ASSET MANAGEMENT PLAN

2013 - 2023

CENTRALINES
LIMITED

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This Asset Management Plan (AMP) is available for public disclosure and applies for the period 1 April 2013 to 31 March 2023. The AMP is reviewed each year and a revised AMP is expected to be available for public disclosure by 1 April 2014.

SECTION 1 Executive Summary

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SECTION 1 Executive Summary

1 Executive Summary

1.1 General History

Centralines is the power lines business that owns and manages an electricity distribution network serving the Central Hawke's Bay region. On behalf of electricity retailers, it distributes electrical energy that has been brought to the single point of supply near Ongaonga by the National Grid operator (Transpower) to approximately 8,285 connected consumers.

Coverage Area

The coverage area of the Centralines network is shown in the map below.

Figure 1-1: Centralines' electricity distribution coverage area

1.2 Purpose of the Asset Management Plan

The main purpose of this Asset Management Plan (AMP) is to comply with Centralines' obligations in terms of the Electricity Distribution Information Disclosure determination 2012. Centralines operates more detailed planning documents internally and this disclosure document is effectively a summary of these.

The asset management planning objectives for Centralines is to efficiently enable the provision of a safe, reliable supply of electricity to customers connected to the electricity network, and to the community at large. This is achieved through the application of sound engineering practices associated with the operation, extension and maintenance of the electricity network, coupled with investment analysis tools to enable prudent levels of investment while achieving acceptable levels of reliability, public safety and regulatory compliance.

This AMP is not a commitment or an approved programme for specific work. It does however highlight programmes of work and specific projects that are considered necessary based on the present level of services, known asset condition, customers' expectations and the existing business environment. As time evolves actual projects and programmes may differ from those highlighted in this plan, particularly where they are driven by specific customer requirements. Actual commitment to works will follow a detailed consideration of alternatives and cost-benefits on a case-by-case basis and will be authorised in accordance with the Company's policy for delegation of authority.

1.3 Asset Management Plan Structure

The structure of this AMP follows the format as prescribed in the Electricity Distribution Information Disclosure Determination 2012 and includes the following Sections:

1. **Section 2** identifies stakeholder interests, sets out responsibility for asset management and provides an overview of asset management systems and processes.
2. A detailed view of the assets covered in this Asset Management Plan is described in **Section 3**, including age, value and condition of assets by category.
3. Service Level targets, and Centralines' recent performance, are presented in **Section 4**, including justification for the selected metrics and targets.
4. Network Development Planning process, criteria and assumptions are reviewed in **Section 5**, along with the details of planned network development projects and programmes for the planning period.
5. Lifecycle Asset Management Planning including maintenance strategies, recent failure modes and renewal strategies are detailed in **Section 6**, along with details of renewal/replacement projects and programmes for the planning period.
6. **Section 7** – Non-Network Development, Maintenance and Renewal
   The non-network development section details the strategies, plans processes and projects employed by Unison to manage a collection of non-network assets. By in large these assets comprise IT systems and hardware as well as data networks. The approaches to creating,

upgrading or replacing assets (CAPEX) or maintaining them (OPEX) differ by asset class/type and these approaches are determined by specialists responsible for each asset class/type.

7. The Risk Management approach employed by Centralines is detailed in **Section 8**, including details of the risk management framework, key risks, mitigation strategies and preparedness of Centralines to respond to contingencies and emergencies.
8. **Section 9** then reviews performance against the plans presented in the 2012 AMP, including the identification of gaps, corrective action taken and improvement initiatives.
9. **Section 10** Capability to Deliver
   The ability to achieve the objectives of the plan is detailed in this section. Caveats to progress and achievement of stated objectives are listed and information is provided to support key assumptions and asset management planning processes.
10. A list of abbreviations used within the document is included in **Appendix A**.
11. Assumptions in asset management planning are discussed in **Section 2**.

1.4 Period Covered by the Plan

This AMP covers a period of 10 years from 1 April 2013 to 31 March 2023. Financial projections have been made for this period with more specific details identified for the earlier years. It should be noted that projections for the last 5 years of this plan are forecasts and, as such, include a greater degree of uncertainty than the projections for the first 5 years.

This plan was approved by Centralines' Board of Directors (the Board) on 27 March 2013.

1.5 Financial Summary of Asset Expenditure

Financial expenditure profiles and reconciliation is provided in more detail in schedules 11a and 11b.

	$000 (in nominal dollars)										
	31 Mar 13	**31 Mar 14**	**31 Mar 15**	**31 Mar 16**	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**	**31 Mar 23**
Consumer connection	360	255	260	265	271	276	282	287	293	299	305
System growth	95	245	229	207	227	287	293	299	305	311	317
Asset replacement and renewal	1,668	1,609	1,561	2,038	1,353	1,435	1,464	1,493	1,523	1,554	1,585
Asset relocations	118	122	125	127	130	132	135	138	141	143	146
Reliability, safety and environment:											
Quality of supply	40	41	42	42	43	44	45	46	47	48	49
Legislative and regulatory	-	-	-	-	-	-	-	-	-	-	-
Other reliability, safety and environment	1,870	490	427	223	769	453	462	471	480	490	500
Overhead to underground conversion	-	-	-	-	-	-	-	-	-	-	-
Subtotal - Capital Expenditure on Asset Management	**4,151**	**2,761**	**2,643**	**2,902**	**2,793**	**2,628**	**2,680**	**2,734**	**2,789**	**2,844**	**2,901**
Service interruptions and emergencies	285	270	276	281	287	293	298	304	310	317	323
Vegetation management	659	775	791	488	498	508	518	528	539	550	561
Routine and corrective maintenance and inspection	190	202	206	210	214	219	223	227	232	237	241
Asset replacement and renewal	894	1,175	503	513	523	534	544	555	566	578	589
Subtotal - Operational Expenditure on Asset Management	**2,028**	**2,422**	**1,775**	**1,493**	**1,522**	**1,553**	**1,584**	**1,616**	**1,648**	**1,681**	**1,715**
Total Direct Expenditure on Asset Management	**6,179**	**5,183**	**4,418**	**4,395**	**4,315**	**4,181**	**4,264**	**4,349**	**4,436**	**4,525**	**4,616**

SECTION 2 Background & Objectives

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SECTION 2 Background & Objectives

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2 Background and Objectives

2.1 Purpose of the Asset Management Plan

The asset management planning objectives for Centralines is to efficiently enable the provision of a safe, reliable supply of electricity to customers connected to the electricity network, and to the community at large. This is achieved through the application of sound engineering practices associated with the operation, extension and maintenance of the electricity network, coupled with investment analysis tools to enable prudent levels of investment while achieving acceptable levels of reliability, public safety and regulatory compliance.

This AMP is not a commitment or an approved programme for specific work. It does however highlight programmes of work and specific projects that are considered necessary based on the present level of services, known asset condition, customers' expectations and the existing business environment. As time evolves actual projects and programmes may differ from those highlighted in this plan, particularly where they are driven by specific customer requirements. Actual commitment to works will follow a detailed consideration of alternatives and cost-benefits on a case-by-case basis and will be authorised in accordance with the Company's policy for delegation of authority.

2.2 Corporate goals, business processes and plans

Centralines' corporate goals are outlined in the Statement of Corporate Intent, and are summarised below:

Company Vision

- **Striving to secure the future**

Company Mission

- **To provide, in a sustainable manner, a safe, efficient and reliable electricity network system**

Company Values

- **Safety First.** Centralines values the wellbeing and safety of its staff, its contractors and the community.
- **Team work.** Centralines values the contribution of all the members of the team. We place the ambitions of the team and company above personal ambitions.
- **Continuous Improvement.** All staff are encouraged to be innovative and creative in the ongoing improvement of processes, services and results.
- **Integrity.** Centralines is committed to the achievement of the highest levels of integrity, with all staff encouraged to set a great example in every facet of their work.
- **Accountability.** All staff are encouraged to exercise appropriate judgment and be accountable for their actions.
- **Respect and Appreciation.** We treat all people with dignity and respect; we appreciate diversity of backgrounds, and recognise the contribution of others.
- **Enjoyment.** Centralines believes that coming to work should be a rewarding experience.

Company Objectives

The Company is an "electricity lines business" as defined in Section 4 of the Electricity Industry Reform Act 1998. The Company, through a focus on service and recognition of the value of skilled staff, will strive to achieve the following objectives:

Safety
Centralines' objective is to achieve an injury-free workplace by creating a culture where each person truly believes that "safety first" is a core value, and that working safely is part of all employees' everyday activities.

Financial Performance
Centralines shall deliver sustained financial performance through sound investment policy, efficient and cost effective services, and strategic growth.

People
Centralines is committed to building an organisation that people want to be a part of. We aim to develop a performance driven culture that is guided by company values. The business must ensure that it has the appropriate number of skilled and engaged employees to deliver operational success.

Network Performance
Centralines aims to sustain and improve the level of network performance to our customers while improving emergency response through enhanced network security and safety.

Works Delivery
Centralines shall deliver its Asset Management Plan commitments to ensure the continued operation of the network meets stakeholder requirements.

SECTION 2 Background & Objectives

Customer Service
Centralines aims to not only meet, but exceed customer expectations through the provision of an economic electricity network service to consumers, priced at sustainable levels, and characterised by on time, on budget, delivery. A customer driven approach is coupled with strong network performance to deliver high levels of customer satisfaction.

Community
Centralines aims to be a good corporate citizen by engaging with our customers and community to understand their needs and expectations and responding appropriately.

Compliance
Through a culture of compliance, Centralines will deliver against its legal, corporate governance and community obligations.

2.3 Relationship with other planning documents

This AMP is a key component of Centralines' planning process which is linked to the following documents:

Statement of Corporate Intent (SCI): Centralines' SCI is published annually and approved by the Trust on behalf of shareholders. The SCI sets out key goals, objectives and performance indicators for the business, including key asset management objectives.

Business Plan: The Business Plan sets annual goals and objectives and key performance indicators for the business. The service levels, policies, processes and budgets defined in the AMP are incorporated in the annual business plan as activity budgets, management strategies and performance measures.

Risk, Environmental and Health and Safety Plans: These identify actions to achieve relevant objectives set in the Business Plan.

Capital Expenditure and Operational Expenditure (CAPEX and OPEX): Projects and works programmes detailed in the AMP are translated into specific expenditure plans each financial year, consolidated in the annual budget.

There are also other corporate plans, including legislative compliance, HR focussed plans etc that are developed to support and achieve objectives that are set by the business plan.

Figure 2-1 following illustrates the links and information flows between the strategic plan and other Centralines' corporate and operational plans.

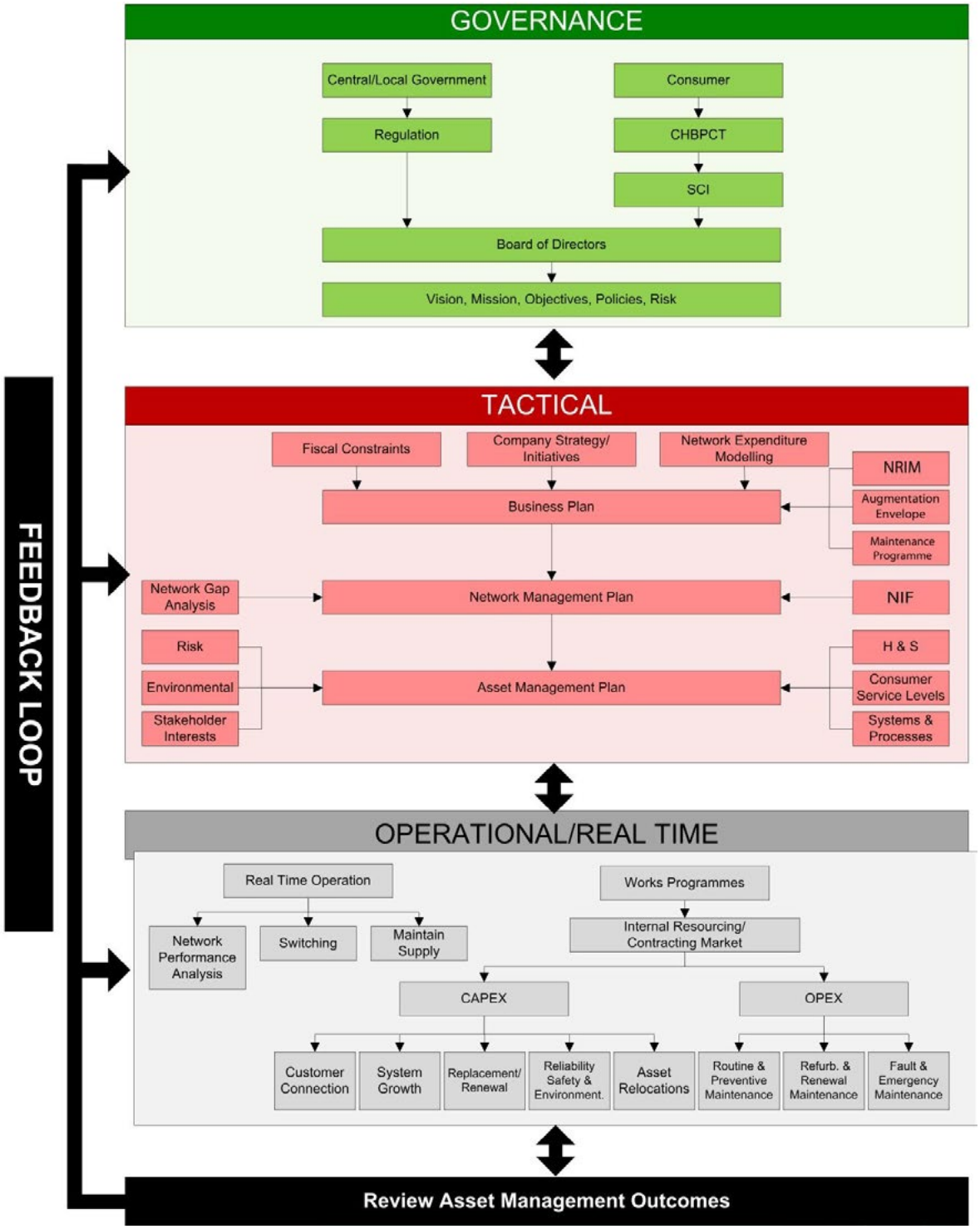

Figure 2-1: Information flows in Centralines' planning process

SECTION 2 Background & Objectives

2.4 Stakeholders' Interests

Centralines' key stakeholders, their interests and the methods used to gain understanding of these interests are detailed in Table 2-1 following. This list is not intended to be exhaustive.

Stakeholder	Key Interests	Engagement methodology
Key Customers and other interested parties	Connection policies Price (Line charges) Service reliability and quality Safety Timely information regarding connection and outages	Routine relationship meetings with key customers. Specific customer satisfaction surveying following provision of service. Customer research surveys. Media Releases and Communications Strategy.
Contractors	Continuity of work Contractual relationship Safety	Regular coordination meetings. Onsite induction and auditing. Relationship management meetings.
Councils	Environmental impact (RMA, District Plan) Local economic development Safety of Community	Strategic Issue meetings. Consultation regarding planned to works to enable coordination.
Developers	Connection policies Timely network connection	Specific project meetings. Timely delivery of agreed works.
Employees	Health and Safety Positive, professional work environment Sustainable employment	Performance Appraisals. Staff engagement surveying. Involvement in planning processes. Monthly briefing detailing performance with delivery of asset management targets.
Energy Retailers	Contractual relationship Line charges Service reliability and quality	Use of System Agreement. Ad hoc meetings.
Government/Regulators	Statutory obligations Consumers Economic efficiency	Submissions. Relationship meetings. Industry conferences.
Interest and community groups	Policy Reliability and Pricing Safety	Individual consultation.
Media	News, PR, environment, information channels, crises	Regular meetings.

Stakeholder	Key Interests	Engagement methodology
Shareholders (CHBPCT)	Return on investment Quality of governance	Regular meetings with Directors. Statement of Corporate Intent.
	Community representation Price/quality Maintenance of infrastructure capability	Annual General Meeting.
Transpower	Network development requirements Operational capability	Regular relationship meetings. AUFLS and Participant Outage Plans.
Centralines Board of Directors	Shareholders' interests Statutory obligations Alternative non-regulated revenue Community interests Management performance	Regular Board Meetings with the Executive team.

Table 2-1: Stakeholders' key interests

Identification of the interests of each stakeholder group is essential to ensuring the practices in the AMP accommodate these interests in an equitable manner.

Centralines has an interposed agreement with customers. This means that whilst Centralines provides services to customers, the contractual counterparty for these services is currently retailers. Centralines recognises that to advise, consult and consider customers' expectations and offer services and prices consistent with customers' requirements, feedback needs to be sought via a survey based approach to gain a representative view of the stakeholder. To achieve this Centralines undertakes regular research surveys, as well as surveying customers for whom services have been recently delivered. This helps the Company to gain understanding of satisfaction levels with the services delivered. This is discussed in detail in Section 4.

The relationships detailed in Table 2-1 above are essential when conflicts of interest inevitably arise between stakeholder groups. In general, the approach undertaken to address conflicts of interest is primarily education with the respective stakeholders to ensure sufficient information is available to gain a comprehensive understanding of influencing factors. This is then followed by leading the stakeholders through the decision making process, enabling a detailed understanding of the conflicting requirements, and the available outcomes. This approach generally results in an agreed and acceptable outcome for all parties.

These stakeholder interests are incorporated into Centralines' asset management practices in many ways, particularly when it comes to providing a safe, reliable supply of electricity. Centralines actively monitors network performance, which is continually being reviewed at network performance review meetings. These meetings are attended by representatives from the wider business and cover investigation of failures, review of response times to outages, suitability of operational restoration procedures and options to improve network configuration to minimise recurrence and support improvements in future restoration. Network performance is a standard item for monthly operational reporting and is a standing agenda item at each Board meeting.

In addition, all network incidents that result in a potentially unsafe situation are investigated, with subsequent reporting then utilised to challenge existing asset management practices, and educate staff and contractors regarding lessons learnt.

Regular reviews are undertaken by external experts to ensure Centralines has sound asset management practices. These reviews are conducted by Unison Networks Limited, and external industry experts.

2.5 Asset Management Accountabilities and Responsibilities

Ultimate responsibility for the planning and execution of the AMP rests with the Board and is delegated to the Chief Executive. In agreement with the Management Team, the Board approves a level of network investment each year for Operational Expenditure (OPEX) and Capital Expenditure (CAPEX).

The CAPEX works programme is comprised of projects classified as either: Customer Connection; System Growth; Reliability, Safety and Environment; Asset Renewal and Replacement; and Asset Relocations. This works programme includes both defined projects (generally for all company generated projects), and unspecified works, both of which are approved by the Board as part of the annual budgeting process, which precedes the compilation of the AMP.

The OPEX works programme is comprised of both preventative, corrective and unplanned maintenance. The preventative maintenance includes programmes of preventative and routine inspection activities. The corrective maintenance plan details planned refurbishment activities across all asset classes. Unplanned expenditure is generally based on a forecast average number of activities across each asset class, with an average cost per activity. Similar to CAPEX, the OPEX works programme is approved by the Board as part of the annual budgeting process which precedes the development of the AMP.

Performance against the approved works plan is then reported to the Board on a monthly basis. Exception reporting is utilised to show significant timing or financial issues arising associated with an on-time, on-budget performance focus for both CAPEX and OPEX works programmes. Remedial actions are debated, agreed and minuted as part of the monthly performance review process with the Board.

Centralines' management structure is shown below in Figure 2-2. Each functional group has its own defined and documented responsibilities in relation to the AMP as detailed below:

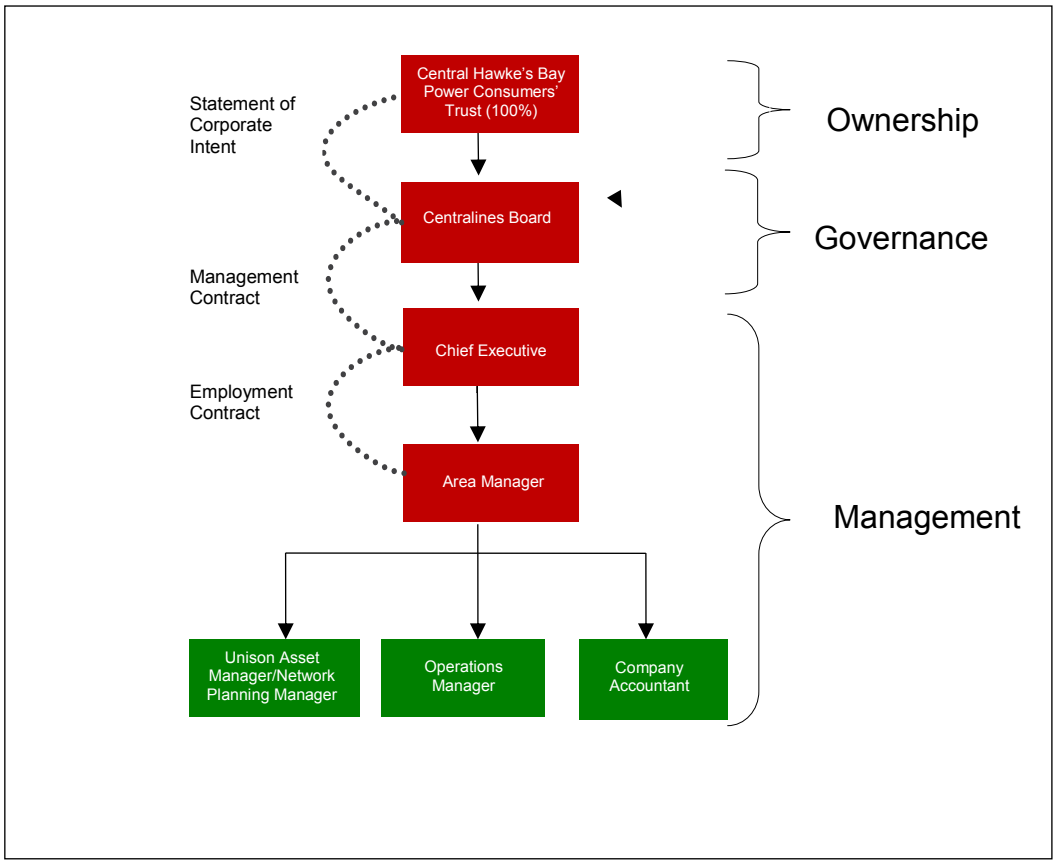

Figure 2-2: Centralines executive management team

Centralines Board: Responsible for the governance of the business and managing the management contract with Unison.

Chief Executive (Unison Employee): Responsible for the overall management of the Centralines business, providing the services outlined in the management contract; reporting directly to the Centralines Board of Directors.

Area Manager (Unison Employee): Responsible for the day-to-day operation of the business, co-ordinating all functions. This includes the establishment and maintenance of Asset Management policies and procedures for Centralines, as well as co-ordination of services delivered by specialist asset management and network development staff employed at Unison.

Operations Manager (Unison Employee): Responsible for the delivery of all CAPEX and OPEX works, including the coordination of internally resourced works, as well as management of the delivery of outsourced works. This role is also responsible for provision of monthly performance reporting against plan.

Unison Asset Manager and Network Planning Manager: These Unison positions are responsible for the following services for Centralines:

Network Planning

1. Annual Network Development Plan – 10 year horizon;
2. Annual Reliability Planning – 5 year horizon;
3. Project Approval Reports for selected projects;
4. Protection Review - 2 yearly;
5. SCADA/Comms Network Review;
6. Assessment of major customer connections.

Asset Management

1. Asset Management Planning;
2. Asset Performance Reporting;
3. Asset Analysis and Investigations;
4. Defect Remediation Coordination.

Company Accountant (Unison Employee): Responsible for the development and monitoring of the annual budget to support the performance reporting undertaken by the Operations Manager and Unison Asset Manager.

The delivery of the OPEX and CAPEX works programmes is delivered via a combination of both Centralines staff and external contractors, with accountabilities for coordination of delivery as described above.

Typically, works are outsourced that Centralines either does not have the internal expertise or sufficient resource to efficiently undertake the works. This is generally limited to large capital network lines projects or substation projects, as well as routine substation maintenance.

