

Response to Independent Review of Aurora Energy Network: Final Report

20 December 2018



1 Introduction

In 2018, Aurora Energy commissioned an independent review of the state of our electricity network. The main aims of the review were to confirm the state of our network and to determine the resulting risk to customers and the wider public.

The final report of the independent engineering review by WSP was published in November 2018 and found most of Aurora Energy's assets pose a low risk to public safety, reliability or the environment. The final report is available on our website www.auroraenergy.co.nz together with summary information.

We provided an initial response to the emerging findings of the WSP review in our 2018 Asset Management Plan. In this document, we provide a further update on our response to the final independent review report.

We will use the findings of the full report as we move forward with our major programme to renew Aurora Energy's ageing network.

2 Recap on the Independent Review Process

Here are the key milestones in the independent review process and our response.

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| March 2018 | In March 2018, in conjunction with the Commerce Commission, we initiated an independent review of the state of our electricity network. The key aims of the review were to confirm the state of our network and to determine the resulting risk to customers and the wider public. |
| May 2018 | In May, we appointed WSP, one of the world's leading professional engineering consulting firms, to independently undertake the review. The review included an initial desktop review of our asset information followed by a detailed assessment of our assets, including physical inspections and sample testing in the field. |
| August 2018 | In August, WSP provided us and the Commerce Commission with interim feedback, which included their emerging views on a number of assets fleets. Broadly, these views confirmed the initiatives that had already been put in place. In addition, the findings and our discussions with WSP, prompted us to review a number of areas in our investment plans. This led to the reprioritisation of our work plan, including increasing our secondary systems and crossarm replacement programmes, and an uplift to our cable replacement programme. |
| October 2018 | The expenditure plans set out in our 2018 Asset Management Plan (published in October) largely addressed the areas raised in the WSP's interim findings. The 2018 Asset Management Plan is available on our website www.auroraenergy.co.nz . |
| November 2018 | In late November, we received the final independent review report from WSP. This comprehensive document brought together WSP's views on a range of issues. We have now considered this report in detail and have set out our further thoughts and response below. |
| March 2019 | A more detailed response will be reflected in our Asset Management Plan Update due to be published in late March 2019. |

3 Key Findings of the Independent Review

We believe the review has been valuable in guiding our response to the challenges we face managing an ageing network. It has provided a common understanding of the current state of our electricity network, including underlying asset condition and the resulting reliability, resiliency and safety risks. It was timely given our intention to carry out a major renewal programme over the next decade.

The review provided important insights and conclusions, including independent assurance that

- most of our assets pose a low risk to public safety, reliability or the environment
- we are targeting our proposed investments in areas that need it most and will deliver the most safety, reliability and resilience benefits
- highlighted the asset fleets (e.g. protection, poles and cross arms) that have a portion of assets whose condition carry a higher public safety risk.

In our view, the review achieved its main aims which were to confirm the state of the network and determine the resulting risk to customers and the wider public. The risk analysis is important for two main reasons:

1. It enables us to target and prioritise our planning and contractor resources to asset renewal and growth initiatives that will achieve the greatest risk reduction
2. It provides a baseline risk assessment that can be used to assess our progress in reducing network risk.

4 How we are Responding to the Independent Review

The independent review has been a valuable exercise and we welcome its overall findings and the insights we received from the process. It has informed our short-term investment priorities and guided us as we look to develop our customised price-quality path investment proposals. The review's interim findings and our discussions with WSP were important inputs into the development of our first Asset Management Plan as a standalone business.

To date, the conclusions of the independent review have reaffirmed the need for our accelerated investments plans and led us to put in place new initiatives, including:

- maintaining an accelerated pole renewal and strengthening programme for up to three further years
- increasing the volume of crossarms to be replaced
- replacing all electromechanical and solid-state relays within 10 years
- upgrading our battery systems to improve DC systems reliability
- reprioritising our zone substation switchgear replacement programme
- expanding condition investigations for conductors and crossarms.

