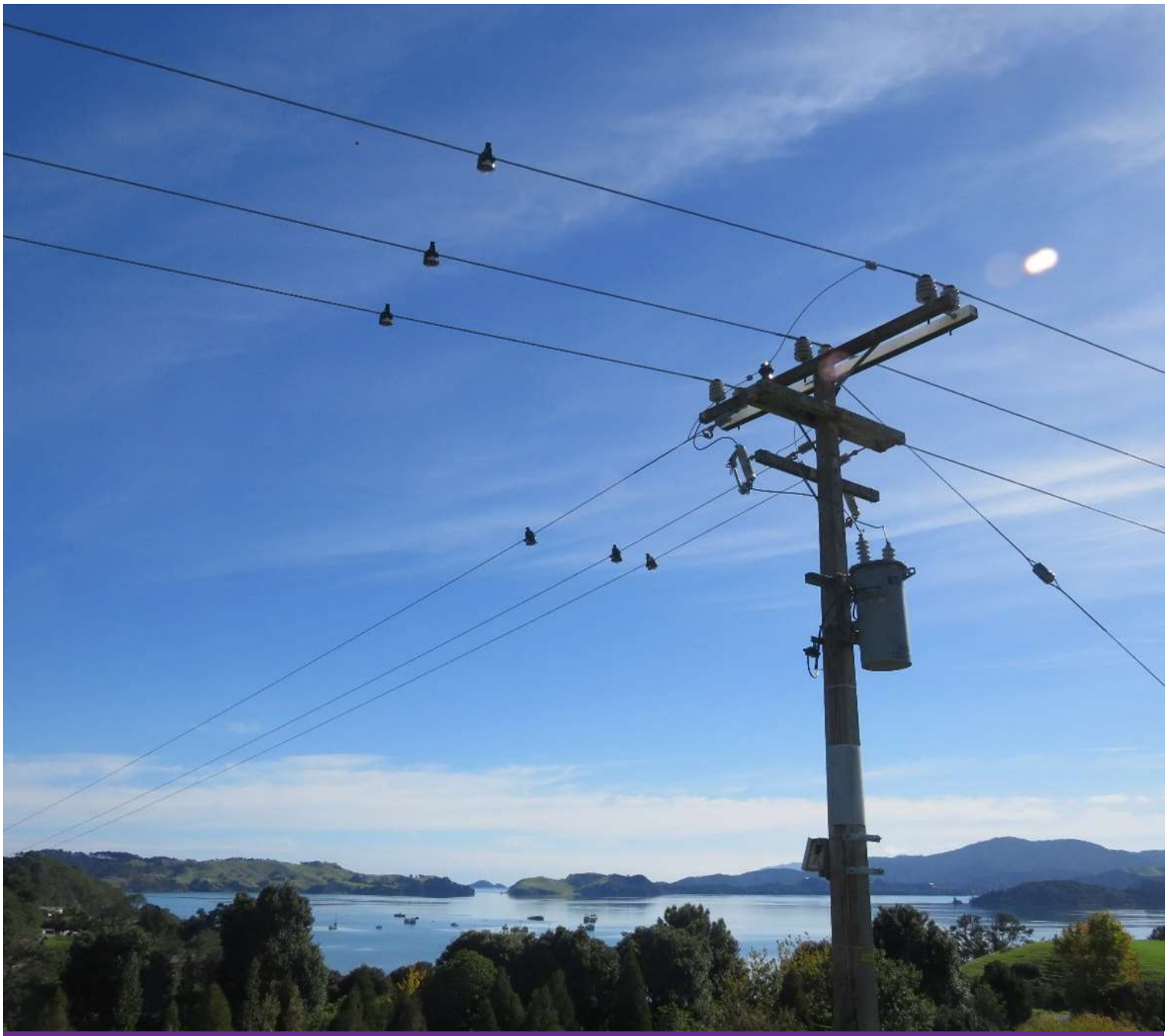

LV Monitoring Disclosure

Electricity Asset Management Plan

August 2024

Introduction

This Asset Management Plan disclosure covers the additional narrative requirements prescribed in the Commerce Commission's Targeted Information Disclosure Review (February 2024 decision)[1]. These requirements are specified in Clause 2.6.1B and Clause 17.2.2 of Attachment A in the Amendment Determination[2]. The requirements are as follows:

> *"**2.6.1B** Each EDB is also required to publicly disclose qualitative information in narrative form that describes its practices in a manner that complies with clause 17.2.2 of Attachment A by 31 August 2024 in a standalone document."*
>
> ***"17.2.2** monitoring load and injection constraints, including:*
>
> *(a) any challenges, and progress, towards collecting or procuring data required to inform the EDB of current and forecast constraints on its low voltage network, including historical consumption data; and*
>
> *(b) any analysis and modelling (including any assumptions and limitations) the EDB undertakes, or intends to undertake, with the data described in clause 17.2.2(a)."*