All internally and externally delivered works are managed by the Operations Manager.

In brief, the key roles with asset management responsibilities, additional to the management team discussed above include:

1. Network Designer – responsible for supply investigations, distribution transformer and low voltage network development planning, preparation of quotations for customer requested works, and project scopes for internally initiated works on the Centralines' network. In addition the role is responsible for the preparation of network designs to comply with Centralines' standards in a timely manner to enable construction to be completed to meet requirements.
2. Field Services Coordinator – responsible for the coordination of all internal field resources, including lines construction and maintenance crews, response crews and customer service field staff.
3. Electrical Services Team Leader – responsible for the routine minor maintenance and operation of Centralines' substation assets.

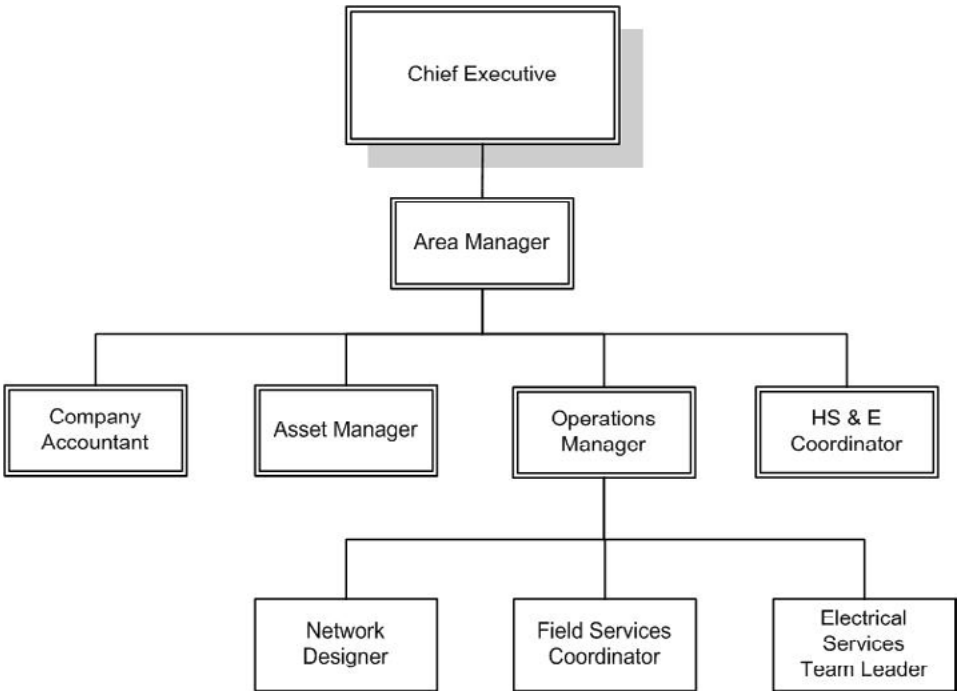

Figure 2-3: Centralines management team

2.6 Asset Management Processes

2.6.1 Processes for Planning and Implementation of Network Development Projects

The process for the planning and implementation of network development projects is dependent upon how the need for the project initiates, which is categorised as either 'customer requested' or 'company initiated'. These are discussed in turn:

Company initiated

The need for new company initiated projects are generally identified from annual planning processes or the results of preventative maintenance activities both of which are discussed in detail later in this plan. All candidate projects are reviewed, options considered and selected option scoped. On an annual basis, these projects are individually assessed against investment criteria in the Investment Prioritisation Framework (IPT) to enable a priority to be assigned against each identified project, relative to other projects.

The annual network development plan is then compiled, comprised of the highest priority projects. The plan is then presented to the Board of Directors for consideration and decision in conjunction with annual budget planning. The subsequently approved programme of projects is then progressed, with monthly reporting against timing and budget targets for each project.

A similar process is employed to determine longer term network development plans.

Customer requested

Following a customer request for network extension or upgrade, the customer requirements are first determined from a timing, cost and quality perspective, and options to meet these requirements developed. In consultation with the customer, the most suitable option is selected, and detailed design and costing then prepared, and a quotation forwarded to the customer. Upon customer acceptance, the project is then scheduled for completion and progressed, with monthly reporting against timing and budget targets for each project.

2.6.2 Processes for Managing Routine Asset Inspections and Network Maintenance

Routine asset inspection programmes and subsequent network maintenance is undertaken across all assets installed on the Centralines' Network. The timing associated with each programme is driven by regulatory and asset performance thresholds. These are discussed in detail in Section 6 for each asset group following. A summary of the processes employed for each asset group follows.

Overhead Sub-transmission and Distribution Lines

A five year asset inspection programme is established for the inspection of all overhead conductor, poles and associated hardware. The asset inspection process includes assessment from the ground by an inspector, with prioritised defects electronically stored via the mobile asset inspection system and uploaded into WASP. The identified defects are then packaged and issued for remediation within the regulatory requirement, with the exception of urgent priority defects, which are attended to within ten days, or more urgently dependent upon the situation.

The sub-transmission overhead network is patrolled on an annual basis to enable the identification of assets that are at risk of failure under adverse weather conditions. These patrols and remediation of subsequent defects are programmed such that all work is completed in readiness for the winter period.

Underground Sub-transmission and Distribution Lines

A five year asset inspection programme is established for the inspection of all underground conductor tails, pillars and associated hardware. The asset inspection process includes assessment from the ground by an inspector, with prioritised defects electronically stored via the mobile asset inspection system and uploaded into WASP. Remediation of defects is the same process as per overhead lines.

Zone Substations

All Centralines' plant with zone substations is routinely maintained, with condition monitoring on an annual basis, and dependent upon the age, condition and type of plant, routinely maintained on either an annual, two-yearly, six-yearly or ten yearly cycles. The asset maintenance programme is undertaken by external contractors and is complemented with a weekly inspection and six month major inspection cycle undertaken by Centralines.

Ground Mounted Transformers

An annual inspection and maintenance programme is undertaken, where each ground mounted transformer is inspected and maintained. Generally, most maintenance is relatively minor and can be completed at the time of inspection. Where this is not possible, the remedial works are programmed for completion following planning and scheduling of the works.

Overhead Mounted Transformers

A five year asset inspection programme is established for the inspection of all pole mounted transformers. The asset inspection process includes assessment from the ground by an asset inspector, with prioritised defects electronically stored via the mobile asset inspection system and uploaded into WASP. Remediation of defects is the same process as per overhead lines.

Distribution Switchgear

Asset inspections for distribution switchgear is as follows:

- An annual asset inspection programme is established for the inspection of all ground mounted switchgear;
- A 5 year asset inspection programme is established for the inspection of all pole mounted switchgear, with the exception of reclosers/sectionalisers/remote control switches;
- A 3 monthly battery test and minor inspection followed by a 12 month detailed and inspection and function test is undertaken for all sectionalisers, reclosers and remote control switches.

The asset inspection process includes assessment by an asset inspector, with prioritised defects electronically stored via the mobile asset inspection system and uploaded into WASP. Remediation of defects is the same process as per overhead lines.

Earthing

A five year asset inspection programme is established for the inspection of all distribution asset earthing. The asset inspection process includes assessment by an inspector, and the measuring of the current earth reading which is recorded and electronically stored within WASP. Past practice within Centralines was to install single earth banks at distribution asset sites. This is now non-compliant with current standards, which specifies dual earth banks. These single earth banks are upgraded to a dual earth bank arrangement, when remedial work is completed on these assets.

Vegetation management

Vegetation sites are visited as part of the Centralines' vegetation management programme. This programme undertakes to assess all vegetation sites within network clearance zones as appropriate given re-growth rates of the vegetation onsite. It should be noted that a survey of the entire network was undertaken in preceding years which enabled the development of a targeted programme to revisit high re-growth sites on an annual basis and slower growth sites to be revisited on a two-year year cycle. Each site is assessed based on individual risk to network assets and recorded for entry into the Centralines' vegetation database. Sites are prioritised for action based on this risk assessment.

Vegetation sites affecting the sub-transmission network assets are assessed on an annual basis as part of the annual line patrol.

2.6.3 Processes for Measuring Network Performance for Disclosure Purposes

SAIDI and SAIFI measures are utilised to enable understanding of Network Performance. These two measures indicate the duration and frequency impact of high voltage outages across all customers connected to the Centralines network as an average.

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The calculation for SAIDI / SAIFI commences at the time logged by the Control Room of the first notification of a high voltage fault. This notification is either through acknowledgement of an alarm generated via the SCADA system indicating the operation of a substation or field mounted switch, or via a customer call. The logging of the fault and subsequent response and completion time are recorded and retained electronically, enabling calculation of the duration of the outage and further analysis of impact of the fault types experienced.

Data recording uses current auditable practices, to assess the number of customers totally or partially affected. It also measures the total duration of the outage and the restoration, or partial restoration times for sections of the circuit as they are restored.

2.7 Significant Assumptions in the Asset Management Plan

2.7.1 Significant Assumptions Table

Assumption 1	
Name of Assumption	Management Services Continuity.
Description of Assumption	It is assumed Centralines will continue with the Management Services Agreement with Unison, which includes Unison providing expertise, systems and support that enable Centralines to manage its assets. This also assumes that development of systems and processes discussed in the asset management plan will be realised, as the development is initiated at Unison.
Quantification of Assumption (approach to quantifying & any values)	Centralines and Unison are contractually bound by the current Management Services Agreement until 31 March 2014. Intention of both organisations is to continue with the current arrangements throughout the planning period.
Significance	Dissolution of the contract may be initiated by either party, with obligations of both parties in such an event prescribed in the Management Services Agreement.
Changes proposed to assumption	No changes are proposed.
Sources of uncertainty and potential impact	Potentially, dissolution of the contract would require Centralines to secure additional technical staff to maintain and support systems, and undertake asset management functions including planning, analysis and reporting.

Assumption 2	
Name of Assumption	Major Customer Continuity.
Description of Assumption	It is assumed the two current major customers supplied via Centralines' network will continue to require energy from the Centralines' network at the same or similar levels throughout the planning period. This is assumed as the potential relocation of either customer outside of the Centralines area would have a substantial negative effect both on the local economy, and on the revenues of Centralines.
Quantification of Assumption (approach to quantifying & any values)	The relocation of either of the two major customers from their current sites is not currently under consideration to the knowledge of Centralines.
Significance	Any such, decision rests entirely with the companies concerned.
Changes proposed to assumption	No changes are proposed.

Assumption 2	
Sources of uncertainty and potential impact	Potentially the loss of either of the major customers would substantially impact the regulated revenue of Centralines, which may place considerable pressure on the capital and to a lesser extent the operating forecasts proposed in this AMP. It is possible that Capital expenditure would be curtailed for discretionary projects, and maintenance plans reduced where assets are no longer required to operate at forecast levels.

Assumption 3	
Name of Assumption	Data Integrity of Asset Systems
Description of Assumption	It is assumed that the integrity of the data held in the Fixed Asset Register, WASP and the GIS are accurate to a sufficient extent to ensure that analysis, simulations and models are not distorted substantially by poor base data.
Quantification of Assumption (approach to quantifying & any values)	The basis of this assumption is that data inputs are completed under robust processes, and data extracts are being taken regularly and compared against either previous data or actual assets on site. This enables the identification of data inaccuracies, highlighting a process issue to be corrected.
Significance	There are a number of lines assets where the installation date is unknown, highlighted in Section 3. These are progressively being addressed as part of a data quality initiative.
Changes proposed to assumption	No changes are proposed.
Sources of uncertainty and potential impact	Potentially these inaccuracies may result in a greater number of line assets needing to be replaced/renewed/refurbished earlier than planned, however this is mitigated by the asset inspection process which prioritises any such action based on assessed condition.

Assumption 4	
Name of Assumption	Customer Price and Quality expectations stability.
Description of Assumption	It is assumed that the customers' and shareholders' expectations, in terms of acceptable reliability and appropriate price of electricity supplied, remain relatively stable throughout the planning period.
Quantification of Assumption (approach to quantifying & any values)	This assumption is based on representative customer research that has indicated Centralines' customers are generally comfortable with the current levels of performance, in consideration of current price. Further, customers have indicated that generally they are not willing to trade off improved or lesser performance for price increases or decreases respectively.
Significance	Changes in energy consumption patterns through differing energy requirements may well lead to changed expectations of acceptable levels of reliability and quality of electricity supply. This could be driven by changes in technology, or a significant reduction in cost of some technologies.
Changes proposed to assumption	No changes are proposed.
Sources of uncertainty and potential impact	Potentially this may result in a requirement for Centralines to improve performance against service levels beyond those planned, as detailed in Section 4. This would require additional forecast expenditure, dependent upon the extent of improvement required.

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Assumption 5	
Name of Assumption	Accuracy of Growth Forecasts.
Description of Assumption	It is assumed that growth forecasts within Centralines' area will follow historical trends, which have seen relatively stable and predictable change in recent years.
Quantification of Assumption (approach to quantifying & any values)	This assumption is based on the fact that, historically, base customer numbers have changed slowly and predictably.
Significance	There are numerous factors that change the growth forecasts for the Centralines' area. Given that Centralines is a small company, an additional large customer, or large increase in load driven by many smaller connections, can place significant demands on the network.
Changes proposed to assumption	No changes are planned.
Sources of uncertainty and potential impact	The potential emergence of significant growth outside the current forecast will, over time, fundamentally change the network development plans for Centralines.

Assumption 6	
Name of Assumption	Accuracy of Load Forecasts.
Description of Assumption	It is assumed that load forecasts detailed in Section 5 accurately represent the changes in loading on the Centralines' network for the planning period.
Quantification of Assumption (approach to quantifying & any values)	The basis of this assumption is detailed in Section 5, and primarily is drawn from a simulation based on historical changes in load, and forecast changes in demographics for the Central Hawke's Bay Region. There is no firm information available presently that suggests wholesale changes in electricity usage in the Centralines' network area.
Significance	Load growth is inherently difficult to forecast due to the volatile nature it inputs, such as the potential introduction of more affordable technology that changes individual energy requirements and usage patterns. Examples include the emergence of individual generation capability, increased levels of large scale distributed generation, and large scale emergence of electric cars. While no potential significant changes are certain, the Ruataniwha Plains development will drive major investment by Centralines in the event the works proceed.
Changes proposed to assumption	The Regional Council is investigating the establishment of 620ha of dams on the Ruataniwha Plains, which will change land use in the district drastically. This study is still in its on-going, with greater certainty becoming clearer during 2013/14 as the study progresses.
Sources of uncertainty and potential impact	The potential effect of significant variations to the load forecast presented in Section 5 is dependent upon the size and location of any significant increases. The network is currently reasonably lightly loaded, and is capable of catering to demands in excess of forecast, dependent upon other impacts such as voltage regulation. Irrespective of this, increased load beyond forecast may introduce a requirement to increase capital expenditure to ensure the network is appropriate to supply the additional load.

Assumption 7	
Name of Assumption	Accuracy of Asset Inspections.
Description of Assumption	It is assumed the asset inspection processes will accurately assess the condition of an asset, and identify assets requiring replacement, renewal or refurbishment in a timely manner, given current inspection programme cycles.
Quantification of Assumption (approach to quantifying & any values)	Assumptions regarding the assessed condition of an asset have been built from analysis of failures, both from within Centralines and Unison, as well as from within the industry.
Significance	Assessment of condition is generally completed via non-invasive techniques, thus not reducing the service life of the asset further. As a result, this introduces considerable subjectivity into the assessment process, particularly when trying to determine the remaining service life of components under stress, such as cross-arms, kingbolts, poles etc.
Changes proposed to assumption	No changes are proposed.
Sources of uncertainty and potential impact	The potential effect of inaccuracies in assessment is either earlier than required remediation, or an in-service failure. The techniques currently employed are aimed at identifying a defect at risk of failure prior to the next assessment cycle, enabling it to be remediated prior to an in-service failure. Provision for reactive maintenance has been included to enable appropriate reaction to in-service failures.

Assumption 8	
Name of Assumption	Accuracy of Expenditure Forecasts.
Description of Assumption	It is assumed the requirement for funding in accordance with Section 11 is an accurate forecast of the requirements of Centralines to enable achievement of the planned works detailed in the asset management plan.
Quantification of Assumption (approach to quantifying & any values)	The financial forecast has been created based on the current estimation standards employed by Centralines, and assumes labour and material costs will change during the planning period in accordance with rates similar to historical actuals, and that forecasts and estimates for works are accurate.
Significance	For the reasons discussed in 1.1 to 1.7 inclusive in this appendix, there exists a number of potential impacts that may influence the level of expenditure required, which may differ from the forecast as presented. Furthermore, changes in the labour market, commodity prices and exchange rates add extra volatility.
Changes proposed to assumption	No changes are proposed.
Sources of uncertainty and potential impact	Material changes to expenditure are to some extent inevitable, and history has shown that these need to be accommodated through reprioritisation, or the securing of additional funding. As a result, such changes are expected to drive refinement of the forecast between asset management plan disclosures.

SECTION 2 Background & Objectives

2.8 Application Systems and Information management overview

2.8.1 Application Systems and integration

Centralines uses a range of information and telecommunications systems to support operations and planning. The general application landscape is depicted in Figure 2-4 below, with a detailed discussion regarding applications utilised for the management of assets following.

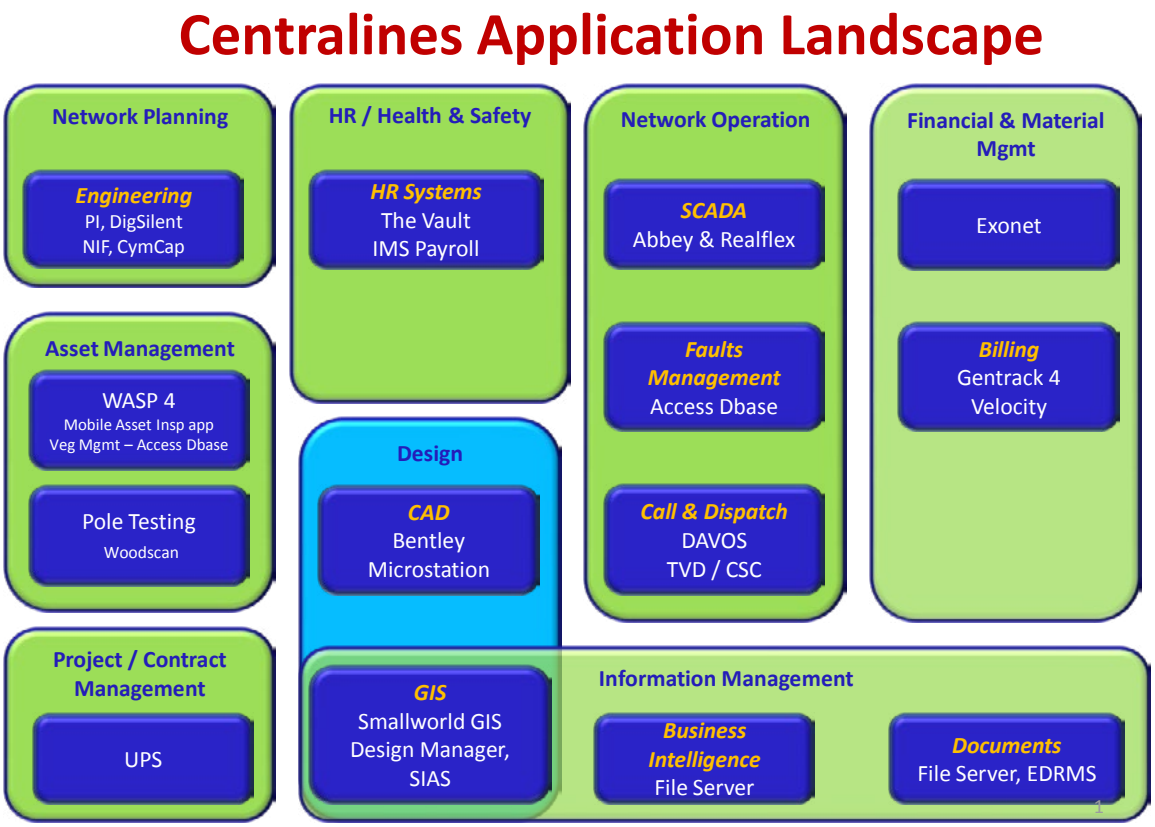


Figure 2-4: Centralines IT systems

The key systems specifically relating to monitoring performance or recording asset condition and operational capacity:

Geo-Spatial Information System (GIS)

The Geo-Spatial Information System (GIS) stores records of Centralines' network assets according to their location and electrical connectivity. GIS supports many of the operational and strategic management activities throughout the business. The GIS system provides the following support functions:

- Primary data source for asset valuations;
- Data source for network modelling applications;
- Reference system for asset locations and planned works;

- Reference system for roads, properties, easements, topological maps and aerial photography;
- Reference system for high voltage network schematics (single-line diagrams);
- Geographic and topological analysis of network data.

Asset Management System

Centralines' current Asset Management System is EMS WASP. The WASP asset register is the main repository for asset data and stores both current attributes as well as historical information. The asset data that WASP records is available for viewing by the GIS thus providing consistency of information.

WASP supports the following key functions:

- Primary data source for asset history;
- Initiation of Asset Inspection regimes;
- Asset Life Cycle management;
- Recording of actions undertaken on an asset;
- Initiating maintenance projects.

Mobile Asset Inspection

Overhead Line Asset Inspection is supported by an application developed by Unison. It utilises IPAQ mobile devices for field use and is interfaced with the WASP Asset Management system.

The application supports:

- Downloading of the asset inspection regimes and previous Inspection details from the Asset Management System;
- Asset inspection results;
- Uploading of the results to the Asset Management System.

Fault Management System

Faults are received and managed by the Unison Control Room, on behalf of Centralines. Unison utilises an in-house developed database for the management of customer faults, retailer actions and network faults. The Faults Management System also provides functionality for supporting network switching activities. The complete range of functions is:

- Logging of retailer action requests;
- Logging of customer fault calls and issuing of work requests to Centralines staff;
- Logging of network fault calls and issuing of work requests to Centralines staff;
- Logging of switching requests to allow efficient programming of the internal Service Group and external contractors action requests;
- Issuing of switching instruction ID numbers for switching activities;
- Provision of source data for network performance reporting (SAIDI and SAIFI).

SECTION 2 Background & Objectives

SCADA System

Centralines operates Realflex and ABBEY SCADA systems. These are regarded as the ideal SCADA systems for a small size organisation such as Centralines. The system runs on an IBM based client server system. The SCADA system is used for:

- Control and monitoring of remote system devices, such as circuit breakers, sectionalisers, reclosers, remote controlled switches, and power transformer tap changers and protective devices;
- Gathering historical analogue and digital data from remote terminal units (RTUs), load control, automatic load shedding, emergency load shedding;
- Logging of changes to system device states, authorisation to work and information for SAIDI calculations;
- Load control management.

The system enables remote operation from the Unison Control Room.

Plant Information (PI) System

This system is a real-time data trending and analytical tool. Real-time data is continuously extracted from the SCADA system for analysis within the PI system. PI is an essential asset planning and forecasting tool used by Centralines' planning engineer.