Building on the above initiatives we are continuing to use the review's findings to improve the condition and performance of our network. Our early view is that our updated ten-year plan, to be outlined in our Asset Management Plan Update in March 2019, will include:

- further accelerating the replacement of high-risk protection relays
- reprioritising our zone substation switchgear replacement programme (e.g. accelerating Green Island switchgear and power transformer replacement)
- efforts to develop improved inspection techniques (e.g. pole-top/crossarm assessment)
- enhanced reporting of network risks
- plans to achieve greater network resilience (e.g. Dunedin meshed 33kV network architecture)

In addition to reprioritising our investment plans, we are beginning to progress a series of initiatives to improve our asset management capability.

In carrying out its review, WSP brought leading asset management techniques, including a robust framework for assessing asset risk and criticality. We aim to benefit from their expertise as we refine our risk management framework. Exposure to these techniques and the interactions our wider team has had with WSP have informed our assessments of our asset management capability and capacity.

We have begun a process to improve our asset management processes and capabilities, our **Asset Management Development Plan**. This includes a Reliability Management Plan which focuses on improving the reliability of the service received by customers.

We have identified several improvement areas including: data management, delivery capability, risk management, and network planning.

Our ultimate aim is to ensure our asset management is consistent with leading New Zealand practice within a five-year period. We plan to use asset management certification (ISO 55000) to monitor and demonstrate our progress to stakeholders.

5 Next Steps

We have begun to further refine the investment plans set out in our 2018 Asset Management Plan and will be publishing new plans in our Asset Management Plan Update due to be published in March 2019. These plans will fully reflect our response to the independent review.

We also plan to engage with the Commerce Commission on further stakeholder engagement that will explain our progress in implementing our investment plans and improvement initiatives.

In the new year we will also begin our preparation for our customised price-quality path proposal. As part of these preparations we will engage with stakeholders on our proposed investments over the medium-term. These plans investments will include further investments and initiatives to address the points raised by the WSP report.

6 Further Detail on our Response to the Independent Review

Below we set out further detail on how we have responded to the findings of the independent review.

6.1 Network Investment Plans

The table below sets out a selection of our planned investments that respond to findings in the WSP report. As we refine our plans in the coming months, we will publish an extended list with further detail in our 2019 Asset Management Plan Update.

| Selected WSP Views | How we are responding |
|---|--|
| Support structures: safety risk is linked to population density. | Our pole programme is prioritised according to areas of high population density (safety criticality). |
| Poles: circa 2,500 poles will reach end-of-life during the next 12 months. | We will continue elevated levels of pole remediation during the first three years of the Asset Management Plan period to address a backlog of end-of-life poles. |
| Crossarms: A large proportion of the crossarm fleet exceeds expected lifespan. | We have developed plans to improve and expand condition assessments of pole tops and crossarms and have increased our planned 10-year renewals expenditure on crossarms. |

| Selected WSP Views | How we are responding |
|---|--|
| Overhead lines: drone inspection / sampling indicates only a modest level of conductor deterioration. | We are reprioritising our conductor replacement programme to focus on the small portion of high-risk assets. Our longer-term plans will retain a significant level of investment to ensure we can address this emerging risk. |
| Conductors: Forensic testing would help better understand conductor strength and deterioration | We will continue to improve our conductor condition data through more inspection and testing. |
| Zone substation switchgear: some zone substation switchgear is a high risk. | Our current plan covers replacement of switchgear identified as high risk. |
| Underground cables: A small proportion of PILC (paper insulated, lead covered) cables exceed expected lifespan | We have reduced the expected lifespan for PILC type cables. We plan to carry out PILC cable replacement in the medium to long term, as the risk associated with a failure is low in the short term. |
| Protection relays: a large proportion of electromechanical relays exceed expected lifespan. | <p>We are now planning to replace all static and electromechanical relays within ten years, with an accelerated timeline for high-risk relays.</p> <p>We plan to revise our lifecycle management programme to ensure that older relays are tested and maintained at sufficient frequency to achieve required desired performance.</p> <p>We have increased the allowance for battery system replacement and upgrading for redundancy to improve performance.</p> |

6.2 Asset Management Development Plan

The table below sets out a summary of our planned improvement initiatives, several which are in direct response to the findings in the WSP report. As we refine AMDP programme in the new year, we will publish an updated set of initiatives in our 2019 Asset Management Plan Update.