Disclosure

Data Collection and Procurement

In our 2024 AMP update we note "*Visibility is power – the imperative for enhanced asset utilisation necessitates vastly improved visibility of the network's state, together with the operational capability to dynamically reconfigure the network and dispatch instructions to distributed flexible resources with precision. Complementing this, customers and markets will need long-term forecasts of network capacity, congestion, network investment plans and ensuing price signals. The heaviest impacts of mass electrification are expected to occur on the LV network, where visibility is poorest. The LV network has low diversity (averaging effect), so operating close to network limits with highly dynamic demand will require high-quality data delivered in near real-time, from potentially multiple devices at each connection.*"

The need for full network visibility underpins Powerco's transformation to a distribution system operator (DSO) and our modernised network architecture strategy. This transformation is required to ensure we can most cost-effectively meet customers' increasing electricity requirements as we work to achieve New Zealand's net carbon zero goal, while at the same time improving the resilience of our networks. The transition to a fully-fledged DSO before the DPP5 reset (starting FY30), is a key Powerco strategy to deliver value for our customers.

To achieve this least cost pathway for customers, we are adopting the following approach:

- Network visibility requires us to have electricity consumption and power quality data at least down to the LV feeder level, but ideally to an individual ICP level. At present we have very limited visibility of power flows or quality at the LV network level, as it has historically not been needed. With the transformation from a passively managed network to a dynamically operating system, in which consumer side offerings

[1] Targeted Information Disclosure Review 2024 - Final decision Reasons paper
[2] Electricity Distribution Information Disclosure (Targeted Review 2024) Amendment Determination 2024

and requirements will be as much part of optimum energy solutions as traditional network solutions, this situation is no longer tenable.

- We do not own electricity smart meters. We have transformer monitoring on around 5% of our LV network.[3] To achieve our DSO target, which sets us on the lowest cost path for customers, we need to address this deficiency within the DPP4 period. For this, we have the option to embark on the installation of our own smart meters at customer premises or at various positions on LV feeders, or to procure smart meter data from retailers and meter providers.
- While historically problematic, we have recently been able to procure half-hourly, historic, consumption data for around 99% of our ICPs. We are also negotiating the acquisition of far more granular, semi-real time, power quality data, covering 80-90% of the network.[4] This data acquisition, while still costly, is more cost effective for our customers than Powerco investing in a wide-spread smart meter network.
- In parallel to acquiring smart meter data, we are planning to accelerate our programme to install LV transformer (including outgoing feeders) monitoring. The transformer monitoring programme will result in approximately 25% of LV circuit coverage by 2033, focused on those parts of our network with the most rapid growth, or where most congestion is foreseen. This goal again assumes draft DPP4 settings are confirmed. These monitors provide real-time phase voltage and current data on our transformer low voltage feeders, visible through a third-party cloud platform.
- Trials to date have shown that the combination of transformer monitoring with semi-real time ICP power quality and consumption data, is sufficient to support our DSO transformation and the operational improvements we are seeking to provide customer value.
- Whilst we have been increasing penetration of transformer monitors across our urban networks, as with all new equipment rollouts there have been significant learning across both ourselves, our vendor and service providers to ensure a sustainable and scalable process for rollout and ongoing asset management of the information they supply. Challenges encountered include need to upskill contractors across our footprint on the technology & installation methods, the ability to make our data available in our operational and business systems, and communications platform maturity. We have changed our procurement specifications and all new distribution transformers have these installed at the factory.

The quality of our low voltage "characteristic" data is improving. We still have unknowns in conductor types, sizes, and connectivity, which are needed for determining capacity. This affects approximately 40% of our LV conductor length. In addition, we have gaps in some of our LV connectivity data. Over the past decade, we have invested to improve this LV data quality. At the time of this document, approximately 86% of our underground pillars have now been labelled, and connectivity corrected for 64% of our urban underground network, though we note there is additional work that is needed in our rural areas, overhead network and conductor size information.

As noted earlier, we are currently negotiating the purchase of Power Quality data (voltage and event data), covering 80 to 90% of our ICPs. We anticipate that detailed analysis of power quality data will allow us to identify the phasing of our ICPs and helping to correct gaps in our connectivity model, as well as working with developing capabilities in analytics to infer conductor typology where there are gaps, that will assist in identifying areas of congestion or overloading.