2.8.2 System controls and process

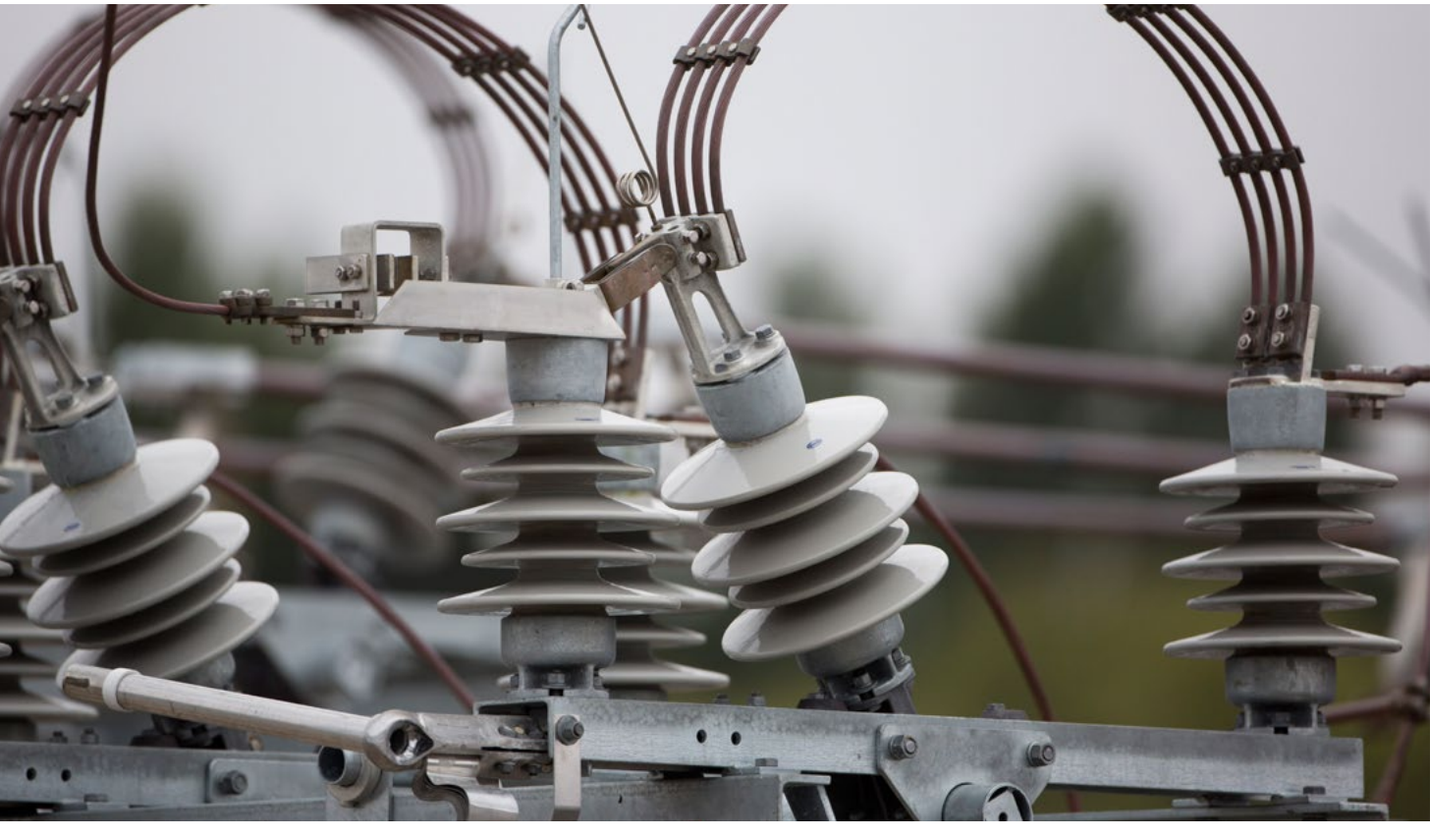
Centralines utilises a master data management system architecture to enable a single system of record and data ownership. Data attributes are either owned by a centralised master data management system or alternatively a defined system of record. System to system integration is used to allow this data to be used elsewhere in the business.

Centralines has several processes in place to maximise data quality in addition to various continuous data improvement programmes, including:

- Design and build workflows are implemented to audit and verify 'as built' information back to the original design information and system data population.
- Exception reports are run on a regular basis and identify differences in the data between the GIS and the Asset Management Information System. Corrections to the data take place on a case by case basis after investigation. These exception reports also look at information around easements to identify where we have easement information which has not been updated in the GIS.
- Physical audits are carried out by GPS of particular assets to ensure that the process of recording location has been correctly followed.
- A mobile tool is used in the field to allow ad hoc data audits, providing a feedback loop where discrepancies are found.
- Network feeder inspections take place to identify any anomalies in SCADA and GIS data. Corrections take place as required.

- Feedback is provided from contractors when anomalies are found on site when compared to the plan from the GIS or CAD. These are then investigated and corrected when required. This feedback is on an as discovered basis rather than a formal programme of inspection.
- Specific high priority data quality issues are being progressively rectified as projects.

SECTION 3 Assets Covered



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LIMITED

3 Assets Covered 3-3

SECTION 3 Assets Covered

3 Assets Covered

This section of the AMP describes the assets covered on the Centralines network. This section logically follows the conceptual asset hierarchy in its structure and content (asset hierarchy depicted in Figure 3-1 in Section 3.1). Summary information on the Centralines portfolio of assets lays the section foundation and is built upon with greater detail incorporated on asset systems and classes of individual assets.

3.1 Centralines Asset Hierarchy

Figure 3-1 below depicts the Centralines asset hierarchy. Discrete assets create the physical Centralines network, however it is often not possible to extract value from these assets until they are placed in an asset system. The most common example of an asset system for Centralines is an electrical circuit made up of various components or discrete assets. Lifecycle decisions are made for assets at both the discrete asset level and asset system level and combine to maximise realised value for the asset portfolio.

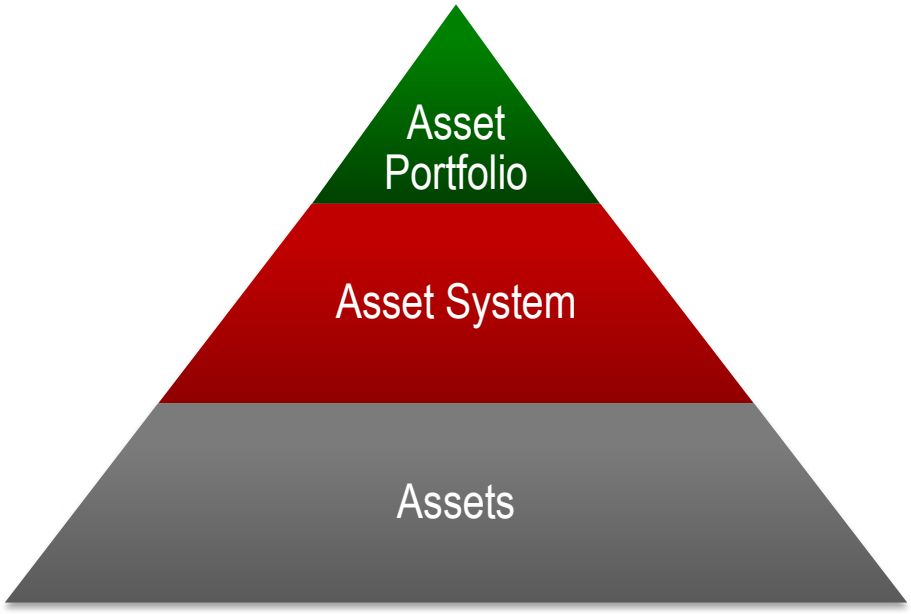


Figure 3-1: Centralines asset hierarchy

3.1.1 Area Covered

Centralines owns, manages and operates a distribution network which matches the boundaries of the Central Hawke's Bay District Council. This region covers the urban centres of Takapau, Waipawa, Waipukurau, Otane, Ongaonga, Tikokino and Porangahau, and covers an area of approximately 3,334 square kilometres and serving approximately 8,300 customers.

SECTION 3 Assets Covered

The Central Hawke's Bay terrain is a blend of coastal North Island terrain, with rugged hinterland bordering the coast in the east, leading to undulating farm land which changes to flat plain farming country around the urban centres. This flat plain continues west across the Central Hawke's Bay until meeting the Ruahine Range in the extreme west.

Local weather is characterised by typically dry, hot summers, frosty winters and rain more prevalent during the colder months, peaking usually through spring. The most consistent period for adverse weather is spring, when extreme wind accompanied by heavy rain and hail is most common, creating challenging conditions for the network and response teams. Landslides during the wet season are quite common for the Centralines region.

The local terrain and weather conditions have proven to be ideal for sheep, beef and dairy farming, interspersed with fruit and small crop farming. As a result, farming is the predominate industry for Central Hawke's Bay, combined with meat processing facilities that are the two largest electricity customers, and are discussed in section 3.1.2 following.

Figure 3-2 shows the geographic area relative to the North Island.

Figure 3-2: Centralines' electricity distribution coverage area

3.1.2 Major Consumers

Centralines has two major consumers supplied from the 11kV distribution network. In total, these two customers represent approximately 27% of the maximum demand on the Centralines network. These customers are:

a. Silver Fern Farms at Takapau. It has dedicated dual circuit 11kV feeders supplying into their switch room equipment from the Takapau zone substation. In total, Silver Fern Farms represents approximately 22% of the total maximum demand on the Centralines network.

b. Ovation Limited. It is supplied off an 11kV distribution feeder that also supplies part of the Waipukurau CBD, and has full backup capacity. Ovation represents approximately 5% of the total maximum demand on the Centralines network.

3.1.3 Load Characteristics

Beyond the two major customers, the load within the Central Hawke's Bay is a blend of light commercial, industrial, residential and agricultural loads. Given the hot dry summers, and the extent of stock farming, the system experiences a summer peak load driven by irrigation and cooling load across the industrial, commercial and residential sectors. In total, the network has a current load factor of 62%.

3.1.4 Peak Demand and Total Energy Delivered

The peak demand and total energy delivered are as follows:

Peak Demand (MVA)	20
Energy Supplied (GWh)	109
Installed Distribution Capacity (MVA) [(1)]	85
Portion of Distribution Network Underground	4.60%
Loss factor	6.5%

(1) The Installed capacity is the MVA sum of all Centralines owned distribution transformers in service as at 31 March 2012

Table 3-1: General system statistics

3.2 Description of Network Assets

3.2.1 Supply Points

The region has no embedded generation connected to the Centralines network and is totally supplied from a single GXP at Ongaonga near Waipawa. The GXP is supplied by four separate overhead 110kV lines; two from Dannevirke in the south, and two from Fernhill in the north. These four lines feed a single 110kV bus supplying dual 20MVA transformer banks. At the same site, a small 11kV supply is provided via a single Transpower owned 10MVA 33/11kV transformer. The supply point is the terminals of 11kV switchgear owned by Transpower.

SECTION 3 Assets Covered

Table 3-2 details peak demand and firm capacity at the GXP.

Supply	Type	20011/12 Peak Demand (MVA))	Firm Capacity Winter (MVA)[1]
Ongaonga 33kV	GXP	20	25

(1) Winter post contingency (n-1) rating.

Table 3-2: Centralines supply point

3.2.2 Sub-transmission Network

Table 3-3: Centralines' zone substations detail the installed capacity and security levels at each of the zone substations within the Centralines' network. It should be noted that Waipawa and Takapau substations are two transformer substations, with security currently limited by the 33kV sub-transmission network, as both substations are currently supplied via single 33kV circuits.

Zone Substation	Supply Voltage	Sub-transmission Security	Installed Capacity (MVA)
Waipukurau	33kV	n-1	15
Waipawa	33kV	n-1	15
Wilder Rd	33kV	n	2
Takapau	33kV	n	15

Table 3-3: Centralines zone substations

Figure 3-3 details the geographic location of the sub-transmission lines and substations. Figure 3-4 details a schematic view of the sub-transmission lines and substations.

The 33kV sub-transmission lines are almost entirely overhead construction, with underground limited to substation terminations, river and railway under-crossings. The pole structures utilised are almost entirely concrete, with timber crossarms.

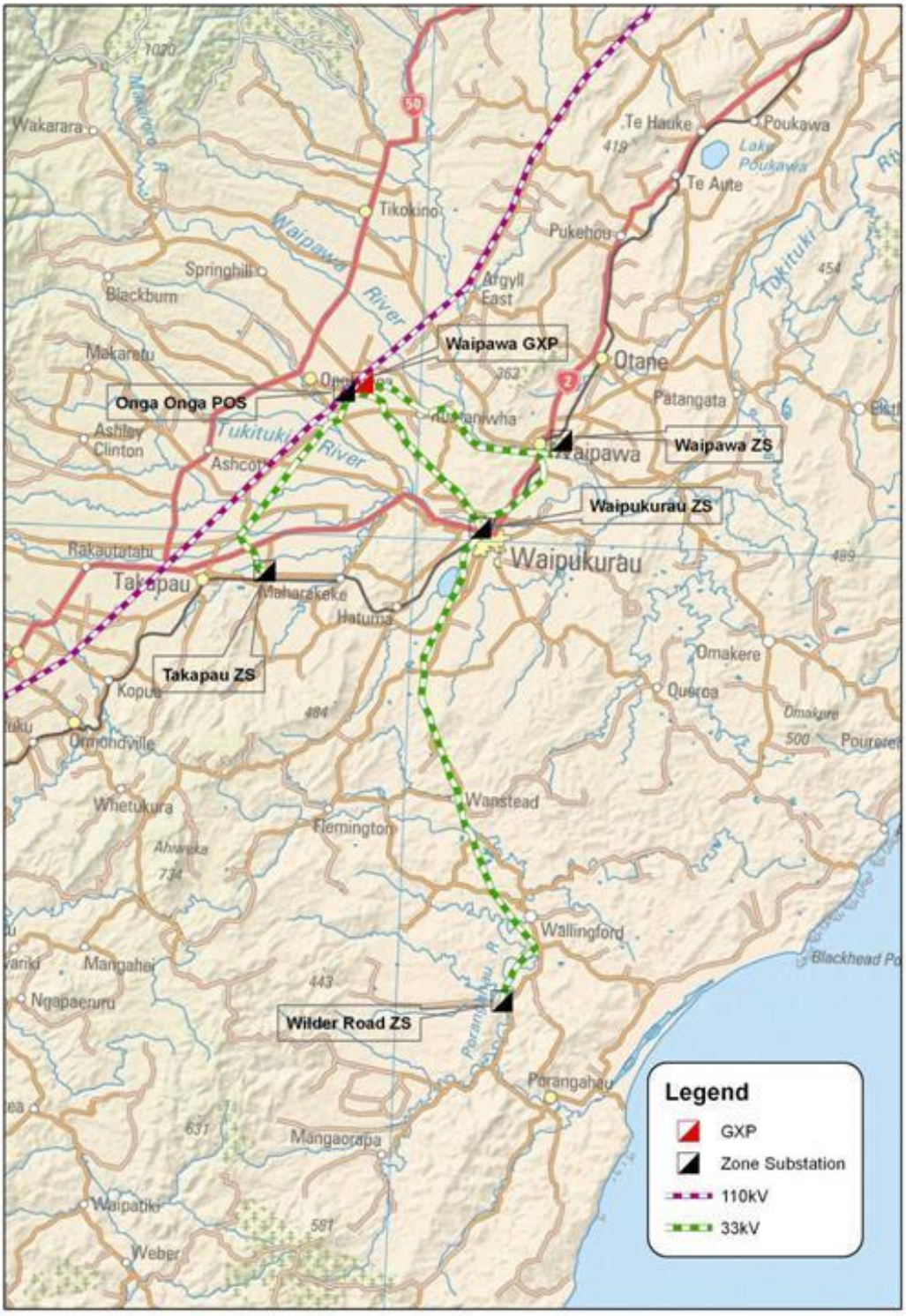


Figure 3-3: Point of supply and 33kV sub-transmission

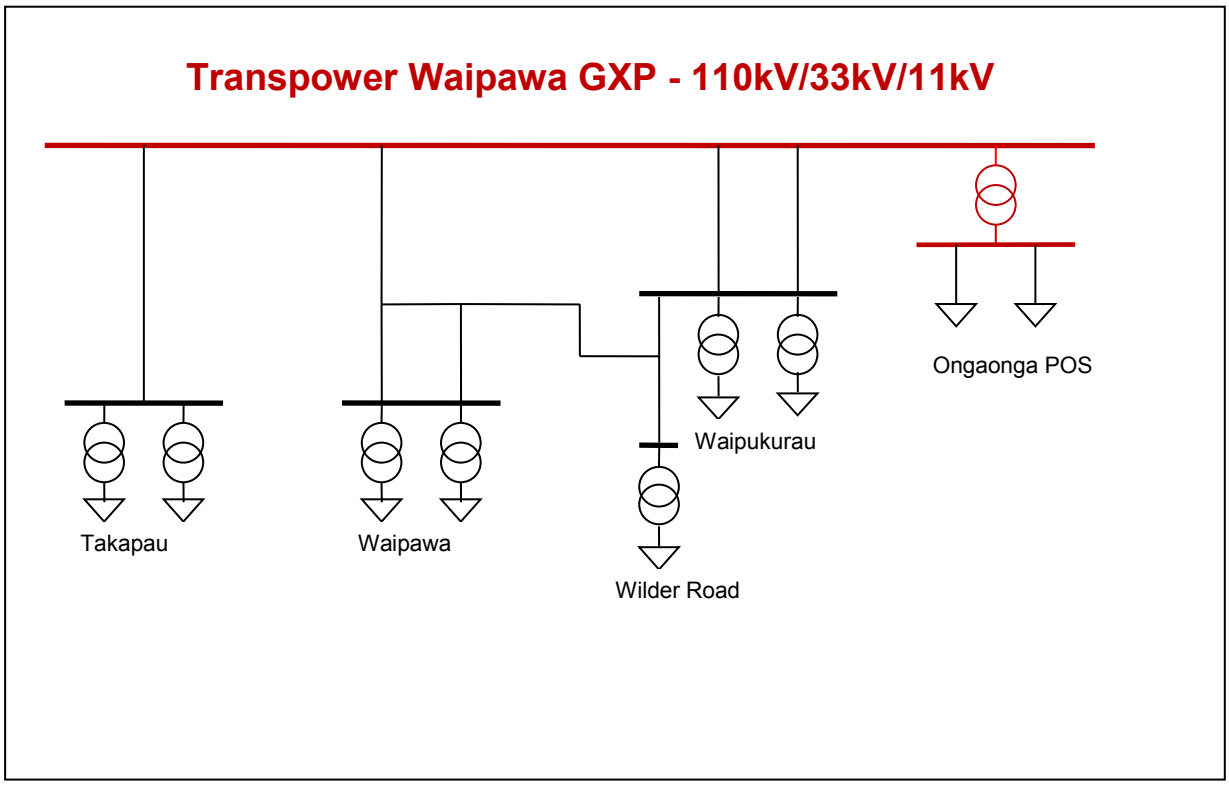


Figure 3-4: Sub-transmission network

3.2.3 Distribution and Low Voltage Network

Figure 3-5: The 11kV distribution system details the geographic location of the distribution 11kV lines. The network is relatively lightly loaded, with much of the load being relatively small, and spread over a large geographic area. This is reflected in the low connection point density for Centralines which is 4.8 ICPs per km. The major load types evident across this network are as follows:

a. 2 x Major Industrial customers discussed in 3.1.2;

b. 74 commercial customers that either situated in the Waipukurau and Waipawa business centres and surrounds, or are commercial farms that are dispersed across the entire rural area of the Centralines supply area;

c. 8,215 domestic residential and rural residential customers (includes connected customers and disconnected supplies which have not been decommissioned yet). Predominately these are situated around the main centres of Waipukurau and Waipawa, and to a lesser extent Otane, Takapau, Ongaonga, Tikokino, Porangahau, Elsthorpe and Pourerere.

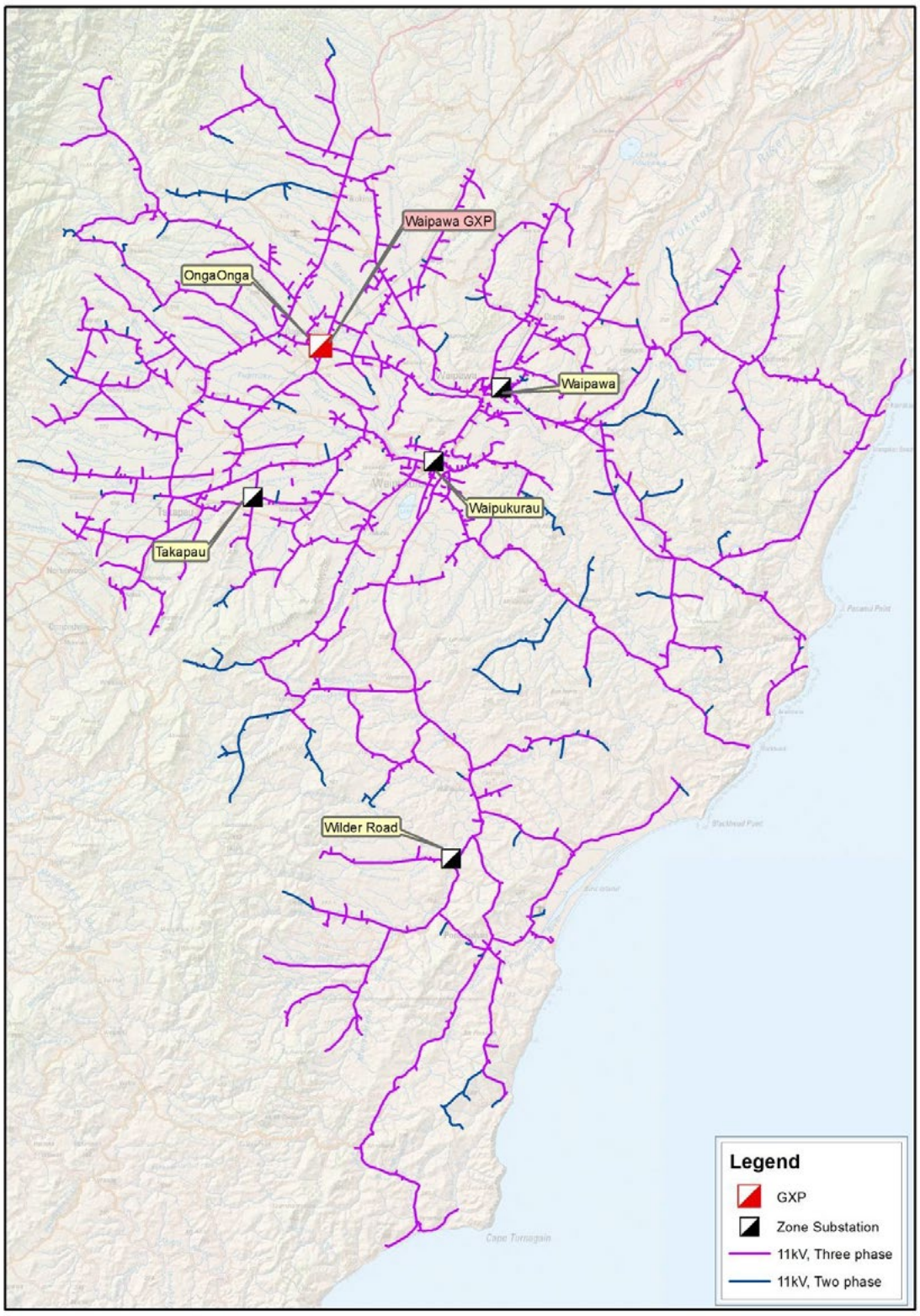


Figure 3-5: 11kV distribution system

SECTION 3 Assets Covered

The 11kV network is comprised almost entirely of overhead lines, with over 98% being supported by concrete poles, generally with timber crossarms. In total, the 11kV network is 1,407km in length, with 1,381km being overhead, and 26km underground.

The LV network in urban areas has an interconnectivity capability with adjacent transformers. Rural and remote rural area LV networks are predominately radial aerial conductors with transformers sized to the connection party's requirements. Sub-divisions are designed on a case by case basis according to design standards. The LV network with a total length of 207km comprises of 156km overhead lines and 51km underground cables. Approximately 87% of the overhead lines is supported by a combination of concrete poles and timber crossarms.

The following table outlines the portion of the 11kV and LV networks that are underground:

Network	Portion of Network Underground
11kV Network	1.85%
Low Voltage Network	24.64%

Table 3-4: UG portion of 11kV and LV network

3.3 Network Assets

3.3.1 Overhead Lines

Description of Asset

Overhead lines are split into three main categories; 33kV sub-transmission, 11kV distribution and LV distribution. The sub-transmission system is the link between the grid exit point (GXP; also known as point of supply) and the distribution network. Centralines' standard sub-transmission voltage is 33kV, which connects to the 11kV distribution networks through zone substations situated at Waipukurau, Waipawa, Takapau and Wilder Road. The only exception is the 11kV supply direct from the Transpower GXP substation, which supplies four (4) feeders servicing the Ongaonga district.

