22 September 2020

Entrust

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New Zealand

Attention: The Trustees

Network Security Report 2020

The Auckland Electricity Consumers Trust (AECT) Trust deed requires that Vector management engage an independent expert to provide a report that advises on the state of the Auckland electricity reticulation assets. Vector's majority owner (Entrust) has requested that this study include all of Vector's electricity distribution assets.

WSP was engaged by Vector to undertake the 2020 review. WSP is one of the world's leading professional services firms, providing engineering, design and strategic advisory services to clients across all industries. WSP is well regarded for our capability to apply our technical subject matter knowledge, combined with strong commercial acumen and regulatory understanding, to ensure that asset management strategies and processes are robust and well supported both technically and economically.

WSP's review team consisted of experienced Chartered Professional Engineers and Certified Asset Management Assessors. The team has extensive experience in undertaking similar investigations and reviews across Australia and New Zealand.

SCOPE OF WORKS

The study focused on the effectiveness of Vector's processes that support Operational Risk Management for its electricity network. Seven areas were specified for the review including maintenance practices, network growth, capacity and security, risk management, data quality and asset management.
To support the desktop review, limited site visits were carried out to assess how well the field service providers are complying with the maintenance and data recording practices specified by Vector.

CONTEXT

Since the previous SOTN was undertaken, a number of factors have influenced Vector's network and the processes applied to manage operational risk. The biggest impacts have been from:

- Significant investment by Vector in asset management and improving reliability performance through a range of initiatives
- The Default Price-quality Path Determination (DPP3) issued by the Commerce Commission with significant changes to the Quality Standards, including the performance metrics established and the calculation methods.

FINDINGS AND RECOMMENDATIONS

WSP found that Vector has developed and implemented appropriate approaches to managing the operational risk of its network. In general, the processes were well defined, consistent with peer electricity businesses, and evidence was sighted to demonstrate that processes were being suitably followed.

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The following paragraphs provide an overview of our findings in each of the areas:

a/ Maintenance

Vector operates a rolling 10-year maintenance programme that consists of preventative, corrective and reactive maintenance. The corrective maintenance strategy applies risk-based prioritisation to schedule defect remediation activities. Other planned work is completed concurrently so that multiple defects can be addressed during a single outage, thereby reducing network interruptions. Evidence indicates the total number of high priority defects has been decreasing and the average duration of outages has decreased, demonstrating management of network risk.

Vector has improved its approach to reactive maintenance through the implementation of a new contractual arrangement with the field service providers that includes an incentive scheme aimed at minimising the time taken to restore supply following a fault.

WSP considers that the approach to maintenance is sound, in-line with industry practices and the budgeting for these maintenance activities is appropriate.

b/ Upgrades

Vector has implemented a sound governance process to manage capital investment. The process is incorporated in the SAP workflow system which provides traceability and is consistent with gateway processes and approval practices at peer electricity businesses. Capital Expenditure Justification (CEJ) documents are the artefacts developed to demonstrate prudency and efficiency of expenditure.

WSP found that the current governance process is consistent with peer electricity businesses and is enabling appropriate capital works to be identified, developed and delivered. However, the process could be improved by producing a full CEJ for all projects that are planned for implementation during the first year of the AMP planning horizon prior to the AMP being published. WSP also found that the CEJ could be improved by strengthening the demonstration of business value.

WSP considers that Vector has implemented an appropriate investment decision making process that includes consideration of network risk when prioritising projects, and that the investments identified appears appropriate for the current state of the network.

c/ Investment and planning for the future

Vector has applied scenario modelling to gain a clearer understanding of future electricity demand. The modelling explores three different scenarios, named Rock, Pop and Symphony, that are based on three plausible trends in the uptake of technology to 2050. Symphony was the scenario considered most likely and has been adopted as the base case in planning. WSP found that this was a sound process.

Vector has demonstrated that it is advanced in its transition to a modern customer centric business model through its development and monitoring of customer experience key performance indicators, and using these to plan and implement customer experience improvement initiatives.

d/ Capacity and Security

Vector has a sound approach to modelling its 30-year demand forecast and identifying constraints at zone substations. The approach uses three separate models which were found to be functioning correctly and producing appropriate outputs. Security of Supply Standards, which are consistent with the standards set by peer EDBs in New Zealand, were correctly applied.

Physical security is maintained by Vector through well documented processes and standards. Contingency plans have been established for all zone substations as well as for specific critical customers. An Emergency Response Plan, which identifies interactions with government systems and requirements, and defines the escalation process from incident to emergency and then to crisis, has been established.

The Information Security Policy sets the requirements for the security of Vector's information systems including specifications for new assets and operation of the network. Cyber security of the SCADA and corporate networks is monitored on a 24/7 basis through the Security Operations Centre (SOC) and penetration testing exercises are also undertaken to identify weaknesses.

WSP considers that the processes applied to capacity and security are aligned with peer electricity businesses, enable identification and mitigation of risk, and are resulting in appropriate investment on the network.

e/ High impact low probability events

WSP found that Vectors processes relating to identification, recording and managing risk were well defined and shown to be actively applied. The network investigation process has been recently updated to include a trigger for large SAIDI events and should enable Vector to meet the reporting requirements of the new DPP3 Extreme Event Quality Standard.

f/ Underlying data

Vector uses industry standard platforms for data collection that are appropriate for its network. Recent initiatives, including establishment of KPI's for data capture and a requirement for increased data capture for outages, should improve the accuracy of data and therefore enable improved planning and risk management.

All the data is stored in two key databases that are the master datasets for business analytics. The data is made available to staff via standard reporting or through requests to the data analytics team. WSP found the data quality to be consistent with peer EDBs.

WSP considers that the systems used, improvement initiatives, and the approach to disseminating data to staff should enable sound, data driven decision making that will enable management of network risk.

g/ Strategic reliability management

Changes have been made to Vectors approach to network performance in order to improve the management of high-risk areas of the network, and specifically to mitigate poor reliability and safety risks. This includes the use of a GIS based SAIDI model to support risk-based decision making, using CBARM models to forecast investment needs and a new risk-based approach to vegetation management. In addition, Vector has established a Strategic Reliability Management Plan that focuses on embedding a suite of new reliability improvement initiatives into business as usual practice.

WSP considers that Vector's focus on improving their approach to managing network reliability and the initiatives that have been implemented will enable Vector to appropriately manage network risk. The resulting expenditure appears appropriate for the current state of the network and the objective to return the network to compliance with the Quality Standards.

h/ Field reviews

Our team undertook assessment of the field service providers completing works on both Auckland and Northern network and covered both distribution and zone substations assets. A high level of safety was demonstrated, which extended from the setup of their site, their work practices, inductions received by WSP's site inspectors and the management of the public. This is aligned with Vector's culture and focus on safety as their primary priority. WSP also found that a high level of workmanship was demonstrated and the FSPs were observed to be following the Vector standards.

CLOSING STATEMENT

In WSPs opinion, the documentation provided, discussions held with key staff and management, and audits of network operations undertaken by field crews, demonstrate that the process, strategies and initiatives currently being implement by Vector are generally appropriate to manage the operational risk of the network.

WSP has made a number of recommendations that will assist Vector with their continual improvement activities and ensure ongoing operational risk management.

Regards,

Rebecca Tjaberings

Director Power