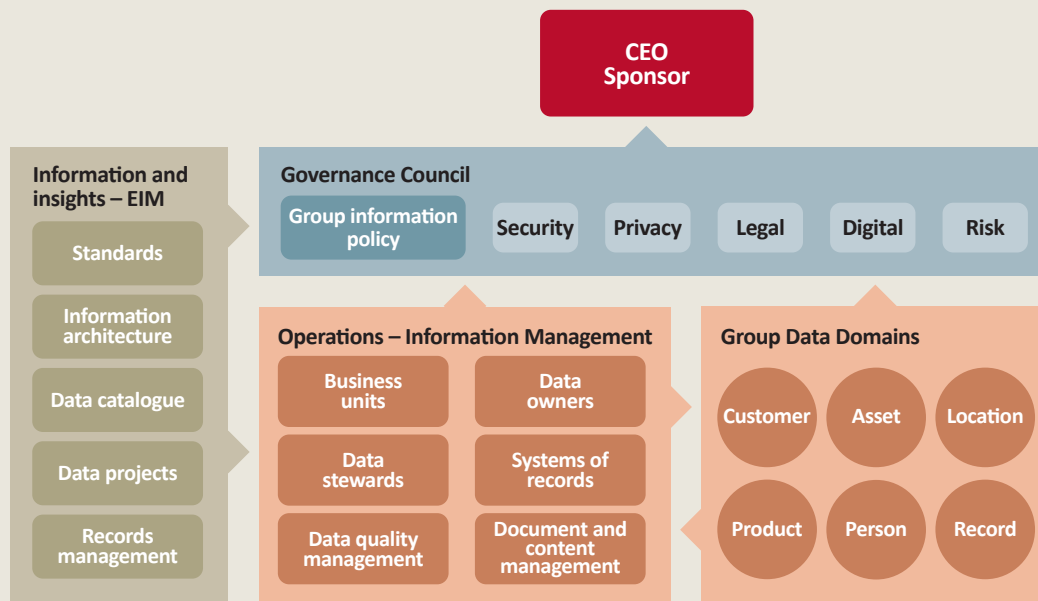
Vector’s approach to data governance is outlined in their 2019 AMP:

“...The Group Information Governance Council has responsibility for setting and enforcing the Group Data & Information policy...”

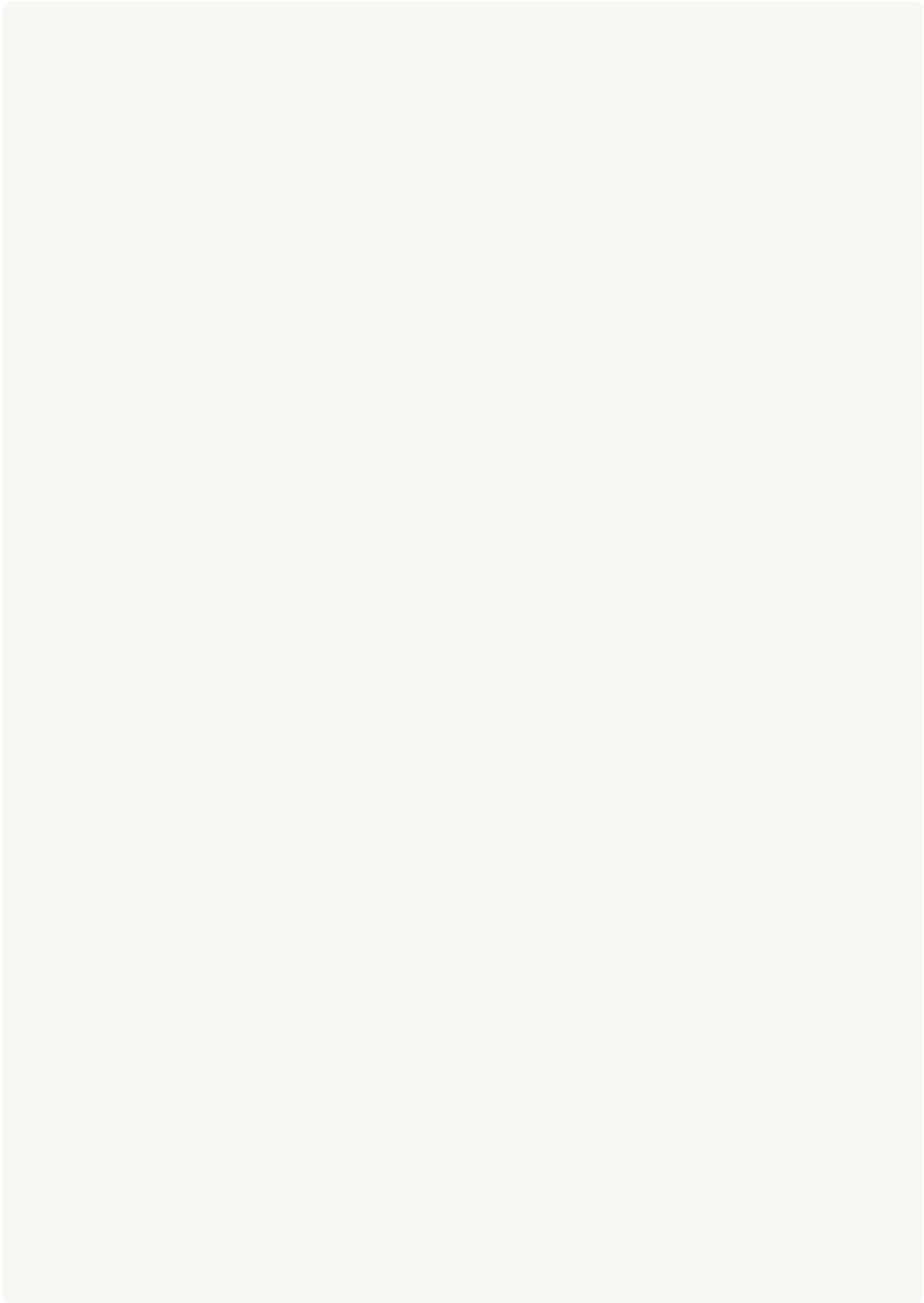


“...Operationally, the electricity business maintains a dedicated Networks Information Management team to perform the majority of the data activities as depicted in the box titled “Operations – Information Management”. This team is responsible for defining and ensuring the implementation of data standards, as well as managing the data within the System of Record for asset, asset performance, geo-spatial and customer data. In addition, the team also manages regulatory reporting (including one off requests) as well as managing other third party data requests such as location information and asset information.”

### Data and Information Management model



Source: Information sourced from Vector’s AMP 2019, section 3.9.



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