Overhead Lines	Quantity 31/12/11 (km)	Quantity 31/12/12 (km)	ODV 31/12/12	
			RC $(000)	DRC $(000)
Sub-transmission	94	94	2,339	1,385
11kV Distribution	1,397	1,381	16,340	10,235
LV Distribution	156	156	2,321	1,403

Table 3-5: Quantity of overhead lines

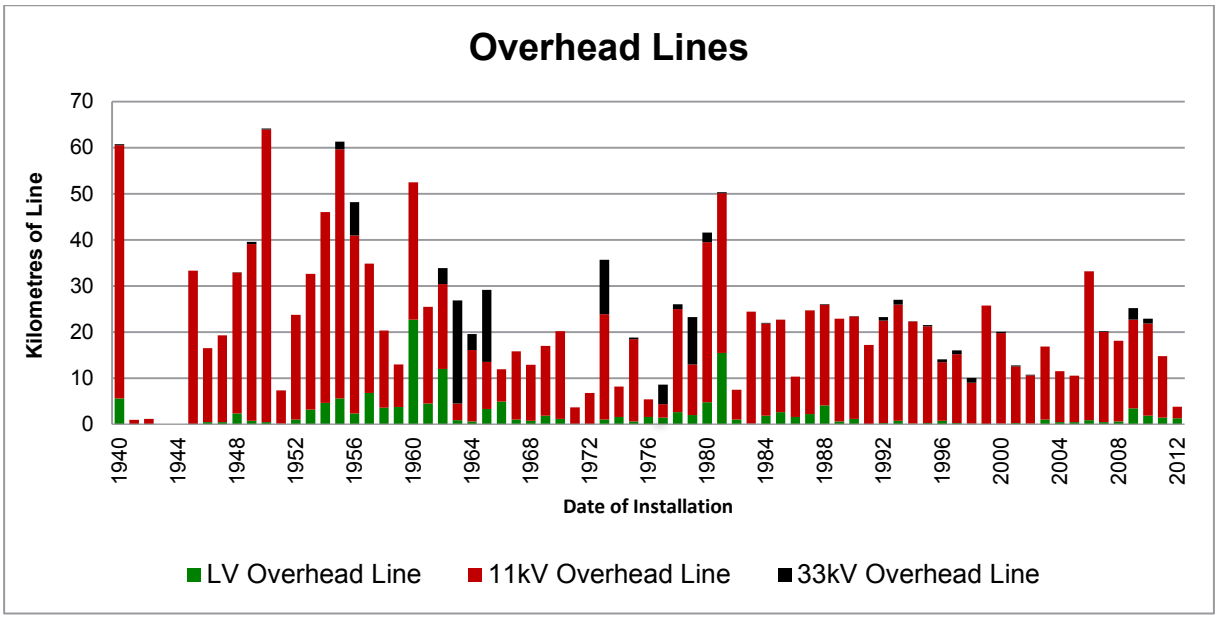
As discussed briefly above, the overhead network is comprised almost entirely of concrete poles. The percentage splits between voltage and concrete and timber are detailed in Table 3-6 following.

Voltage	Count		Percentage	
	Concrete	Wood	Concrete	Wood
33kV	1000	4	99.60%	0.40%
11kV	15,323	225	98.55%	1.45%
LV	938	141	86.93%	13.07%
Total	**17,261**	**370**	**97.90%**	**2.10%**

Table 3-6: Pole population by voltage and type

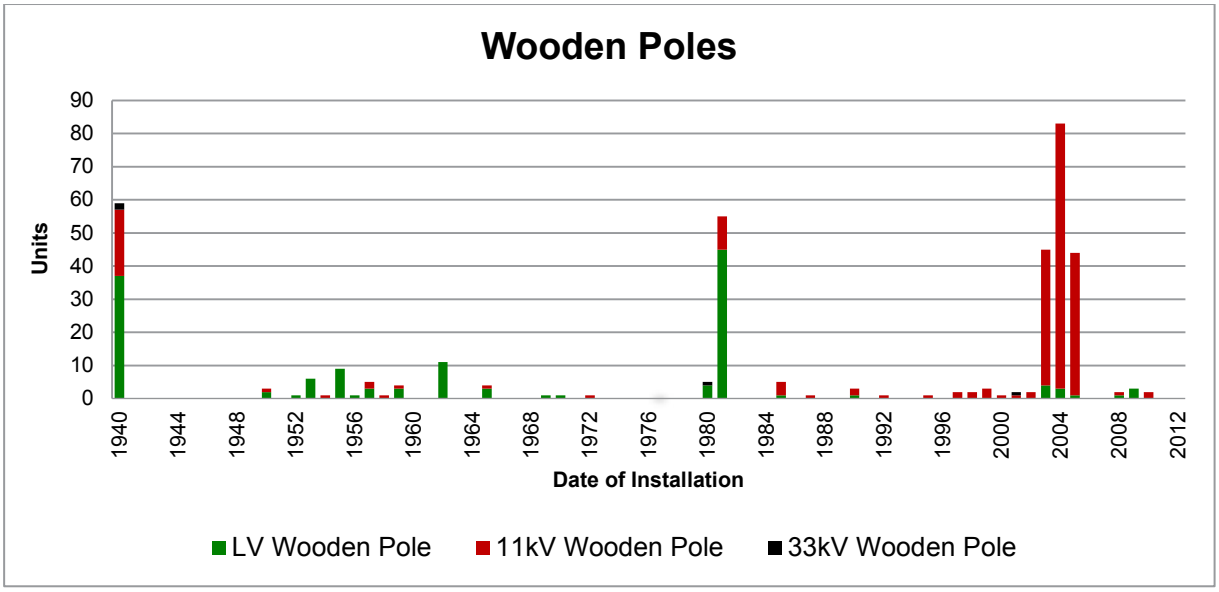
Age profile

The age profiles of the overhead network are detailed in the following graphs:

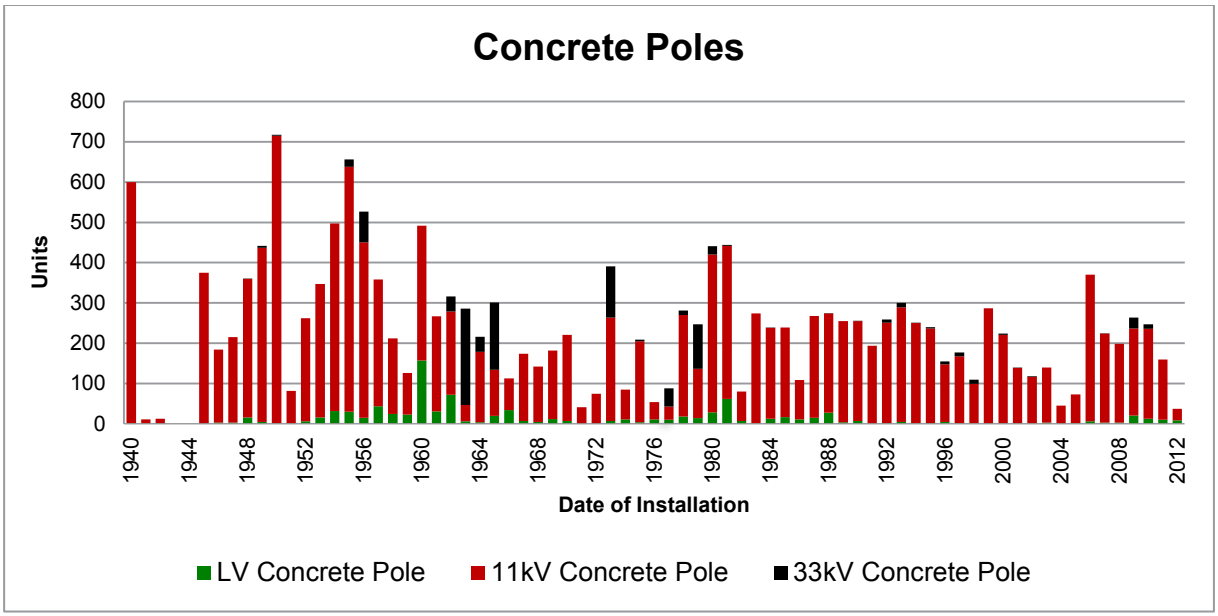


Graph 3-1: Overhead lines age profile

SECTION 3 Assets Covered



Graph 3-2: Wooden poles



Graph 3-3: Concrete poles

Condition

As detailed in Section 4, system reliability has improved substantially in the last five years, which has been attributable to:

- Capital investment in reliability improvement initiatives such as the installation of distribution automation, including remotely controlled distribution switchgear, enabling faster restoration to many customers following a sustained fault. In addition, a considerable investment in the

installation of individual fusing for 11kV spur lines is being progressively implemented, to limit the customer impact of sustained outages.

- Increased capital investment in line asset renewal initiatives, with degraded conductors, crossarms and poles having been replaced.
- Sustained level of investment in maintenance required to enable a comprehensive understanding of asset condition, enabling a prioritised approach to the rectification of defects.

Generally the feeders are appropriately configured across the network to meet loading and reliability requirements. During peak load periods, some of the 11kV feeders supplying rural customers were at their voltage regulation limits, which have arisen due to the continual growth of large irrigation load, mostly associated with dairy farm development. This has been addressed through a combination of either re-conductoring, or the installation of 11kV regulators and 11kV capacitors.

The relatively dry Central Hawke's Bay environment, combined with low levels of airborne pollution and a coastal hinterland provide for very low levels of natural degradation of the overhead network, with most of network well insulated from the effects of salt spray on the coast. As a result, the concrete poles continue to perform extremely well, with very few in-service failures being experienced and very low levels of replacements assessed as necessary.

The performance of the concrete poles has enabled the formulation of a view that the average standard life for the poles and conductors is 65 years, given the electrical loading and environmental conditions within Centralines' operational area. Consequently, Centralines is anticipating an economic service life in the order of 80 years for the population of concrete poles and conductors.

3.3.2 Underground Cables

Description of Asset

Underground cables installed on the Centralines network account for only 4.6% of total network in regard to length, equating to 79km of the 1,710km of total circuit length. Cables installed are split into three categories; 33kV sub-transmission, 11kV distribution and LV distribution, each discussed in turn.

The sub-transmission underground cabling totals 1.6km in aggregate, and is primarily associated with the connection between the 33kV switchgear and the 33kV overhead network at the GXP substation at Ongaonga, the connection between the 33kV overhead network and the 33kV switchgear for feeder 9 at the Waipawa substation, and the railway crossing at Waipukurau on the Wilder Road 33kV circuit. These cables are single core XLPE and are inspected visually on an annual basis to identify any developing defects.

The 11kV distribution underground cabling totals 26km in aggregate. The most critical 11kV underground cabling is the feeder tails to all feeders originating from the Waipukurau, Waipawa, Ongaonga and Takapau substations. With the exception of Waipawa, all 11kV feeder tails are multi-core XLPE or HDPE insulated cabling; Waipawa has one multi-core paper lead insulated cable tail still in service. The other feeder tails are XLPE insulated multi-core cables. The remaining 11kV underground cables installed in the 11kV feeders are a mixture of paper lead or XLPE insulated multi-core cables. All 11kV underground cabling is visually inspected above ground as part of the 5 year inspection process, with the exception of 11kV feeder tails, which are inspected and tested on a 3 year

basis. Generally the 11kV underground cabling has proven to be very robust, with very few defects identified and no in-service failures in recent years.

The LV distribution underground cabling totals 51km in aggregate. These cables are mainly insulated with PVC or XLPE, with some older PILC cables still in service. All cables are multi-core. Inspection of these cables is limited to the exposed cables at transformers and pole terminations, which are visually inspected as part of the 5 year asset inspection programme. Generally the LV underground cabling has proven to be very robust, with very few defects identified and faults in recent years, and no unassisted in-service failures.

Underground Cables	Quantity 31/12/11 (km)	Quantity 31/12/12 (km)	ODV 31/12/12	
			RC $(000)	DRC $(000)
Sub-transmission	1.6	1.6	387	331
11kV distribution	26	26	3,583	1,970
LV distribution	53	51	4,518	2,161

Table 3-7: Quantity of underground cables

Age Profile

No specific age profile of the underground cables installed is available, due to legacy record keeping associated with underground cabling being incomplete.

The standard life of 45 years is assumed for asset investment modelling.

3.3.3 Power Transformers

Description of Asset

Power transformers are used at zone substations to transform the 33kV sub-transmission voltage to a lower voltage level that is suitable for distribution networks. These transformers convert 33kV to 11kV and are rated at 7.5MVA at Waipukurau, Waipawa and Takapau, with a 2MVA transformer at the Wilder Road substation. All seven power transformers are three phase units.

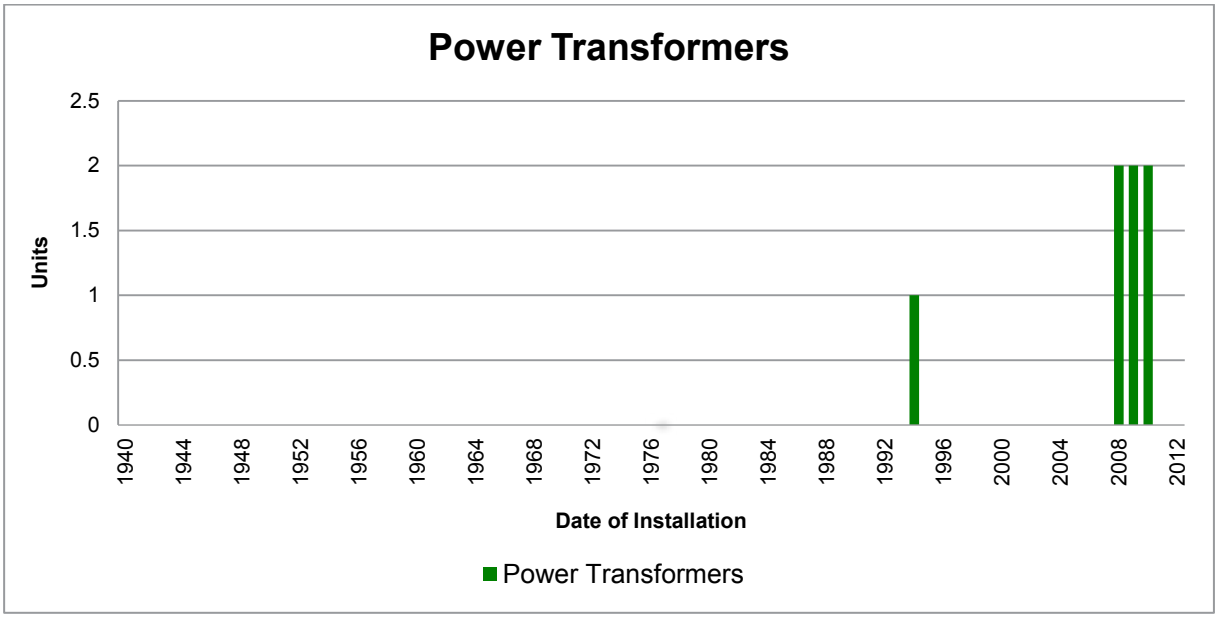
Apart from Wilder Road, all power transformers have automatic, on-load tap changers to keep the output voltage within defined limits. Wilder Road has voltage control via a voltage regulator on the 11kV outgoing side of the power transformer. All Centralines' power transformers are filled with mineral insulation oil.

Power Transformers	Quantity 31/12/11	Quantity 31/12/12	ODV 31/12/12	
			RC $(000)	DRC $(000)
Standard Life (45 years)	0	0	0	0
Extended Life (60 years)	7	7	4,432	2,675

Table 3-8: Quantity of power transformers

Age Profile

The age profile of the power transformers is detailed in the following graph:



Graph 3-4: Power transformers

The age profile for Centralines power transformers is as follows:

a. Waipukurau – Currently there are 2 x 7.5MVA transformers installed at Waipukurau. Both transformers were replaced during 2008, and were manufactured in 2007.

b. Takapau – Currently there are 2 x 7.5MVA transformers installed at Takapau. Both transformers were manufactured in 1977, and both have been fully refurbished and installed during 2009 following identification of excessive insulation degradation during routine testing.

c. Waipawa – Currently, there are 2 x 7.5MVA transformers installed at Waipawa. Both transformers were manufactured in 1965 and were been fully refurbished and installed in 2010. Both transformers have an assessed remaining life of 30+ years, based on insulation degradation tests conducted during refurbishment.

d. Wilder Road – Currently there is a single 2MVA transformer installed at Wilder Road. This transformer was manufactured and commissioned in 1994, replacing the original transformer installed and commissioned in 1993 due to an in-service failure.

While not a Centralines asset, the Transpower owned transformer at Ongaonga substation supplies Centralines customers. This 10MVA 33/11kV transformer was replaced late 2008 with a new unit. The new transformer includes an on-load tap changer, and replaces the single bank transformers and regulator that was installed prior.

Condition

Overall condition of the power transformers (including on-load tap changers) is as expected for their age. Operationally the transformers have been loaded well below rated capacity limitations, and have been maintained via a comprehensive maintenance programme including annual condition monitoring. This has enabled reliable performance overall, with risks to supply continuity able to be proactively managed.

Centralines assumes its power transformers will operate for an economic service life of 60 years.

3.3.4 Circuit Breakers

Description of Asset

Circuit breakers (CBs) are used at zone substations to interrupt electrical power circuits. They are able to interrupt power by an initiated control command or automatically by sensing devices when a fault or abnormal situation occurs. Although they are limited by a two-shot reclose operation, they can interrupt these circuits repeatedly and safely both under normal load and fault conditions.

Circuit Breakers are manufactured using several types of insulation medium. Older types use a tank filled with mineral insulation oil that houses the main interrupting contacts. The mineral oil acts as an insulation medium and also to extinguish any arc generated by the opening of the main current carrying contacts. This process generates a considerable amount of carbon and by-products from the degradation of the contacts in the oil. These circuit breakers require regular intensive maintenance particularly for contact condition assessment, and oil filtering to prevent insulation failure.

More modern circuit breakers are designed with contacts opening in either a vacuum or within a chamber filled with sulphur hexafluoride gas (SF_6).

The vacuum type of circuit breaker has the main interrupting contacts contained within a sealed vacuum bottle which is then insulated in either a tank of mineral insulation oil, or in a tank of SF6 gas, or moulded into epoxy resin housing.

SF_6 circuit breakers use the gas as an insulation medium and for arc extinction. The gas is contained in a sealed chamber, usually at slightly above atmospheric pressure, and are normally sealed for life. During current interruption the gas decomposes and then recombines ready for the next operation. Arc extinction within these types of circuit breakers is very efficient and causes minimal contact degradation.

The circuit breakers currently installed at each substation are as follows:

a. Waipukurau – 6 x 33kV outdoor circuit breakers (1 x vacuum and 5 x SF_6) and 9 x 11kV SF_6 insulated Reyrolle circuit breakers with SEL protection relays;

b. Waipawa – 4 x 33kV outdoor circuit breakers (4 x SF_6) and 9 x 11kV mineral oil insulated indoor circuit breakers;

c. Takapau - 9 x 11kV mineral oil insulated indoor circuit breakers;

d. Wilder Road – 2 x 11kV SF_6 insulated pole mounted reclosers;

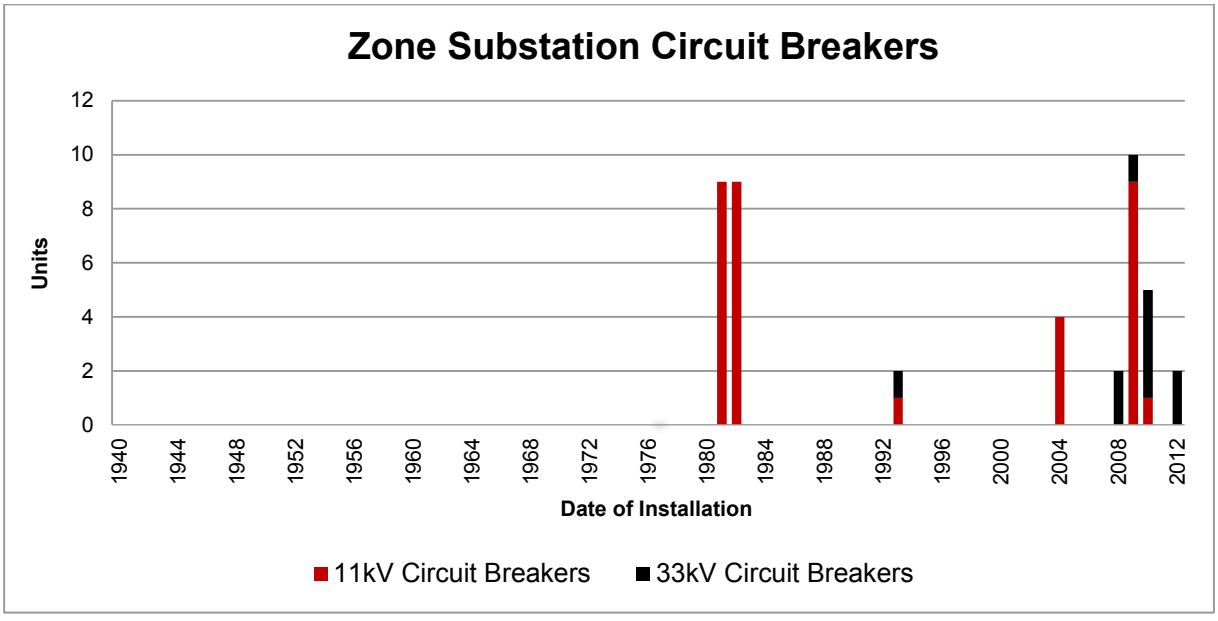
e. Ongaonga – external to the Transpower GXP substation, Centralines has 4 x 11kV SF_6 insulated pole mounted reclosers installed, establishing 4 feeders that originate from the Transpower owned 33/11kV transformer at the GXP.

ZS Switchgear	Quantity 31/12/11	Quantity 31/12/12	ODV 31/12/12	
			RC $(000)	DRC $(000)
33kV Outdoor CB	8	10	569	518
11kV Indoor CB	27	27	1,025	543
11kV Outdoor CB	6	6	205	160

Table 3-9: Quantity of circuit breakers

Age Profile

The age profile of the circuit breakers is detailed in the following graph:



Graph 3-5: Circuit breakers

The age profile for Centralines circuit breakers is as follows:

a. Waipukurau – There are 6 x 33kV Outdoor circuit breakers and 9 x 11kV Indoor CBs installed at Waipukurau substation. One 33kV unit was replaced during 2009 as part of the asset renewal programme, a further two of the 33kV CBs were replaced in 2008 in conjunction with the power

transformer replacements, and a fourth installed in 1993. Two incoming 33kV circuit breakers were installed in 2012. All 11kV CBs were replaced during 2009 as part of an asset renewal programme.

b. Waipawa - There are 4 x 33kV Outdoor CBs and 9 x 11kV Indoor CBs installed at Waipawa substation. All four of the 33kV units were installed in 2010 in conjunction with the power transformer replacements. The 11kV units were installed in 1981.

c. Takapau - There are 9 x 11kV Indoor CBs installed at Takapau substation. These were installed in 1982.

d. Wilder Road - There are 2 x 11kV Outdoor Reclosers installed at Wilder Road substation. One unit was replaced in 2010 following in-service failure, the second unit was installed in 1993.

e. Ongaonga – There are 4 x 11kV Outdoor Reclosers installed external to the Transpower owned substation. These were installed in 2004.

Condition

The general condition of these assets is as expected for their age and Centralines has experienced few failures. Deterioration shows mainly as contact wear and mechanical wear on mechanisms. Outdoor equipment is subject to normal environmental deterioration.

Operationally the circuit breakers have been loaded well below capacity limitations, and are maintained via a comprehensive maintenance programme including annual condition monitoring. This has generally enabled reliable performance overall, with risks to supply continuity able to be proactively managed in most instances.

Circuit Breakers have been identified in the ODV Handbook as having an operational life of 45 years, and Centralines supports this as a reasonable estimate of service life for these assets.

