

**Sinclair Knight Merz**  
32 Cordelia Street  
South Brisbane QLD 4101 Australia  
PO Box 3848  
South Brisbane QLD 4101 Australia

Tel: +61 7 3026 7100  
Fax: +61 7 3026 7300  
Web: [www.skmconsulting.com](http://www.skmconsulting.com)



Auckland Electricity Networks Trust  
P O Box 10 9626  
Auckland 1149  
New Zealand

10 December 2012

QH10432B0004

To the Trustees

### **State of the Network Report 2012**

Under the terms of the Auckland Electricity Consumers Trust (AECT) deed, Vector Limited is required to undertake an independent review of its electricity network in Auckland, and to provide the report on the outcome of this review to the AECT.

The scope of the review is required to cover the following areas:

- The state of the electricity network with regard to maintenance programs and the appropriateness of expenditure levels
- Any need for upgrading the electricity network, taking into account what is already being planned by Vector Limited
- The capacity of the electricity network, in relation to forecast demand
- Any security risks to the electricity network

The Australian office of Sinclair Knight Pty Ltd (SKM) was engaged by Vector Limited to undertake the review, and to prepare a detailed report on its findings.

SKM has previously undertaken a similar review for AECT in 2010.

SKM has extensive and recent experience in developing, applying, reviewing and auditing transmission and distribution network planning, asset management, maintenance, and operating criteria and practices in many countries, including New Zealand, Australia, South Africa, the UK, and several South East Asian countries .

This experience encompasses system planning and security criteria, forecasting methodologies, capital planning and governance processes, operating and maintenance practices, capital and operating expenditure reviews, reliability analysis, and regulatory compliance requirements.

The 2010 State of the Network Review focussed heavily on Vector's system security and planning criteria, measures of system utilisation and reliability performance, and the adequacy

Sinclair Knight Merz Pty Limited

The SKM logo trade mark is a registered trade mark of Sinclair Knight Merz Pty Ltd. ABN 37 001 024 095

Offices across Australia, New Zealand, UK, South East Asia, Middle East, the Pacific and Americas



of forward plans for capital and operating investment. In addition to the above areas, the 2012 review also looks closely at the extent to which Vector has considered and developed pre-prepared contingency plans for the sorts of credible contingency events that may occur during project construction, and normal operation of the electricity system.

The 2012 State of the Network Review was conducted primarily by Mr Cliff Jones of SKM's Power and Energy Business Unit, Brisbane (Australia), with the assistance of various technical specialists. Mr Jones has approximately 30 years engineering and management experience with a number of Australian electricity distribution companies, and approximately 15 years consulting experience in the benchmarking and performance assessment of transmission and distribution companies in various countries, including New Zealand.

The key findings and conclusions of the State of the Network Report, 2012 can be summarised as follows:

- The general condition and serviceability of Vector's Auckland electricity assets were found to be good, and the assets as a whole appear well maintained in accordance with sound electricity industry practices.
- Vector's electricity assets are relatively young by international standards, and the future budgetary provisions (over the next five to 10 years) for maintenance and refurbishment are appropriate.
- After reviewing the overall magnitude of proposed capital works funding for growth and augmentation works, and a sample of individual projects, it was found that Vector's processes for planning and implementing new capital works projects to upgrade the system are sound.
- Vector's security of supply and planning standards, which have been refined and updated since 2010, represent what SKM would consider to be "leading edge" industry practice. They represent a very effective mix of deterministic and probabilistic strategies which when properly applied will give a cost effective balance between outage risk and system security.
- The reliability of supply of Vector's Auckland system, as measured by the international standards SAIDI (minutes off supply) improved by some 37% since the 2010 review, and compares very favourably with peer Australian utilities. Vector's SAIDI is the second best of fourteen distributors in the study, after CitiPower (Melbourne) and better than Jemena (Victoria), Ausgrid (Sydney), and ActewAGL (Canberra).
- Vector has introduced an enhanced load analysis and forecasting methodology since the 2010 review which will assist in more accurately forecasting future load growth at the zone substation level.
- Coincidentally, the Auckland Region experienced its coldest weather in many years during the winter of 2011, resulting in an increase in the system maximum demand of 11.3% over 2010. The loadings on many of the Vector zone substations increased by similar, and in



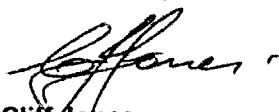
some cases, greater amounts. Overall however, the system performed well under these abnormally high loads.

- Based on the current forecasts of normal growth in maximum demand, Vector's planned capital works program, and corresponding budget allocations appear adequate.
- After reviewing a sample of Vector's operational contingency plans we concluded that Vector's contingency planning processes and documentation are comprehensive, sufficiently detailed, and regularly updated.
- Operationally, Vector takes a prudent, slightly conservative approach to limiting the loadings on system elements (e.g. transformers, cables, etc), by adopting cyclic ratings rather than emergency ratings as the maximum level of loading that will apply.
- Subject to the statements and observations made in SKM's report to AECT/Vector, it is SKM's assessment that there is no material risk to Vector's electricity distribution system, or to the quality and reliability of supply to Vector's customers, other than the normal intrinsic risks associated with the management and operation of an electricity distribution system.

SKM and the Project Team would like to thank AECT for the opportunity to conduct this consultancy assignment, and to Vector Limited and staff for the cooperation and assistance in providing complete and timely information.

We look forward to the opportunity of being of any further assistance.

Yours faithfully



**Cliff Jones**  
*Project Manager*