| Initiative | Description |
|------------------------------------|---|
| Asset Management Competency | |
| ISO 55000 Certification | We will identify and address the necessary steps to achieve ISO 55000 certification by 2023. |
| Competency framework | Develop a competency framework and provide targeted training to meet business needs, broaden technical skill-sets and grow our leaders. |
| Build and retain capability | Review and amend our people frameworks, systems, and processes to ensure they are relevant and can attract, engage and retain quality people and motivate high performance. |
| Reliability Management Plan | |
| Governance and reporting | <p>Improved governance to ensure that visible, effective steps are being taken to manage and improve performance against quality standards.</p> <p>Fit-for-purpose operational reporting.</p> |
| Stakeholders | <p>Directly contact key customers in advance of planned outages</p> <p>Improve business engagement prior to planned outages with major impacts.</p> <p>Improve visibility and communication during outages.</p> |

| Initiative | Description |
|---------------------------------------|--|
| Planned outage reduction | Optimise planned outage work in outage windows. Initiate systematic ex-post review of planned outage performance. Temporary generation policy. |
| Post-event analysis | Implement post event analysis 'protocol' and lessons learned framework to drive improvements. |
| Strategy and analysis | Improve the analysis of unplanned outages to provide increased understanding of controllable and uncontrollable causes. Improve the quality of data and the analysis of "line down" incidents to provide a deeper understanding of the contributory factors. Network architecture changes to enhance reliability Review the approach to vegetation management to identify opportunities for improvement. Develop and implement a systematic approach to the preparation and storage of protection performance reports. |
| Risk and Review | |
| Improve review and feedback processes | Establish effective feedback and review mechanisms to provide assurance that objectives are being achieved and to support continual improvement. |
| Review practices | Establish regular self-reviews that will assess the continuing suitability of our asset management policy, strategy, objectives, plans and delivery. |
| Appropriate structures | Review organisational structures, processes, roles and responsibilities and contractual relationships. Effective leadership will be a key aspect. |
| Business continuity planning | Undertake a strategic review of contingency preparedness and emergency response capability. |
| Asset Management Decision Making | |
| Asset criticality | Extend the application of our pole and overhead lines asset criticality framework to a wider group of assets. Criticality may incorporate a number of dimensions depending on relevance to the asset type. |
| Fleet management plans | Develop a suite of dedicated fleet management plans that will set out planned improvements in asset information, condition assessments, forecasting tools, cost estimation, and solution options. |
| Network planning | Our demand forecasting methodology and load flow models will need to be updated and expanded to model future load scenarios. These innovations are important if we are to pursue 'least-regret' investments. |
| Improve lifecycle analysis | Improve approaches used for decision-making across the stages of an asset's life through new analysis and tools. |
| Asset health | Refine asset health models for major asset types, including introducing multi-factor models for the higher value or higher risk asset types. |
| Asset failure risk | Formalise and expand the use of asset health measures and integrate this with our evolving criticality framework to capture asset-failure risk. |
| Cost estimation | Improve in-house cost estimation capability, which incorporates feedback from systematic reviews of outturn costs of delivered works. |

| Initiative | Description |
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| Works Delivery | |
| Process development | Develop and implement improved works management capability for capital projects delivery, maintenance, and vegetation management, including necessary information system improvements. |
| Multi-party process development | Develop and implement a new contracts management capability to manage multiple service providers and increased tendering of works. |
| Improve delivery and planning interfaces | Review the internal communications required to deliver the works plan, including information handovers from planning to delivery, and the feedback required from delivery. |
| Asset Knowledge | |
| Asset information strategy | Develop and implement an asset data quality strategy that will ensure our asset managers and operations staff are provided with comprehensive and accurate asset and network performance data. |
| Asset information roles | Develop an implementation plan to drive improvements in asset information collection and data quality. This will include clarifying the roles of data owners and stewards. |
| Asset data structures | Define and document key requirements for asset and network data to support decision making, including master data, condition data, work and defect history, and performance records. |