3.3.5 Other Substation Equipment and Buildings

Description of Asset

This section of the AMP covers all assets located in substations, other than the major components of transformers and circuit breakers.

Instrument Transformers

Instrument transformers are generally of two types; Voltage Transformers (VT) and Current Transformers (CT).

Voltage Transformers are used to transform high voltages to lower voltages that can be more safely used for indication, metering and protection. VTs may be located on outdoor or indoor equipment and be either a single phase unit or a three phase unit.

Current Transformers are used to transform high currents to lower levels that can be used for control, indication, metering and protection. Outdoor CTs are generally stand-alone, single phase, oil insulated units and usually form part of a circuit breaker. Indoor CTs are generally single phase, solid insulation and located on each phase of a circuit breaker.

DC Systems

DC systems at zone substations are used to provide an independent stand-alone power supply that can function if mains power fails. The general arrangement is to have battery banks on continuous charge and connected to critical loads, such as circuit breaker actuation circuits, designed to run on the DC power supplied from these batteries.

Protection Equipment

Protection equipment is used to detect faults on the electrical network, and to selectively operate circuit breakers so as to isolate the faulted section with adequate speed and sensitivity to minimise personal injury or equipment damage. Protection relays are also used for flagging and alarms back to the Network Control Centre.

Generally each circuit breaker has its own protection scheme and various protection schemes are used to provide the required type of protection. Some schemes may require several protection relays to operate under specific conditions.

Schemes are generally designed to detect Over-current, Earth Faults, Power Differential, Power Direction, Under and Over Voltage and other miscellaneous protection such as transformer oil surges.

Substation Oil Containment Systems

Environmental concerns with oil leaks from transformers are being constantly monitored. Waipukurau, Waipawa and Takapau all have oil containment bunding for each transformer on site. These are monitored as part of a weekly routine to ensure any oil leaks are identified early and action taken to minimise the environmental impact.

Oil containment options at Wilder Road substation will be considered in conjunction with a transformer foundation upgrade project. The driver behind this project is to enable further contingency options in the event of transformer failure.

Buildings

Buildings store indoor switchgear, protection equipment, DC supplies, ripple injection equipment and communications systems.

Outdoor Structures

These assets form the physical framework in the substation yards that allow switchgear and power transformers to be connected in a safe and reliable manner. These consist of overhead support structures and conductive busbars.

Zone Substation Earths

Because of the high voltages and currents encountered in zone substations, earthing systems are designed in detail at the time of construction to ensure safety to personnel and equipment, and reliable protection operation. They generally comprise bare copper cables laid in the ground in a grid formation and connected to deep driven earth rods. All station equipment is bonded to the earth grid.

Conductor sizes have to be able to carry the full fault currents likely to be experienced, and the layout is to ensure that step and touch voltages are within acceptable limits as described in the Electrical Code of Practice ECP35.

SECTION 3 Assets Covered

Age Profile

Since this asset category consists of a large number of component systems, an indication of the overall age of the equipment is best represented by the commissioning dates of each zone substation site as below.

The commissioning dates for each substation are as follows:

a. Waipukurau 1965

b. Takapau 1982

c. Waipawa 1981

d. Wilder Road 1993

Condition

These assets are maintained via a comprehensive maintenance programme including annual condition monitoring and both major and minor periodic maintenance. This has generally enabled reliable performance overall, allowing supply continuity risks to be managed pro-actively.

General condition of these assets is good and any deterioration of equipment is mitigated when found to ensure in-service failure does not occur.

As part of the asset renewal capital programme, major plant is progressively being replaced as discussed earlier. Inclusive in this programme is the upgrade of CTs, VTs, protection relays and outdoor structures including links and switches.

Waipukurau substation, which was originally commissioned in 1965, has been mostly rebuilt over the past 3 years, with new transformers, new 33kV CBs and 9 new 11kV CBs. In conjunction with this work installation of upgraded protection relays, voltage regulation relays, new local supply, new outdoor 33kV bus, switches, CTs, VTs, feeder and transformer cabling was all undertaken. As a result there remains little of the original equipment installed, and as such the substation is in very good condition.

Waipawa substation was commissioned during the early 1980's. The final phase of the capital work to upgrade the 33kV security to n-1, and to replace the transformers with units of a compatible vector group, have been completed in 2011. The original equipment currently installed is expected to remain serviceable for the remainder of the planning period of this AMP.

Takapau substation was commissioned during the early 1980's and it is expected that the secondary systems and other equipment will be serviceable for the remainder of the planning period for this AMP. It should be noted the 11kV protection relays at Takapau were upgraded to electronic relays in 2001 and voltage regulation relays were upgraded during 2009.

Similarly, Wilder Road substation was commissioned during the early 1990's and an expected remaining serviceable life in excess of 30 years remaining life is assumed.

All protection relays are subject to detailed preventative maintenance on a 6 yearly cycle, which is enabling reliable performance.

Standard service lives for these assets are assumed. Centralines will seek an extension from 50 to 100 years for concrete (block or pre-cast) buildings at the next valuation supported by independent assessment after considering current condition, age, construction styles and environmental conditions.

3.3.6 Distribution Transformers and Voltage Regulators

Description of Asset

Distribution transformers are connected to the 11kV distribution feeders and are used to convert the distribution voltage to a lower voltage level of 400/230 volts suitable for use by the customers. These transformers are located throughout the whole network and are either pole or ground-mounted. These transformers are supplied by a number of different manufacturers.

Transformer size is determined by the consumers' connected load and may range from small pole-mounted 0.5kVA single phase transformers up to large ground-mounted 750kVA three phase transformers.

The majority of Centralines' ground-mounted substations are mounted on concrete pads. Pole-mounted substations are typically mounted via steel support arms attached to concrete poles, but a small number of two-pole structures with wooden support arms are in service to support the weight of larger transformers. The existing two poles structures that exist in the network are all approximately the same age, and are no longer a standard construction practice within Centralines. As such, these transformers are being progressively replaced with either single pole or ground mounted transformers under a replacement programme. Where opportunity exists, these are removed from service and the 400V supplied via an existing transformer, to reduce connected capacity on the network. These options are considered during asset renewal projects or when there are changes in loading.

Voltage regulators are used for voltage control at Wilder Road substation and on some long 11kV rural feeders to improve voltage regulation and maintain statutory voltage levels at customers' premises.

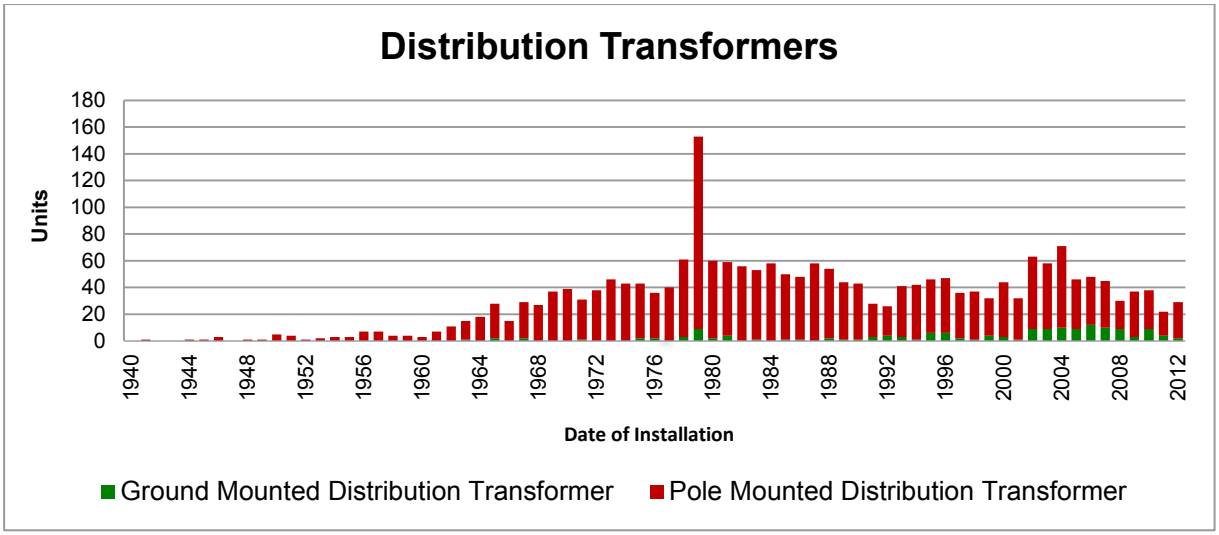
Table 3-10 details the quantity of other distribution transformers assets installed across the Centralines area. Note: "Distribution substations" is a valuation category that refers to the assets at a distribution substation site, not inclusive of the transformer at the site. The differential in numbers evident below is due the count of emergency spare transformers included in the transformers count.

Distribution Transformers	Quantity 31/12/11	Quantity 31/12/12	ODV 31/12/12	
			RC $(000)	DRC $(000)
Voltage Regulators	4	4	408	212
Distribution Transformers	2,245	2,250	19,896	10,454
Distribution Substations	2,245	2,250	4,127	1,910

Table 3-10: Quantity of distribution transformers

Age Profile

The following Graph 3-6 details the age profile of the distribution transformers in service, by type.



Graph 3-6: Age profile: distribution transformers

Condition

Distribution transformers are simple and robust and deliver a very high level of service reliability and availability. Overall, Centralines has extended the assumed life in the ODV handbook from 45 years to 50 years based on analysis of failure rates.

Ground-mount transformers are in satisfactory condition overall, based on condition assessments and preventative maintenance which is carried out on an annual basis. Pole mounted transformers are visually inspected as part of the 5 year asset inspection programme, and are assessed to similarly be in satisfactory condition overall.

The condition of the voltage regulators is variable, with one aged unit (1960) still in service. This unit is due for replacement during the planning period under asset renewals. The newer regulators were purchased in 1998, 2001 and 2009 respectively, and are in serviceable and reliable condition.

3.3.7 Distribution Switchgear

Description of Asset

Distribution switchgear includes all the electrical switching equipment in the HV network. They are used for isolating and connecting sections of the network for operational requirements. The main types of switchgear used are described below.

Air Break Switches

Air Break Switches (ABS) are manually operated switches and are used as a means to connect or disconnect different sections of 11kV or 33kV overhead lines. All three phases of the switch are mechanically linked so they operate together.

Early ABSs were primarily intended for no load switching, but more modern switches have arcing horns and/or load break attachments to enable switching under load conditions. These are all manually operated.

Dropout Fuses/Links

Dropout style fuses are utilised to protect and isolate 11kV spur lines of both three phase and single phase construction. Dropout style links are used to isolate long lengths of main mesh circuits in addition to the shortening of long spur lines that do not require further fusing.

These devices are manually operated with a Hot Stick.

Ring Main Switches (RMS)

The RMS is an 11kV ground-mounted switch used in the underground network to provide a similar function to an ABS. Generally a RMS comprises one, two or three, three phase switches. They are designed to mechanically operate all three phases simultaneously.

Most RMS switch contacts are immersed in insulating oil which assists with arc suppression on opening. With new technology manufacturers are now using SF6 and vacuum insulation for arc control moulded into solid plastic resin housings.

RMS units are available in several combinations, the most common being a fused switch with two isolators fed from a common busbar. The fuse switch is used to provide overload and circuit protection for a transformer or circuit. The two isolators are used to provide switching availability from different sources. The whole arrangement is then mounted in a common tank assembly.

In all cases each switch is identified separately with a unique number for operational requirements.

Remote Controlled Switches (RCS)

The use of Remote Control Switches is to reduce outage times and improve network performance. These are used on the overhead network at strategic locations and provide remote switching ability to enhance network operations.

Centralines has a mix of single-phase vacuum-insulated switches that are electrically linked to operate simultaneously across all phases, or a retrofitted three phase switch installed for this purpose. A VHF radio provides the communication link to operate these switches remotely.

Reclosers/Sectionalisers

Reclosers are installed in the overhead network distribution lines to automatically isolate and restore supply to sections of line after transient faults. They are circuit breakers that are able to interrupt a fault current when set criteria are met. When the circuit breaker trips open it will re-close a predetermined number of times until it locks out and remains open, or if the fault has cleared it will remain closed. All of these devices reset automatically.

Sectionalisers are similar to reclosers in operation but are not able to interrupt fault current. If a fault occurs in the spur-line sectionalisers sense this fault as it passes through and will open during the time when the recloser has opened to clear the fault. These devices are a mix of automatic and manual

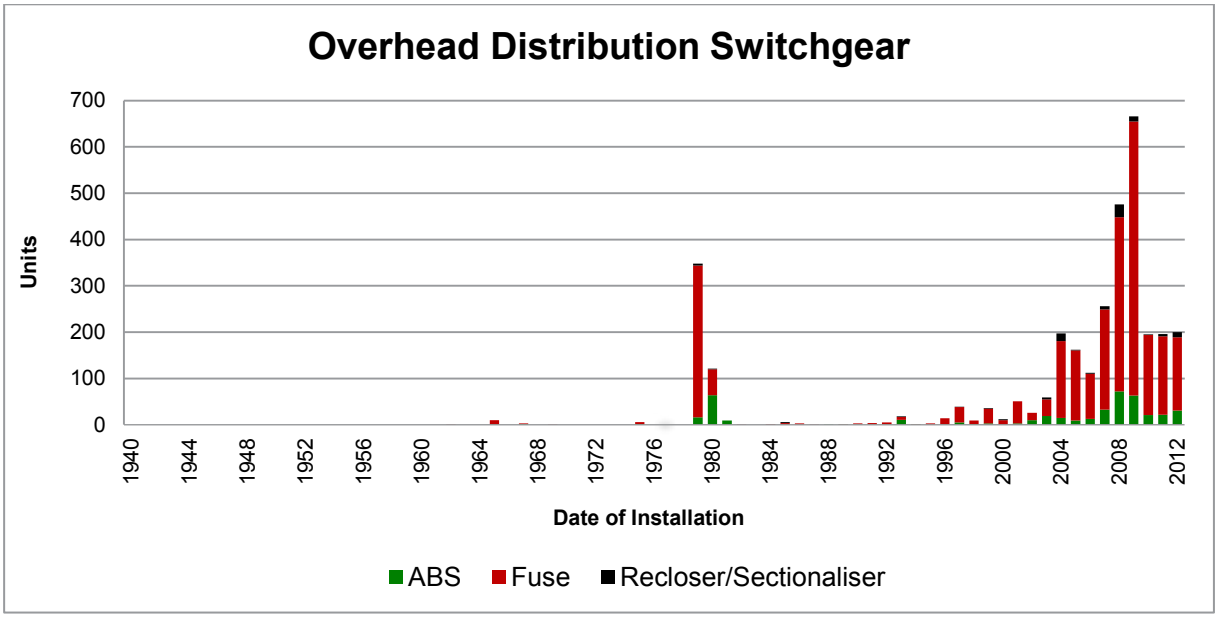
operation, with the automatic sectionalisers being controllable remotely enabling the rapid response to the restoration of supply in the event of transient faults.

Distribution Switchgear	Quantity 31/12/11	Quantity 31/12/12	ODV 31/12/12	
			RC $(000)	DRC $(000)
Air Break Switches & Links	427	434	3,608	2,657
Dropout Fuses	2,718	2,724	7,675	5,659
Recloser/Sectionaliser/RCS	95	98	2,031	1,692
RMS & FS	22	25	617	495

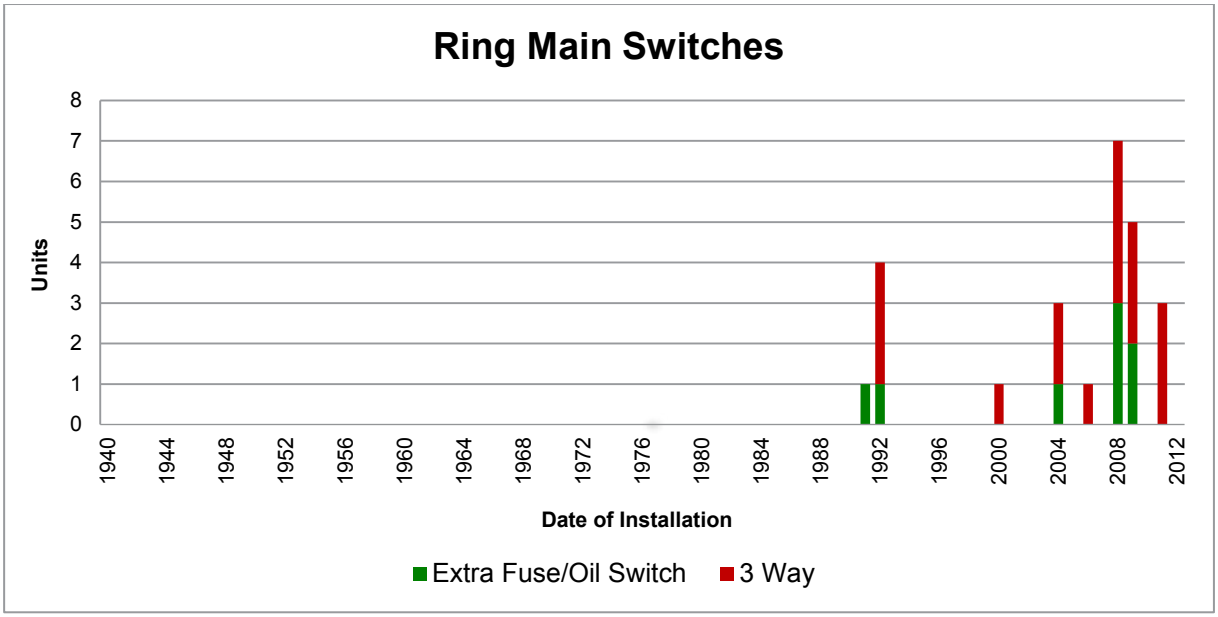
Table 3-11: Quantity of distribution switchgear

Age Profile

Age profiles for all overhead distribution switchgear and Ring Main Units are detailed in Graph 3-7 and Graph 3-8 respectively.



Graph 3-7: Age profile of overhead distribution switchgear



Graph 3-8: Age profile of ring main switches

As per the Centralines ODV, all switchgear, where a manufacture date is not available, is aged in accordance with the average age of the feeder it is connected to.

Condition

The general condition of these assets is good and is as expected for their age. Outdoor equipment is subject to normal environmental deterioration. The maintenance programmes applied to distribution switchgear differs between the asset classes listed above, hence is discussed in turn.

ABSs and Dropout Fuses are subject to a 5-year asset inspection, with maintenance then carried out as identified, or following identification of a fault when operated in service. This approach has seen these assets perform reliably when required. Overall condition of these assets is good with in-service failures being limited to insulator failure on a specific type ABS of which there is very few left connected to the network. There is however a large number of ABS assets approaching the end of their normal expected operating life. These continue to be progressively replaced based on age and operational criticality under the capital renewal programme.

The general condition of RMS assets is commensurate with their age and they are generally reliable. These assets are inspected annually in conjunction with ground mounted equipment inspections. The tanks are subject to normal environmental deterioration.

Reclosers and sectionalisers are all generally in good condition, and standard service lives as per the ODV handbook are considered reasonable. These assets are subject to 3 monthly inspections and annually tested for operational purposes to ensure the switch operates correctly during fault conditions.

SECTION 3 Assets Covered

3.3.8 Load Control Plant

Centralines purchased its ripple injection plant back from the retailer (Meridian). The ripple plant provides Centralines with the capability to manage controlled load within the network. This plant is maintained under contract and condition reporting made available to Centralines to enable understanding of any serviceability issues.

3.3.9 Miscellaneous Distribution Equipment

Description

Consumer Connections
Pole and pedestal mounted 400V fuses are installed at take-off points where consumer service lines, both overhead and underground, are connected to the network.

Pedestals are manufactured in various sizes and configuration to suit requirements. They contain fused LV connections for the individual customer connection point (ICP) between the network and the customer. They are manufactured from concrete, metal, plastic or fibreglass and are fitted out with various size fuses as required. Council and some privately owned streetlights are connected to Centralines' LV streetlight circuits.

Miscellaneous Distribution Equipment	Quantity 31/12/11	Quantity 31/12/12	Valuation 31/12/12	
			RC $(000)	DRC $(000)
Consumer Connection OH	6,293	6,151	528	452
Consumer Connection UG	1,886	1,889	699	605
Consumer Connection Light	605	629	44	13

Table 3-12: Miscellaneous distribution equipment

Age Profile
These assets have generally been installed at the same time as the LV reticulation, so age profiles are comparable to the average age of the feeder they are connected to.

Condition
Fuses are expected to operate for the life of the asset they are protecting. It is not considered economic to perform condition assessment on these assets so in-service failures are repaired as they occur.

Streetlight and hot water lines are all in serviceable condition. In some areas, hot water cabling systems have reached the end of their economic life and are progressively being abandoned, made possible with the installation of new ripple control relays at each metering installation by the meter providers. Standard service lives for these assets are considered reasonable as per the ODV handbook.

3.3.10 SCADA Control & Communications

Description of Asset

Supervisory Control and Data Acquisition (SCADA) is a generic term that covers the system that Centralines uses to monitor and control network operations, obtain system information, and create historical records of events.

The assets employed for this purpose, in summary, comprise primarily an Abbey Systems computer application with connection through 2 x VHF channels to equipment and devices connected throughout the network. This is connected to a "RealFlex" computer application which is utilised by the Unison Control Room based in Hastings which has a mimic of the Centralines system in its database.

This is the primary means of sending signals for switch control and other information to field equipment and zone substations. Signals are transmitted through the communication links to Remote Terminal Units (RTUs) located at the substation or field equipment. The RTUs provide the communication interface that allows for central control commands to be conveyed to appropriate plant and for data to be returned.

The communication systems used by Centralines for network control include:

- Leased radio link: Zone Substation and field mounted equipment to the Abbey System Master PC;
- Leased data circuit: Abbey System link to Realflex;
- Leased wireless circuit: Abbey System link to Realflex.

SCADA

The SCADA system is extensively used by Centralines for control, monitoring and events reporting and forms the heart of Centralines' network operations. The hardware is individual PCs with Abbey System and Realflex software on separate interconnected machines to allow full mimic of operational equipment and real-time action of non-connected switches.

Communication to the RTUs and Unison's Control Room in Hastings is via a fibre optic cable, a wireless link from Airnet Services, and a radio network provided by Rangitoto Radio Inc.

Remote Terminal Units

The majority of the RTUs have been in service for eight years and Centralines holds sufficient spares to cover reactive maintenance in the short term.

With the increased number of automated switches and zone substation equipment reporting through the SCADA system the need to minimise traffic volumes on the single data RT channel became a priority. Centralines added a second RT channel, via Rangitoto Radio to provide an alternative communications path for the zone substations, whilst retaining the existing channel for the field mounted equipment. This is expected to meet the data traffic volume requirement for the immediate future, including upgrades to protection relays at Waipukurau and Waipawa substations undertaken

during 2009 and 2010. Further data volumes may require the addition of a further channel/s, which are readily available to meet the requirements during the planning period.

Age Profile
The nature of these assets renders a combined age profile inappropriate. The comments made above indicate the age of various components.

Condition
Regular preventive maintenance has provided reliable operation to date. Centralines has undertaken a proactive approach to monitoring the field mounted equipment via a three month check of the automated sites to check battery life and the operation of the individual switch to ensure its readiness for use.

Further, the primary SCADA equipment at Waipukurau control desk is supported on an ongoing basis by the supplier, which includes 24 hour fault response, system upgrades, and help desk services for minor fault and general system support.

3.3.11 Generation Plant

Centralines owns a generator that can support small to medium LV supplies. For larger supplies, Centralines is required to hire a suitable generator. Given the relationship between Centralines and Unison, Centralines has the ability to secure the supply and operation of a Unison 625kVA mobile generator on an as required basis. This generator is situated at Hastings, which is approximately 30 minutes from the centre of Centralines supply area.

Centralines operates a small generator to provide backup support to the Peel Street control desk and SCADA system.

3.3.12 Power Factor Correction Equipment and Metering Systems

Centralines does not currently own power factor correction equipment for use on the network, or provide metering services for consumers.

3.4 Justification for the Assets

Centralines provides access to electricity supply for users of electrical energy. Access is only via Centralines' power line network.