The cost and effort for acquiring this data (both consumption & power quality) is significant. Additionally, we have undertaken significant work in developing our environments to store this information and in internal training to meet the contractual privacy requirements. We believe there have been, and continue to be, strong

[3] While not perfect, we have much better visibility on our distribution (11kV) and subtransmission networks.
[4] This will provide consumption and voltage level data at 5-minute intervals, currently with around 24-48 hours lag

benefits to establishing common industry standards on the access to PQ data (similar to ENA/ERANZ version of Appendix C for consumption data but with learnings applied). Regulatory oversight on a pricing methodology may also help ensure a fair process between data providers and EDBs in this area – we observe that much is currently carried out via bespoke commercial negotiations that appear specific between the vendors and each EDB – which we think has the opportunity to benefit customers across the whole sector. There also seems limited ability for a scalable approach to accessing the data (offerings appear to be either small data sets or multi-year contracts) to allow network companies to develop their capability to work with the data over time.

Analysis and Modelling

Core to better managing our customer needs and developing our DSO capabilities is a richer understanding of load and generation patterns across our low voltage networks. As discussed above, for the past decade we have been carrying out foundational work to improving our connectivity information and improving our visibility of LV networks through installation of our own distribution transformer monitors. To this point we have utilised the information provided by the monitors through vendor platforms, which provide historic details and near real-time data.

We have been using this data to deliver better customer outcomes – such as right-sizing requirements on transformers, to avoid unnecessary investment by the customer through our Customer Initiated Works (CIW) process. Additionally, we have been able to instigate Power Quality Investigation and rebalance the LV network, realising capacity for new customers. At the end of 2023, we completed several pilots of LV visibility platforms to utilise the consumption and power quality data we have so far had access to.

We are using smart meter data to build a customer segmentation model, allowing us to create meaningful groupings (based on customer demand profiles) and forecast the potential for future growth and flexibility. Additionally, we are leading efforts with Electricity Networks Aotearoa Future Network Forum to establish universal customer segmentation models to be shared industry wide. This will help EDBs prioritise investments and resourcing to support customers through their decarbonisation journeys. The next datasets from the NZ Census are expected to provide the most up-to-date and comprehensive insights into our current customers. Significant work remains to update and enhance existing forecasting tools with this information.

While we are making progress in broader scale visibility with the increasing availability in consumption and power quality data, this will be greatly ramped up with the acquisition of the NODs data. Key benefits of this work will include:

- better mapping of LV network connectivity and ICP locations (including phasing)
- expanding our network model to include the LV network
- defect detection and compliance
- safety enhancements (e.g. broken neutral, or lines down detection)
- visibility of AS/NZS4777 compliance of inverters
- enhancing our understanding of LV network congestion and upcoming “hot spots”
- trend-analysis on the uptake and impact of solar, EV and battery storage
- improved customer intelligence, including segmentation into representative user types
- improved, granular demand forecasts and resulting investment decisions

These are all requirements for a fully fledged DSO supported by a modernised distribution network.

To achieve these benefits, our 2024 AMP includes +$18m provision over the DPP4 period compared to the 2023 AMP associated with funding smart meter data, a LV visibility platform to carry out analysis of this data, as well as

resourcing to start planning and operating our LV networks. Resourcing this rapidly developing area is a potential constraint. Therefore, as part of submissions on the Commerce Commission's default-price quality path reset, we have requested additional expenditure allowances to take on additional LV network operators and LV planners. These resources will enable us to fully leverage advancements in data to improve our service for customers.

We also note that our goal to transform to a DSO before the next regulatory reset, has moved quickly since publishing the 2024 AMP. We are working through the difficult trade-offs which will be needed to implement this work within allowances. The proposed INTSA allowance will also support the transition to new applications.

However, the ongoing procurement of flexibility services is likely to be problematic during DPP4 as these markets are emergent – there is significant potential but there is insufficient opex allowance for this. While we are hopeful reopener mechanisms will support this, it is not clear whether they will sufficiently allow for flexibility options to be incorporated. We will continue to monitor this and work with the Commission on how this can be resolved.

Director Certification

Electricity Distribution Services Information Disclosure

For the year beginning 1 April 2024

Certification for disclosures
Pursuant to clause 2.9.2 of section 2.9

We, John Loughlin and Richard Van Breda,

being directors of Powerco Limited certify that, having made all reasonable enquiry, to the best of our knowledge:

a. the information prepared for the purposes of clauses 2.3.1, 2.3.2, 2.3.8 - 2.3.12, 2.4.21, 2.4.22, 2.5.1(1)(a)-(f), 2.5.2, 2.5.2A, **2.6.1B*** and 2.7.1 of the Electricity Distribution Information Disclosure Determination 2012 in all material respects complies with that determination;

b. the historical information used in the preparation of Schedules 8, 9a, 9b, 9c, 9d, 9e, 10, 10a and 14 has been properly extracted from the Powerco's accounting and other records sourced from its financial and non-financial systems, and that sufficient appropriate records have been retained [and if not, what records and systems were used].

Director

22 August 2024
Date

Director

22 August 2024
Date


POWERCO