To provide this access Centralines uses an extensive network of lines, cables, associated switchgear and transformers that convey electricity from its Transpower point of supply to each customers point of supply. The following asset groups characterise Centralines' electricity network:

Sub-transmission
Centralines' sub-transmission assets comprise of a 33kV network of lines and cables including switches and protection devices. This network is used to transfer power from Transpower's GXP to

Centralines' zone substations. This choice of voltage is made taking into consideration load to be supplied, losses, and ease of material procurement and construction.

Zone Substations

Zone substations are used to convert the 33kV sub-transmission voltage to the 11kV distribution voltage level. Each zone substation is strategically located at load centres. Given that the zone substations are relatively lightly loaded, current investment decisions are primarily focussed on security of supply, reliability and asset renewals.

11kV Distribution

The 11kV assets form an extensive distribution network that is used by Centralines to distribute electricity to 400V distribution substations. The choice of 11kV voltage is mainly historical and is found to be satisfactory for present technical requirements. Other voltage levels may be evaluated in the future as load increases on the rural feeders of the network.

The existing 11kV feeders have a high degree of inter-connectivity, facilitating the current strong levels of reliability being experienced.

Distribution Transformers/Substations

Distribution transformers transform 11kV distribution voltage to 400/230V, which is the supply voltage for the majority of end use consumers. These substations are used to supply groups of up to 100 end use consumers.

Given the low density of the loads within Centralines area, historically a large number of distribution transformers have been installed relative to the number of connections, with many used for individual loads. Given that transformer capacity is governed by the transformer manufacturer, it is common for transformer capacity to significantly exceed the connected load for Centralines, due to the relatively small number of opportunities to share load for any given single transformer. As a result, Centralines has a relatively low distribution transformer utilisation ratio of 22%. Despite this situation, Centralines takes every opportunity to rationalise transformers and optimise utilisation for each transformer as network load changes, and investment decisions are required.

Low Voltage

Low voltage assets comprise lines and cable including associated switchgear operated at 400/230V and these are used to connect end use consumers' points of connection to distribution substations.

For similar reasons as for transformers, some low voltage assets experience low levels of utilisation, however Centralines takes every opportunity to rationalise conductors to optimise utilisation while maintain voltage performance for LV circuits as network load changes, and investment decisions are required.

SCADA, Communication and Control

Unison operates a control centre for Centralines that is attended 24 hours a day, 365 days a year. Centralines utilises its SCADA, communication and control systems to enhance the level of reliability, safety and customer services it provides.

SECTION 3 Assets Covered

Capital and Operating Expenditure Trade Offs

Centralines undertakes a rigorous approach to asset inspection and condition monitoring of its Substation and Lines assets, as detailed in Section 6 of this AMP. The results of these activities form a key input into the determination of prudent investment decisions regarding the level of operational expenditure required for repairs and replacements, as well as provide key inputs into the capital renewal decisions.

Via a management services contract with Unison, Centralines utilises an Investment Prioritisation Tool to make prudent investment decisions for capital expenditure. This is discussed in detail in Section 5, and provides a framework for consolidating and objectively evaluating all potential capital investments, including emerging network constraints arising from either the annual network development planning process, or dynamic events such as a large new customer load, or assessed renewals or reliability or safety driven projects. This tool is used to evaluate the outcomes, drivers and risks associated with each potential project and enables a ranking, enabling objective evaluation regarding whether the investment is warranted, and when.

Utilisation of the Unison Network Renewal Investment Model and the Triple-R (Repair/Refurbish/ Replace) Model is currently under investigation for use by Centralines, to determine the potential benefits to investment decisions.

ODV Handbook

The Commerce Commission's ODV Handbook required a series of optimisation tests to be systematically applied to the whole network to identify stranded assets, excess capacity and over engineering. These tests could also be considered as a basis for justifying assets in the network. The last ODV was carried out in 2006, however as loads and network constraints/assets have not changed materially since then, it is considered that the network remains optimal to meet demand.

SECTION 4 Service Levels

CENTRALINES
LIMITED

4 Service Levels 4-3

SECTION 4 Service Levels

4 Service Levels

4.1 Introduction

Service for Centralines is about understanding stakeholder's expectations and delivering cost effective solutions wherever possible to meet these expectations. Levels of service encompass not only quality of power supply but also network design, account management, project management and general communication and interaction with Centralines.

Centralines endeavours to achieve the service level targets discussed below within its supply coverage area. These are not contractual obligations to be met, rather benchmarks by which actual performance is to be assessed, enabling understanding of where improvement and focus is required. Centralines' Use of System Agreement with Electricity Retailers outlines Centralines' contractual commitments in service delivery.

4.2 Consumer Oriented Performance Targets

Centralines operates on an interposed model for service level agreements and billing end-use consumers of electricity through Electricity Retailers. While this means that Centralines does not currently deal directly with any end-use customers from an energy purchase viewpoint, the Company recognises that to offer levels of service that meet customer requirements, it is necessary to gain an understanding of customers needs and seek feedback on performance through greater engagement with customers. This is currently undertaken directly with Centralines' larger industrial customers, and more broadly with commercial and mass market customers via representative surveys.

To manage performance levels provided to customers Centralines has adopted the following service level measures:

a. Reliability measures of SAIDI, SAIFI and CAIDI;

b. Number of faults by 100km of line, by voltage;

c. Improvement to the worst two performing 11kV feeders;

d. Power Quality performance;

e. An overall satisfaction performance measure for customer requested works.

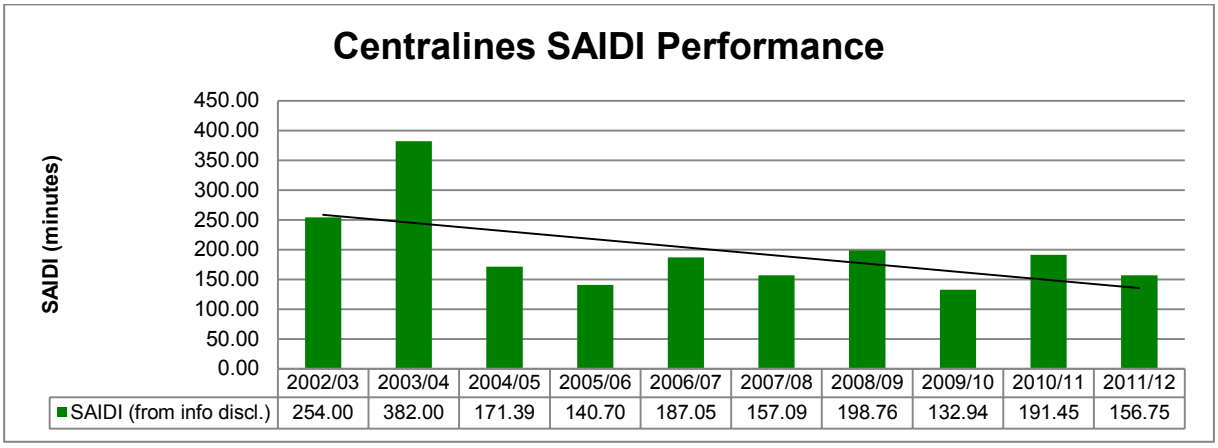
4.2.1 Reliability Measures - SAIDI SAIFI & CAIDI

SAIDI is an indicator that relates to the length of time the system is not available to customers when the network fails. It is largely affected by how fast supply can be restored when a fault occurs and is influenced by the quality of maintenance, planning and design standards, as well as environmental factors.

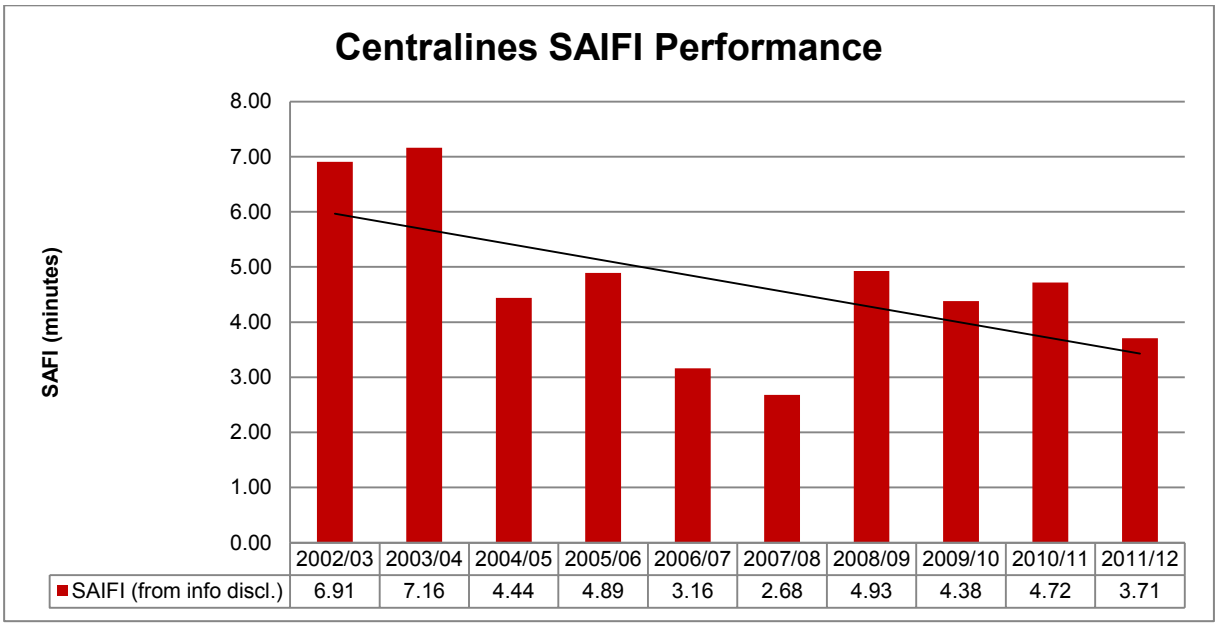
SAIFI is predominantly an asset performance indicator that reflects the number of times network components fail and supply is interrupted. Similar to SAIDI, it is influenced by the quality of maintenance, planning and design standards, as well as environmental factors.

SECTION 4 Service Levels

Graph 4-1 and Graph 4-2 detail the SAIDI and SAIFI performance respectively for Centralines for the period 2003 to end 2012, including trend lines.



Graph 4-1: Centralines SAIDI reliability performance



Graph 4-2: Centralines SAIFI reliability performance

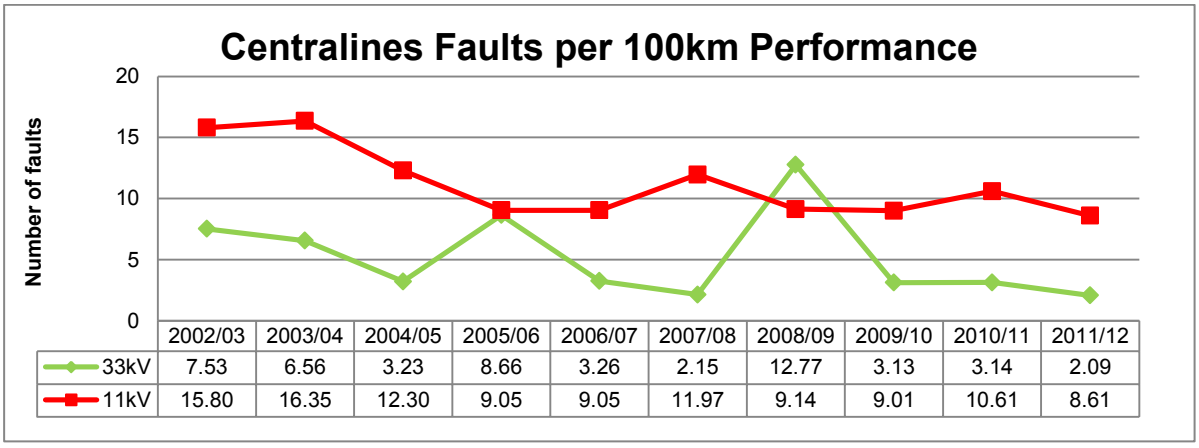
Evident from the above graphs, Centralines continues to sustain the improvements in SAIDI and SAIFI attained over the last 5 years. While the graphs continue to show a declining trend in the overall network impact from SAIDI and SAIFI, the adverse impact of storms in the last three years has contributed to the higher SAIDI and SAIFI reported.

4.2.2 Reliability Measure – Number of faults per 100km

Graph 4-3 details the number of faults per 100km of network, by voltage, experienced by Centralines' customers for the period 2003 to 2012. This improvement in performance in the 11kV network has

been attained following a focussed capital programme to improve the reliability, including the installation of a number of remotely controlled network automation devices, which have extensively improved the outage performance to a number of rural and remote rural customers.

The overall 11kV and 33kV network performance has improved in recent years. This is largely attributed to improved network interconnectivity, circuit breaker upgrades and targeted maintenance activities on critical feeders.



	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
33kV	7.53	6.56	3.23	8.66	3.26	2.15	12.77	3.13	3.14	2.09
11kV	15.80	16.35	12.30	9.05	9.05	11.97	9.14	9.01	10.61	8.61

Graph 4-3: Number of faults per 100km - by voltage

While these measures give an indication of overall performance, they do not ensure that all customers connected to the network are receiving appropriate service. To enable a better understanding of customer experience with reliability, surveys are conducted with a representative sample of customers to gain understanding of their respective levels of satisfaction across a range of network reliability experiences. The responses received from the latest survey carried out in 2012 show that the majority of customers perceive they are experiencing shorter and less frequent outages a further improvement on previous survey in 2010.

This experience is generally supported by Centralines' performance data detailed above. Centralines acknowledges that some customers experience considerably worse performance than the average, which is limited to a few customers connected to the worst performing feeders, hence improvement of performance of the most extreme parts of the network are also targeted. Considering the Centralines has only a small number of feeders, the measure of performance improvement of the two worst performing feeders is selected as a reliability measure.

4.2.3 Reliability Measure – Improvement to the two worst performing 11kV feeders

The selection of the worst performing 11kV feeders is based upon the SAIDI minutes lost associated with unplanned outages on the feeder. This targets the customers experiencing the highest outage durations, initiated locally by unplanned events.

The two worst performing feeders have been assessed as:

a. Feeder 45. This feeder contributed 8.16 unplanned minutes to the SAIDI year to date total of 92.6 minutes as at 31 January 2013. Environmental influences, third party damage and

equipment failure were the main causes of failure on this feeder, contributing 7.15 minutes to the total of 8.16 unplanned SAIDI minutes.

b. Feeder 1. This feeder contributed 5.68 unplanned minutes to the SAIDI year to date total of 92.6 minutes as at 31 January 2013. An operational error and vegetation related faults were the main causes of failure on this feeder, contributing 4.84 minutes to the total of 5.68 unplanned SAIDI minutes.

To address the performance of these two feeders, the following actions have been initiated:

a. Feeder 45 – This feeder is scheduled for feeder maintenance in the 2013/14 year.

b. Feeder 1 – This feeder is programmed for feeder maintenance in the 2013/14 year.

4.2.4 Reliability Performance Targets

The performance targets for all planned and unplanned interruptions on the Centralines network for the period of this plan are outlined in Table 4-1 following. The performance for the 2011/12 financial year ending 31 March has been extrapolated based on forecast.

SAIDI		**2011**	**2012**	**2013F**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Target	Planned SAIDI	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1
	Unplanned SAIDI	130.4	130.4	130.4	130.4	130.4	130.4	130.4	130.4	130.4	130.4
	Total SAIDI	**197.5**	**197.5**	**197.5**	**197.5**	**197.5**	**197.5**	**197.5**	**197.5**	**197.5**	**197.5**
Actual	Planned SAIDI	84.81	**33.65**	**72.5**							
	Unplanned SAIDI	106.64	**123.11**	**53.9**							
	Total SAIDI	**191.45**	**156.75**	**126.4**							

SAIFI		**2011**	**2012**	**2013F**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Target	Planned SAIFI	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21
	Unplanned SAIFI	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01	3.01
	Total SAIFI	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**
Actual	Planned SAIFI	0.42	0.21	0.33							
	Unplanned SAIFI	4.30	3.41	2.46							
	Total SAIFI	**4.72**	**3.63**	**2.79**							

Faults per 100km		**2011**	**2012**	**2013F**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Target	33kV	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Target	11kV	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Actual	33kV	3.14	2.09	1.1							
Actual	11kV	10.61	8.58	8.2							

Table 4-1: Network reliability performance targets

The above illustrates that Centralines is intending to make only modest improvements to reliability performance for the period of this plan.

Over the next 2-year period, Centralines will be focusing on clearing vegetation in close proximity to its lines. With a large majority of unplanned outages being vegetation related, this is seen as the next steps to improving reliability.

Investment in distribution automation has seen a significant improvement in reliability in the last five years. The current level of performance is seen as appropriate by the majority of Centralines' customers. In the last survey most customers indicated they were satisfied with the level of outages they experienced. The levels of satisfaction, measured on a 5 point Likert scale are shown in Figure 4-1 following which plots satisfaction results geographically, providing further insight into customer satisfaction associated with different areas of the Network.

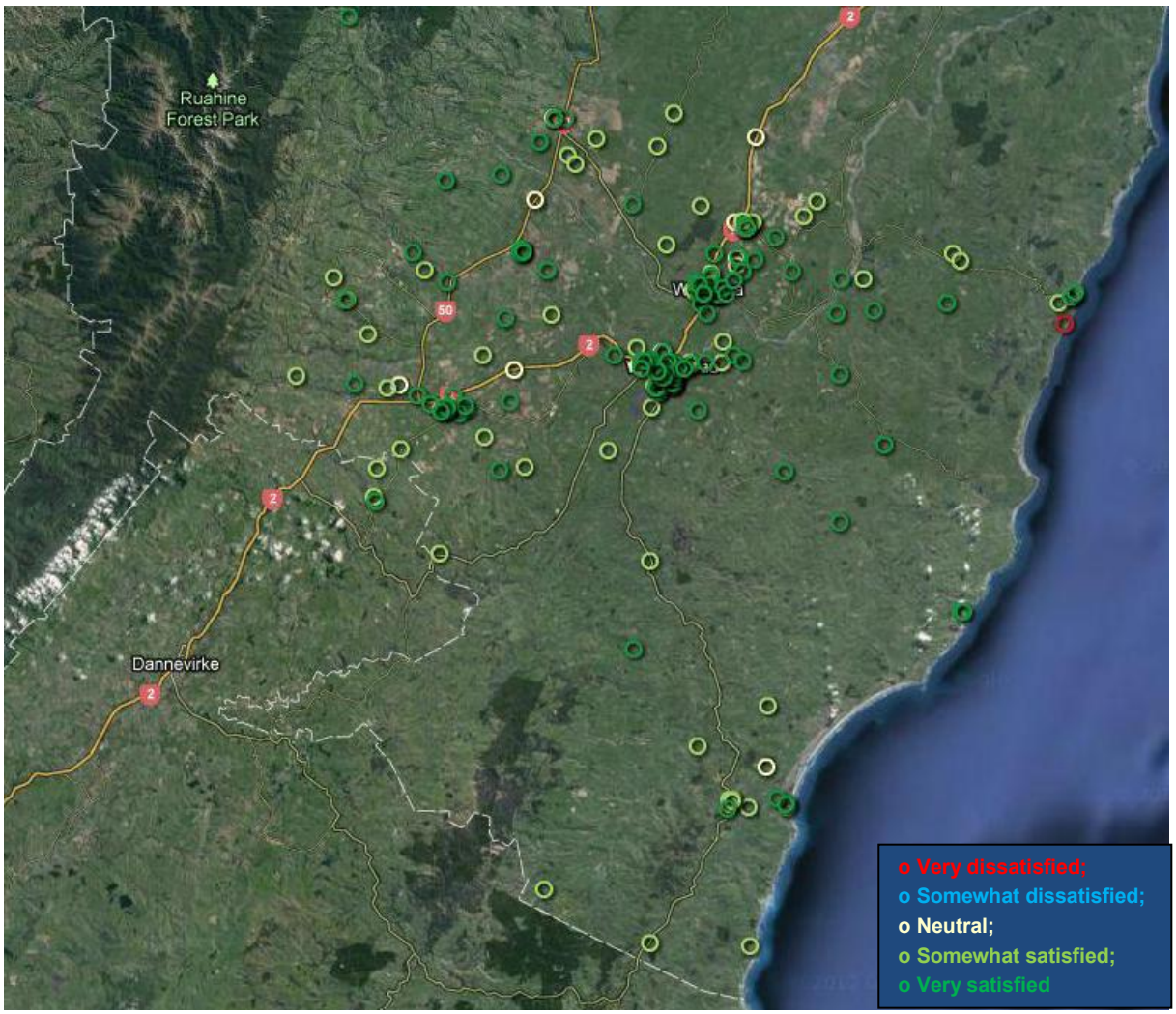


Figure 4-1: Outage satisfaction by customer segments and groups

Scale: 1=Very satisfied, 2=Satisfied, 3= Neutral, 4=Dissatisfied, 5=Very dissatisfied

SECTION 4 Service Levels

Across all customers in 2012 overall satisfaction was recorded as 4.32, or satisfied. This represents a slight increase on the 2010 figure of 4.10.

90% of customers in 2012 stated that they were somewhat to very satisfied with Centralines services.

Very little variation was recorded in satisfaction levels between Mass Market and Commercial Customers in 2012.

As a result of this feedback, Centralines' aim is to sustain reliability improvements achieved to date, and target incremental improvements for the planning period.

4.2.5 Power Quality

Power Quality is also another key performance issue for Centralines' customers, in particular the industrial and commercial customers whom are adversely affected by supply quality issues. While quality means different things to different customers, Centralines understand that for industrial and commercial customers, momentary voltage dips, spikes and sags, or the presence of waveform altering harmonics results in reduced productivity and reduced profitability.

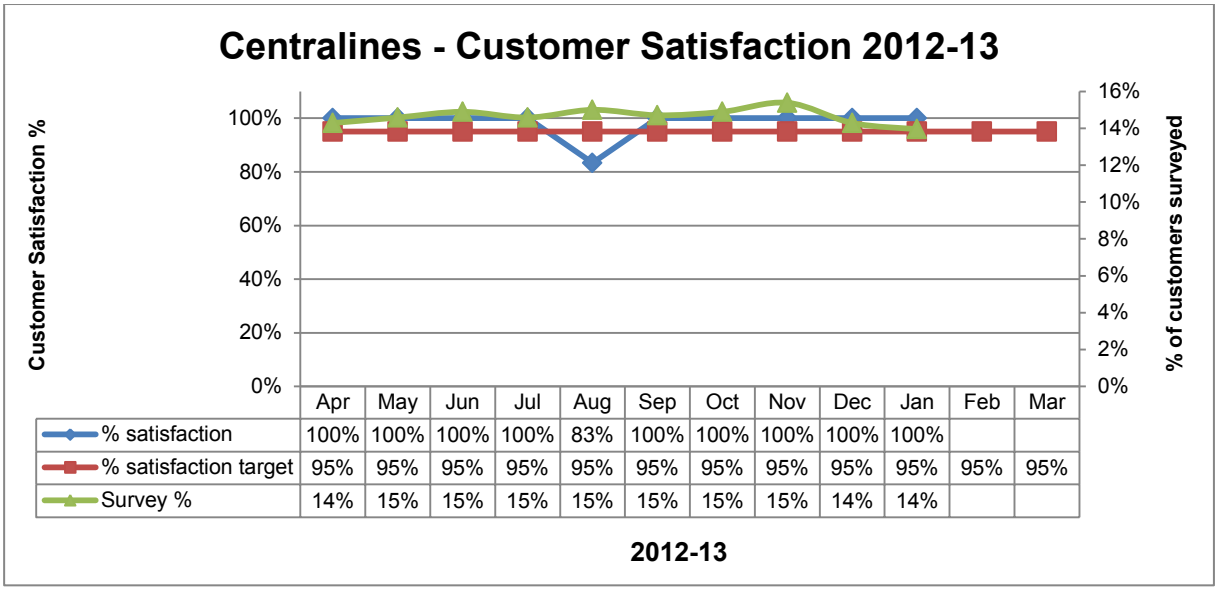
The ongoing monitoring of power quality for all commercial and industrial customers, let alone all customers, is simply cost prohibitive. To monitor the situation, periodic customer surveys are conducted which include questions which request a response indicating experienced power quality and level of satisfaction. For the most recent survey, power quality was rated by Commercial and Industrial customers as the fourth highest performance area of importance beyond price, reliability, responsiveness to faults and being provided. Importantly, these customers indicated an increased level of satisfaction with power quality compared to the previous year.

For the mass market power quality was again fourth highest concern. As a result, Centralines has adopted an expectation of 99.95% adherence to supplying compliant voltage levels (230V ± 6%) at the point of connection, and any installations outside acceptable levels are rectified on identification. This target is believed to represent a fair price/quality balance in accordance with surveyed consumer expectations. Compliance with this measure is monitored by exception, where customer complaints are individually investigated, and if necessary, rectified.

4.2.6 Satisfaction with delivery of customer works

Every customer contact is seen as an opportunity for Centralines to enhance the relationship with our customers. To this end, following the completion of customer requested capital works, or non regulatory works, Centralines undertakes a sample based approach to gaining an understanding of perceptions of our performance via a short customer survey, conducted over the phone. This is monitored by graphing the results and reviewing monthly enabling timly identification of any issues and opportunities for improvement.

The results for 2012/13 to date are shown in Graph 4-4 following, and show a 97% satisfaction level, with a sampling rate averaging 15%, which is considered a reliable indicator of customer satisfaction.



	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
% satisfaction	100%	100%	100%	100%	83%	100%	100%	100%	100%	100%		
% satisfaction target	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Survey %	14%	15%	15%	15%	15%	15%	15%	15%	14%	14%		

Graph 4-4: Centralines customer satisfaction 2012

4.3 Asset Performance and Efficiency Targets

As well as delivering supply reliably, there is a need to ensure this is done in an efficient and cost effective manner. Individual aspects of this AMP (e.g. IT systems, maintenance plans, renewal investments) all undergo continuous review to ensure proposed practices represent cost effective and sustainable performance, and achieve objectives. This is discussed in further detail in the following chapters.

At a business performance level, Centralines uses a number of additional indicators to understand whether the asset management strategies are delivering efficient outputs. Given the relative low density of the customer base at Centralines asset performance and efficiency measures are limited to compare past performance with current performance, with targets that are appropriate given current performance, and opportunities for improvement. Benchmarking against industry averages for asset performance can result in inappropriate comparisons, hence benchmarks are undertaken against peer electricity distributors sharing similar load density ratios.

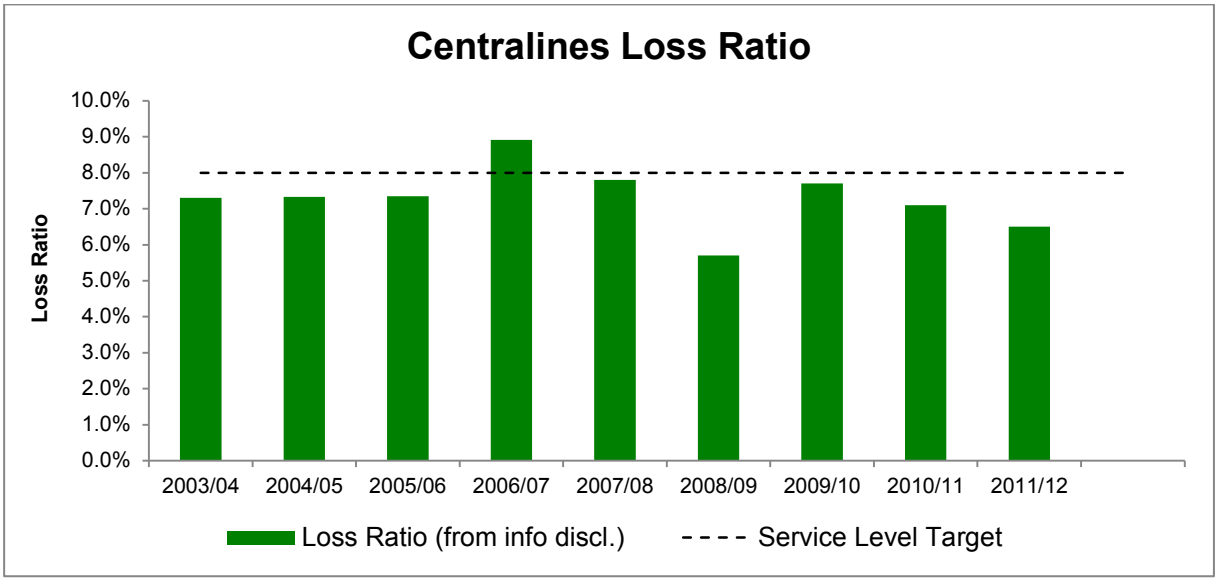
The current measures employed are network losses, transformer capacity utilisation, capital expenditure as a percentage of replacement costs, and operational expenditure per connection point. Performance against these is discussed in turn.

4.3.1 Network Losses

The network losses experienced across the Centralines network are calculated based on the difference between the co-incident metered energy import at the GXP and the metered input exports at the ICPs.

SECTION 4 Service Levels

Graph 4-5 details the network losses experienced in recent years, as well as the target losses for the planning period. The losses for Centralines has been consistently below target for the last three years.



Graph 4-5: Network losses

4.3.2 Transformer Capacity Utilisation

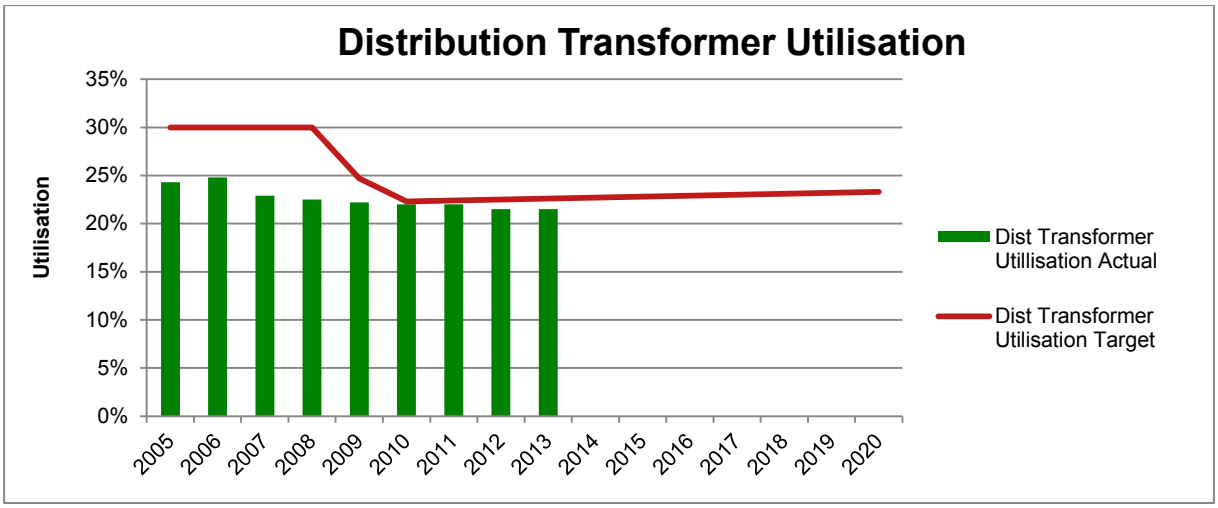
Distribution Transformer Capacity Utilisation is calculated based on the maximum network demand versus the installed capacity of all distribution transformers. Typically some level of under utilisation is expected due to the fact that transformers can only be purchased in certain sizes, and are generally selected such that the capacity exceeds the estimated after diversity maximum demand.

Centralines' distribution transformer utilisation is very low, as expected for a low customer density distribution network. Graph 4-6 details recent performance as well as the target transformer capacity utilisation for the planning period.

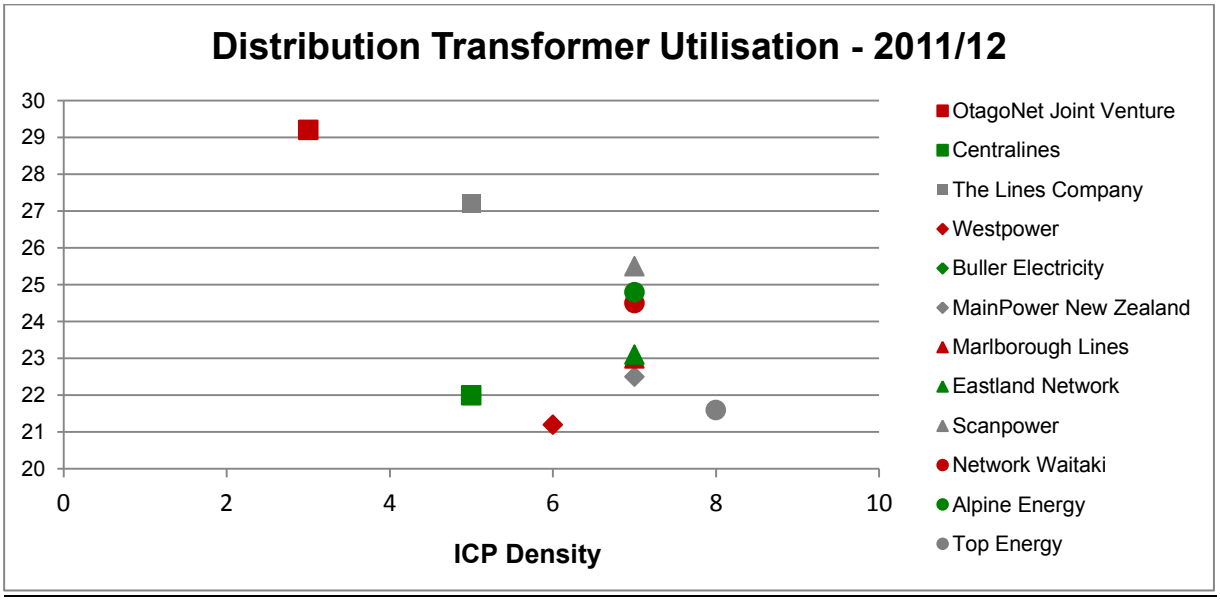
Comparison with other EDBs shows Centralines to have amongst the lowest levels of capacity utilisation, detailed in Graph 4-7 following. This is to be expected given the low density of customer connections, although there is clearly some room for improvement. Given that improvements in capacity utilisation are only attainable when either load is increased up to available capacity, or when changes to distribution transformers are undertaken, Centralines is only in a position to address this situation slowly over time with no significant improvement foreseen in the current planning period. Each opportunity for new load or requirement to replace existing transformers will be undertaken inclusive of a detailed analysis of the capacity of the local network, and the after diversity maximum demand of the load, to identify opportunities and achieving improved capacity utilisation over time.

Evident from Graph 4-6, transformer utilisation has been trending unfavourably downwards, which has been driven by the earlier omission of approximately 12MVA of installed distribution transformer capacity which is owned by customers.

Given this revision historical target for distribution transformer capacity utilisation of 30%is clearly unattainable given financial constraints, hence this has been adjusted down to an attainable level for the current year, with gradual improvement going forward then factored in.



Graph 4-6: Centralines distribution transformer utilisation

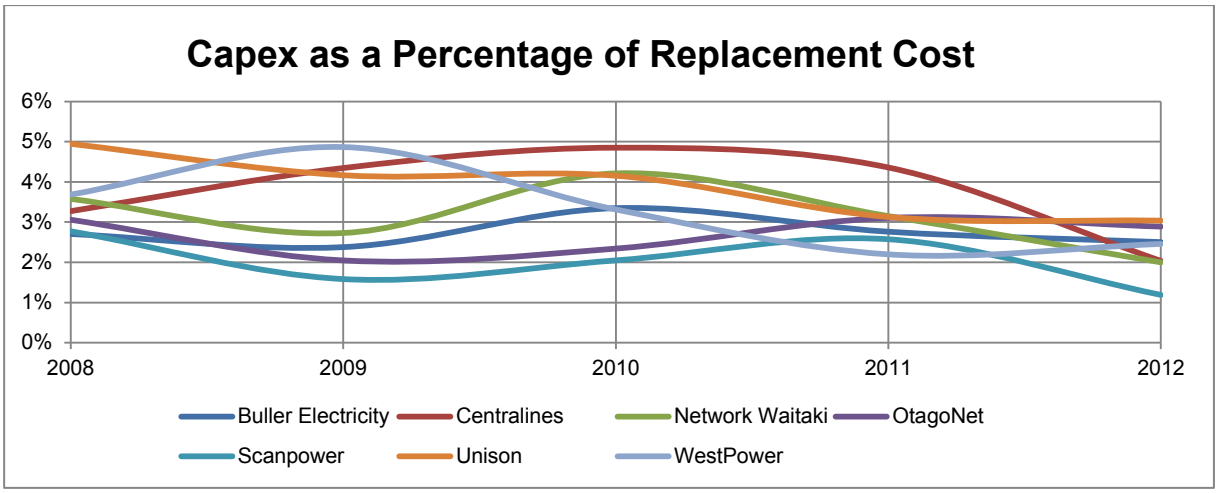


Graph 4-7: Comparison - distribution transformer utilisation

4.3.3 Capital Expenditure as percentage of Replacement Cost

Centralines has adopted this measure to enable an objective understanding of the extent to which annual capital investment decisions are accelerating, or decelerating the rate at which the network is being progressively replaced, comparative to an average overall replacement rate given the anticipated age of all assets. This enables network capital expenditure to be managed at a

sustainable and efficient level over the long term. This network capital expenditure is compared against peer electricity distribution businesses (EDBs) to enable comparison of current capital investment levels being taken within the industry. Graph 4-8 details Centralines' capex as percentage of replacement cost over time and compares this against peer EDBs. This indicates that while recent capital expenditure levels have been high for Centralines which has been necessary to address growth in irrigation demand, overdue renewals and upgrade sub transmission protection this increase is not unique to Centralines and importantly this ratio is now returning to sustainable longer term levels.



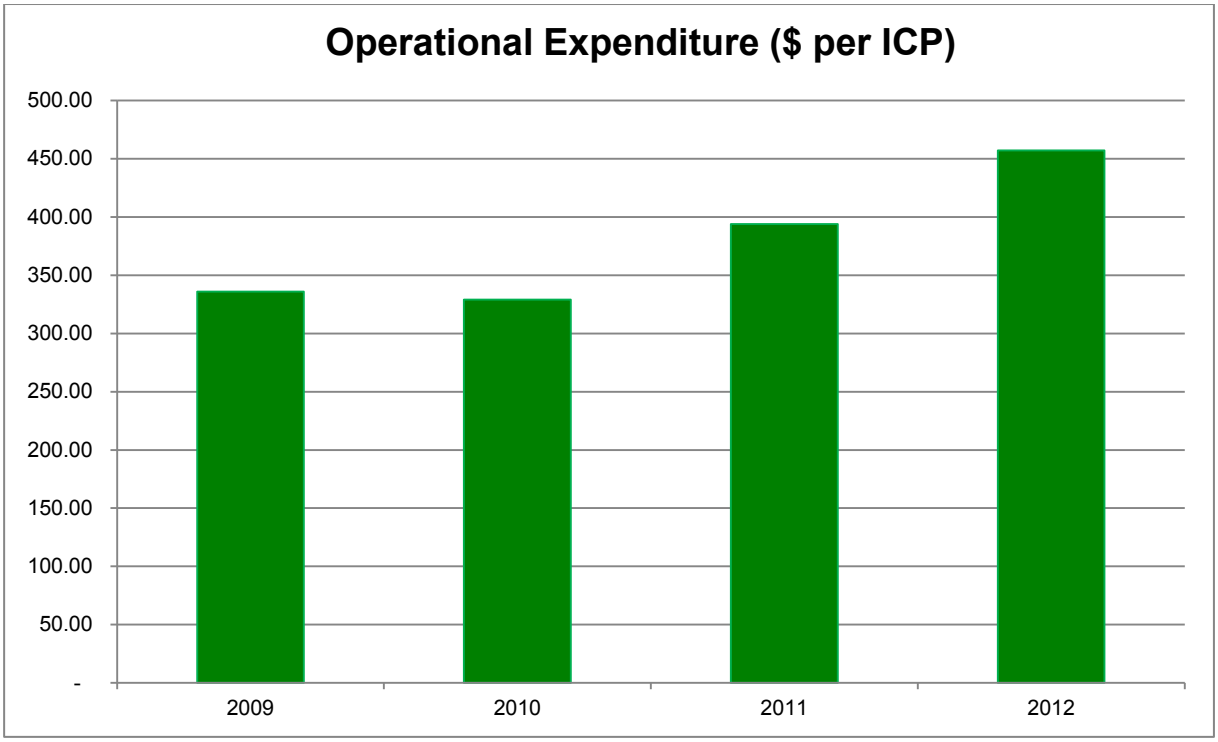
Graph 4-8: Comparison - CAPEX as % of replacement cost

4.3.4 Operational Expenditure per connection point ($/ICP)

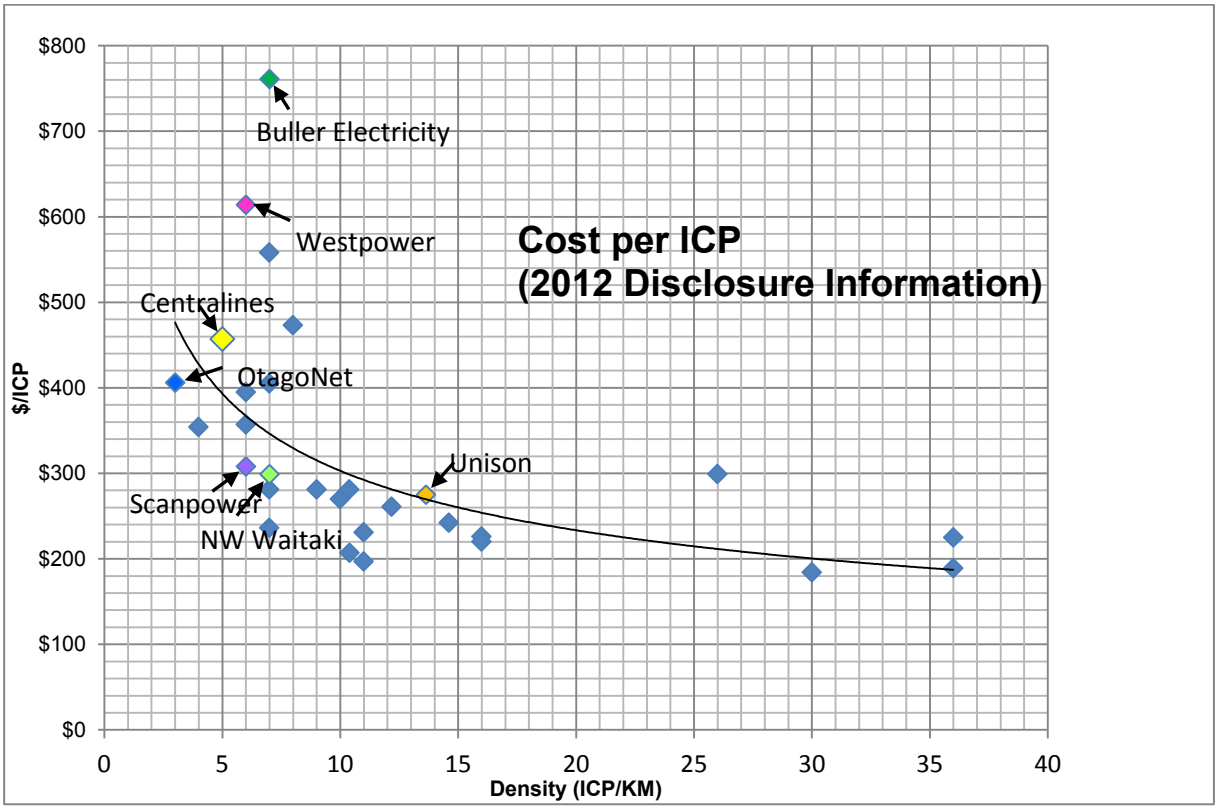
Centralines has adopted this measure to enable an objective understanding of trends in the average level of operational expenditure required to service each connection. This is also compared against peer EDBs to enable understanding of Centralines performance relative to its peers.

Graph 4-9 and Graph 4-10 detail Centralines performance over time, and comparison against peers. These indicate that Centralines operating expenditure has increased in 2011/12 due to increased levels of vegetation management Which has been identified as a priority to make further reliability performance improvements. This increased level of expenditure on vegetation control is expected to continue however Centralines continues to perform well in comparison its peer group for operational expenditure levels per customer.

Not only does Centralines operational expenditure per customer compare well in relative to peer EDBs it is at the lower end of current expenditure rates for the electricity distribution sector despite the low density of customers on the Centralines network, and the lack of opportunity for economies of scale, given Centralines relatively small number of connections. In summary, it is suggested Centralines operating expenditure decisions have proven to be prudent, given the performance levels achieved overall.



Graph 4-9: OPEX per ICP



Graph 4-10: Comparison - OPEX per ICP

SECTION 4 Service Levels

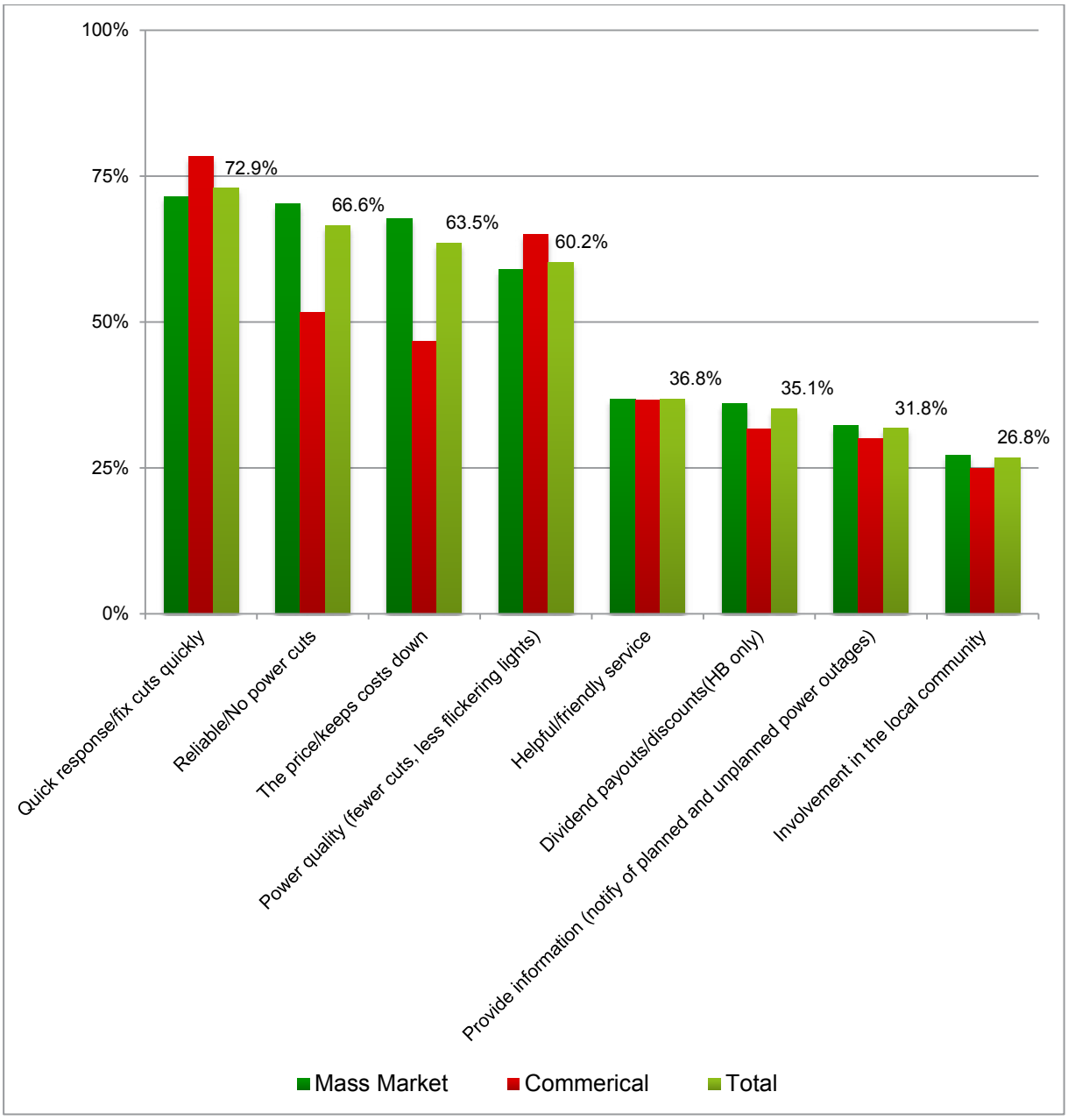
4.4 Justification for Service Level Targets

The service level targets determined for Centralines are justified in consideration of the following:

4.4.1 The Customer oriented performance measures are reflective of the customer stated requirements.

Centralines undertakes representative surveys to enable understanding of customer priorities. The most recent survey highlighted the highest priority is quick restoration followed by reliability of supply and keeping the cost down.

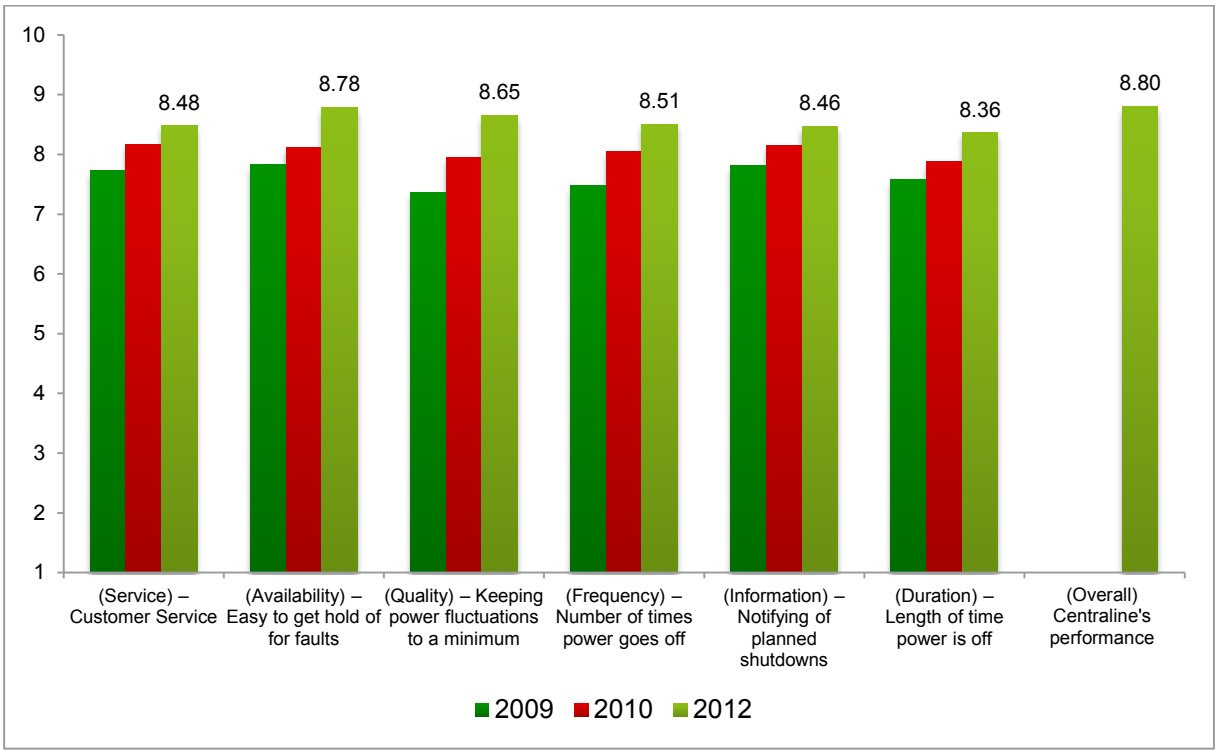
Graph 4-11 following illustrates the responses received.



Graph 4-11: Most important deliverable - all customers

Customer satisfaction with delivery of services and network performance is also a key performance indicator used in setting service level targets. In 2012 43% stated that they were *very satisfied* with ***Centralines*** services and 47% stated that they were *somewhat satisfied*. This resulted in an overall satisfaction KPI of **90%**. Only minor variations were recorded between Mass Market and Commercial Customers and this result suggests Centralines current SLA targets and performance are meeting customers expectations.

Customer perception and satisfaction with perfromance of specific deliverables is also evaluated through the customer survey to further understand where to focus efforts and what targets to strive for. This can be seen in Graph 4-12 which shows that mass market customers perceive that centralines is continuing to improve its performance across the range of deliverables.



Graph 4-12: Diverable performance - mass market

Given that Centralines is also wholly owned by the Central Hawke's Bay Power Consumers' Trust, Centralines' customers are also our owners, and meeting their expectations in terms of service, and the other performance criteria agreed, is of paramount importance to Centralines.

SECTION 4 Service Levels

4.1.2 Asset & Efficiency performance measures:

- Network Losses – The use of this loss ratio as a service level is justified as it indicates, at a high level that asset selection and operation decisions have been appropriate, and whether the network is operating at an optimal level of efficiency in terms of losses, given physical constraints. The target of 92% is reflective of long run performance is in line with network losses experienced by networks of similar customer density, size and and architecture.
- Distribution Transformer Capacity Utilisation – The use of this ratio as a service level is justified as it reflects asset utilisation which is indicative of the quality of network development planning which drives capital investment decisions. The target takes into account actual historical performance, and while long term improvement is factored into the target this takes into account the time horizon over which this can occure as assets are gradually replaced, upgraded and redeployed.
- Capital Expenditure as a percentage of replacement costs – The use of this measure as a service level is justified as it indicates whether the network investment is cost effective and sustainable over the long term.
- Operational Expenditure per connection point - The use of this measure as a service level, particularly when comparison with Centralines peers is undertaken, is justified as it enables an understanding as to whether operating expenditures are appropriate and efficient given the operating parameters of the company. The target is set annually based on operational plans for asset management however this is compared with historical performance and benchmarked against relevant EDB peers.

SECTION 5 Network Development Plans

CENTRALINES
LIMITED

5 Network Development Planning 5-3

SECTION 5 Network Development Planning

5 Network Development Planning

5.1 Introduction

This Network Development plan outlines details of the network reinforcement strategies for this planning period which sees a continuation of capital investment in the network to meet forecast consumer driven growth, improvement in network security, maintenance of customer service levels, and achievement of improvements in network reliability and safety. The strategy employed is to ensure reinforcement projects meet customers' capacity, quality, security and reliability needs, and that these are delivered in a cost effective and timely manner.

This section of the AMP discusses Centralines' planning methodology based on security criteria, load forecast and planning standards. The planning philosophy also investigates capital deferral options such as embedded generation, mobile technology and demand side management in conjunction with the consideration of capital renewal and network augmentation options.

The section further highlights Centralines' increased focus on the use of non-network solutions to enhance network efficiency. This leverages off the work being undertaken at Unison Networks Ltd, as part of Centralines' network management contract, i.e. Smart Grid implementation, scenario planning, and research into emerging technologies.

The development plan is prepared taking into consideration Centralines' condition based replacement strategies as well as known information regarding load growth and potential generation developments. The projects beyond 2013/14 are indicative only, because of uncertainties as to the nature and magnitude of future growth. All proposed investments are reviewed annually and consequently may proceed with revised timing, different to that currently envisaged.

5.2 Planning Criteria and Assumptions

Planning is undertaken on an annual basis to assess the capability of Centralines' network to continue to meet load forecasts, and proactively identify limitations that are forecast to emerge through load growth and electricity usage pattern changes occurring across the network. This includes the development of 20-year load forecasts for each zone substation and feeder, assessed against plant rating for the transformers and conductors that are presently utilised. This is coupled with known growth areas within the network and potential growth areas driven by emerging changes in land use. This enables identification of the need for capacity increases or improved voltage regulation for individual parts of the network.

5.2.1 Planning Process

To ensure Centralines treats all its customers in an equitable manner, standard planning criteria have been established to ensure a consistent approach to discretionary investment in the network.

In brief, the process employed involves:

- Understanding the network loading, network limitations and growth forecasts for the network. Each distinct issue is addressed through individual projects;
- A comprehensive definition of the project outcomes to be achieved;
- Investigation of the potential options available to enable achievement of the outcomes required, and selection of the most appropriate option for each project; and
- Development of a programme of works, inclusive of the projects that will enable the achievement of network development objectives with due consideration of financial and resourcing constraints.

5.2.2 Planning Criteria and assumptions

Planning criteria and assumptions guide the decisions of planning engineers in the formulation of optimised network development solutions, given known constraints over the planning period.

Key planning criteria and assumptions include:

- The level of network reliability;
- The level of power quality;
- System performance under contingency events;
- Maximum current carrying capacity of network elements;
- Fault ratings;
- Potential impact of uncertainties facing the network of the future.

Appropriate level of network reliability

The achievement of network reliability targets as defined in Section 4.2.4 is enabled through targeted capital projects aimed at progressive improvement of critical sections of the network, through either:

- refurbishment or renewal works to make the network more resilient; or
- through capital projects aimed at enabling faster network restoration following a fault.

Projects are assessed on their relative merits in terms of forecast contribution to a reduction in SAIDI and/or SAIFI, based upon the local fault history.

5.2.3 Security Criteria

Security of supply is the ability of a network to meet the demand for electricity in circumstances under contingency conditions. The more secure an electricity network, the greater the ability to continue to perform or the quicker it can recover from a fault. Centralines has adopted the following security of supply criteria, as set out in Table 5-1 and Table 5-2 below, to guide investment levels in the network.

Description	Load type	First event	Second event	Bus fault
Class D	Single large consumer	Depends on consumer needs and willingness to pay.		
Class C	CBD	Restore 50% within 15 minutes, restore remainder within 45 minutes.	Restore 50% within 60 minutes, restore remainder within 3 hours.	Restore 50% within 60 minutes, restore remainder within 3 hours.
Class B	Suburban feeder	Restore 50% within 45 minutes, restore remainder within 2 hours.	Restore 50% within 3 hours, remainder in time to repair.	Time to repair.
Class A2	Rural feeder up to 1MVA load	Restore 50% within 2 hours, remainder in time to repair.	Time to repair.	Time to repair.
Class A1	Rural feeder up to 500kVA load	Restore 20% within 2 hours, remainder in time to repair.	Time to repair.	Time to repair.

Table 5-1: Centralines' security levels

Substation	Target	Actual	Remarks
Waipukurau Urban	Class C	Complies	
Waipukurau Rural	Class B	Complies	Possible from back-feeds/load shifting
Waipawa Urban	Class C	Complies	
Waipawa Rural	Class B	Complies	Possible from back-feeds/load shifting
Takapau	Class A2	Complies	
Ongaonga 11kV	Class A2	Complies	Due to automation in area
Wilder	Class A1	Complies	Due to automation in area

Table 5-2: Centralines' supply classification and security levels

The above security levels are set for network planning and development purposes. Centralines believes these criteria continue to be reflective of the various customer and stakeholder groups' expectations, as outlined in Section 4.

Performance against these targets is evaluated and, where not met, improvement options are investigated. Engineering analysis is applied, together with judgment, to assess relevant factors in determining the treatment of the issue:

- Likelihood of the contingency under consideration;
- Cost of the improvement options;
- Impact of the energy/demand not served;
- Type of consumers affected.

SECTION 5 Network Development Planning

Economic analysis is conducted on improvement options to ensure efficient network development and prioritisation of reliability driven upgrades.

The Electricity Engineers Association (EEA) is undertaking a review of its guidelines for security levels. The results of this may lead to Centralines reviewing its security criteria.

Appropriate level of power quality

Power quality is evaluated under load forecast scenarios, to ensure adequate performance is maintained. Various planning periods are assumed, with detailed investigations focusing on the short term up to five years ahead, and annual development planning reviews for a ten-year horizon.

As quality of supply issues are almost always a shared problem between the Centralines' network and the customer's installation or equipment, Centralines utilises a Network Connection Standard to manage these issues. This document outlines the responsibilities of both Centralines and the customer to ensure that all connected customers receive supply of electricity to appropriate quality standards.

Voltage Performance under Normal Conditions

The voltage regulation guidelines listed in Table 5-3 below are used for planning purposes to identify potential power quality issues. These take account of Transpower's stated voltage regulation policies:

- 220kV and 110kV ± 10%
- Unregulated 33kV ± 5%

Supply Level	Maximum	Minimum
33kV substation connection (1)	+5%	-5%
11kV distribution circuit (2)	+2%	-3%
Distribution transformer	+5%	-2%
Low voltage distribution circuit, including allowances for service connection	+6%	-6%

(1) Regulated with On-Line Tap Changer (OLTC) equipment on 33/11kV transformers.

(2) These figures will vary in particular rural distribution areas due to the sometimes lengthy 11kV radial feeders. LV circuits are designed with these variances taken into consideration.

Table 5-3: Voltage performance criteria

In addition to the above guidelines, Centralines has a "Quality of Supply" standard which deals with voltage regulation, harmonic voltages and currents, voltage dips, voltage unbalance and flicker.

Centralines designs and operates the network to supply voltages to consumers in accordance with the regulated limit of 230 volts ±6%. However, despite these efforts, and usually due to unanticipated changes in consumer loads, some consumers may occasionally experience voltages outside these limits. When issues are identified, either by Centralines' internal modelling or monitoring, or a customer enquiry, the subsequent investigation and any required resolution are treated as a matter of priority.

In addition to the voltage regulation limits above, Centralines also endeavours to keep voltage unbalance on all voltage levels of its networks below 2%.

Occasionally, specific types of consumers' equipment can cause interference, such as power factor correction capacitors or large motors. This interference can arise in many forms, including sags, flicker and absorption of Centralines' load control signals. To ensure that this equipment does not cause problems, the Network Connection Standard provides guidelines for consumers to notify Centralines when this type of equipment is to be connected. This allows Centralines to assist the consumer by assessing whether a problem is likely to occur before expensive investment decisions are made.

The allowable level of harmonic distortion of the voltages supplied to consumers is also covered by regulation. Tracking the source or cause of harmonic distortion is generally very difficult and often includes investigation of one or more consumer installations, as well as the network configuration. Centralines endeavours to work with all affected parties to identify the source of the distortion and develop cost effective solutions. As a last resort, if a particular consumer installation is identified as the cause, Centralines reserves the right to disconnect that installation to protect other consumer installations from damage.

System performance under contingency events

Greater variation in network performance is expected under contingency conditions, particularly in terms of voltage. The following criteria are applied to ensure that, even in contingency circumstances, balance is maintained between performance (quality of supply to consumers) and lifecycle asset condition (cost):

- The highest system voltage (as specified in the standards applicable for each type of equipment) shall not be exceeded at any point in the network;
- Zone substation 11kV bus voltages shall not be allowed to fall below 95% of rated voltage during single contingencies;
- No individual element shall carry a sustained load beyond its design rating for the ambient conditions that apply;
- Protection relays shall not be used to keep loads within operational limits;
- A substation busbar fault is considered abnormal;
- Alternative feeds permit restoration of supply after switching has been undertaken;
- Radial feeds envisage restoration time dependent on defect repair time;
- All possible steps are taken to ensure the safety of people and to eliminate damage to network equipment.

SECTION 5 Network Development Planning

Maximum current carrying capacity of network elements

Centralines utilises conservative maximum continuous current ratings for planning purposes for short to medium term planning developments, but assumes higher ratings (more than the current summer and winter continuous ratings) for long term network developments.

Fault Ratings

Fault current interrupting switchgear and equipment will have ratings sufficient for fault and routine operation. Fault levels in the network are reviewed to ensure that network equipment ratings are not exceeded. As part of planning for network configuration or supply arrangement changes (particularly point of supply, sub-transmission and embedded generation developments) the impact on fault levels is assessed and any resultant equipment rating issues are addressed.

Potential impact of uncertainties facing the network of the future

A key uncertainty facing the electricity industry today is the potential impact of emerging technologies on the relevant distribution network. Emerging technologies such as Distributed Micro Generation, (e.g. photovoltaics) and the charging of electric vehicles, could have a substantial impact on the network.

Based on research done on these technologies and others, it has become clear that long standing norms and the conventional wisdom in electricity distribution and associated industries are shifting. Where once electricity distribution was a technologically static industry with merely organic load growth expectations, there is now uncertainty and dynamism. There is growing recognition of the significant potential for advancement in technologies that will cause step changes in electricity demand (both 'up' and 'down'). This also raises the fundamental question of whether there is a future for electricity distribution as we know it and consequently what alternative supply methods and form of network may result.

Unison manages and proposes developments of the Centralines network as part of the management services agreement. It has a number of initiatives underway to rehearse the future and to investigate relevant options with which to respond by way of application to its own and Centralines' networks. The initiatives include scenario planning and emerging technology trials (as part of a research and development programme).

Scenario Planning

During 2012, Unison undertook an internal exercise in strategic scenario planning, following the approach developed by Peter Schwartz of the Global Business Network, to identify the greatest uncertainties to potentially face Unison's network (and subsequently the Centralines network) over the next twenty years. The exercise highlighted two core uncertainties, i.e. Technology Innovation and Customer Savvy & Engagement. For each uncertainty the two extremes were considered before being mapped into a two-by-two matrix, summarised below in Figure 5-1, representing four plausible futures.

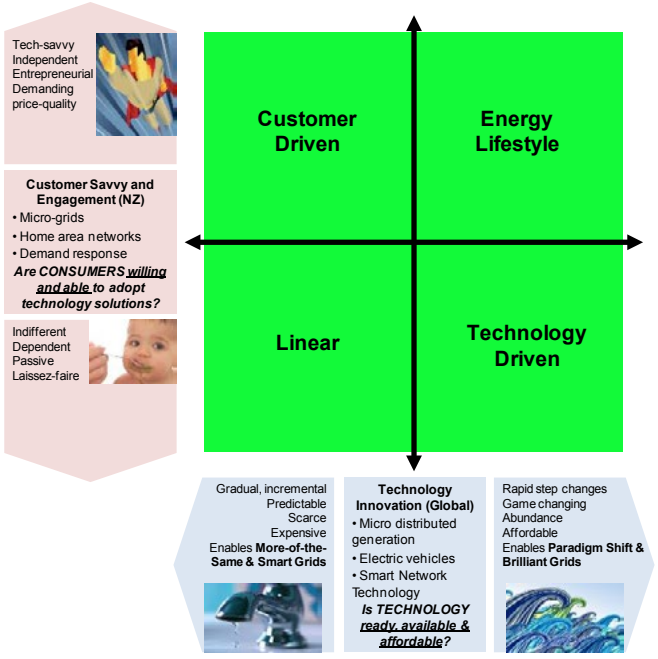


Figure 5-1: Key uncertainties facing the network of the future

Further description follows of the four plausible scenarios that were comprehensively evaluated:

"Linear"	Where the electricity market continues much in the same direction it has for decades. The excitement and hype generated by the 'smart grid revolution' fails to materialise into tangible benefits, and utilities retrench to focus on conventional network infrastructure. Increasing electricity prices have yet to provoke a united response from customers.
"Customer Driven"	Where savvy and engaged customers demand far more choice, services and quality of supply than their electricity utilities are capable of delivering with the technology that is available.
"Technology Driven"	Where advanced and abundant network technology enables utilities to greatly enhance their productivity, but a general lack of interest from disengaged customers means that innovation is limited to the 'supply-side'.
"Energy Lifestyle"	Where the convergence of customer engagement and availability of efficient new technologies is leading to fundamental change in the relationship between customers and utilities and the operation of the wider electricity market.

Unison will continue to use scenario planning, to both rehearse the future and to recognise the indicators as to which path and scenario actually eventuates. This will enable Unison to manage the Centralines network to avoid surprises, adapt, and act efficiently and effectively.

Emerging Technology Trials

Emerging technologies could have a considerable impact on the network, and could lead to substantial investment in network infrastructure, if their effects are not mitigated in a timely manner. In

SECTION 5 Network Development Planning

2012 Unison established a Research and Development programme to enhance Unison's Smart Grid capabilities. Information on the Research and Development programme is provided in Section 5.8.2.

One of the projects included in the programme involves three key emerging technologies, i.e. Distributed Micro Generation, Electric Vehicles (charging) and Energy Storage. Whilst these technologies, individually, could cause substantial constraints on the network they are also highly interrelated with good prospects for integration. If this set of technologies is managed together, rather than individually, they could provide Unison and Centralines with an optimum solution to otherwise daunting constraints.

This "Interplay" research project will:

- Develop an understanding of consumers potential behaviours and expectations;
- Investigate potential uptake rates for each of the technologies;
- Investigate the impact these technologies can have on the network, individually and collectively;
- Investigate and trial the potential benefits of the interplay between these technologies and the potential commercial value this could yield.

Figure 5-2: Interplay between three of the key emerging technologies

More specifically, energy storage is seen as the solution for the intermittency of renewable micro distributed generation as it will allow electricity to be available twenty-four hours a day, regardless of the status of the primary energy source. For example:

- Storage of solar energy collected by photovoltaic panels during the day can be used at night; and
- Consistency of electricity supply from micro wind turbines, despite constant fluctuations in wind speed.

Electric Vehicles also represent a potential local energy storage solution. A parked and plugged in Electric Vehicle could sell the stored electricity from its battery during peak loads and recharge during off-peak times (assuming advancements in battery technology to mitigate the effect on battery lifespan of larger numbers of charge-discharge cycles).

5.3 Cost Efficiency Strategies & Process

The central objective of Centralines' asset management and planning processes is to strike an optimal balance between maximising asset performance, minimising risk, and maximising long-term value, subject to constraints such as regulation and specific requirements of the shareholder. Historically balancing these sometimes competing drivers has been difficult, due to the high associated cost of conventional network solutions, the restricted performance improvements that are able to be gained from traditional practices and the limited information available to maintain/reduce the risk of asset failure. Enhancements in new technology and the availability of real-time asset and planning information will provide Centralines with the tools to optimally balance the three drivers, enabling Centralines to maximise the efficiency of its network.

In addition, significant effort is being expended reviewing, upgrading and refining business processes and strategies, and applying asset standardisation in order to maximise the performance and cost efficiency of the network.

The following section describes how Centralines will benefit from the way Unison utilises a combination of new technologies, processes, strategies and asset standardisation practices to maximise efficiency.

5.3.1 The Use of New Technology

Centralines continually reviews proven new technologies such as intelligent automated devices, sensors, technologies and communication infrastructure and is considering these with the specific aim of optimising future investment in the network.

Enhanced Visualisation and Control

Unison is currently in the process of installing an Advanced Distribution Management System (ADMS) which will be used to operate the Centralines network. The ADMS will efficiently amalgamate the functions of numerous legacy applications, including the traditional network monitoring and control functions (SCADA), into one platform. It will provide functionality such as self-healing, which is alternatively referred to in the ADMS as "Fault Location, Isolation, Supply Restoration" ("FLISR"). FLISR allows real time monitoring and control of the distribution network and automates decision making. It enables optimised load shifting that manages network constraints, alleviates overloading conditions, reduces outage occurrence and duration, and creates a more efficient electricity distribution system.

The benefits of FLISR include:

- Centralised, remote monitoring of electrical distribution infrastructure;
- Expeditious fault detection, fault location and service restoration;
- Intelligent reconfiguration and sectionalising of feeders;
- Improves reliability;
- Analysis of distribution load flow;
- Increased infrastructure reliability;

- Optimised decision making;
- Reduced operating and maintenance costs;
- Improved customer satisfaction.

The ADMS operates in concert with intelligent, automated field devices and the enhanced communications infrastructure capability. Prior to commissioning the ADMS these devices are being operated remotely and individually. This ensures delivery of at least some of the benefits described above, including achieving a reduction in "truck rolls", prior to full implementation of the ADMS. Part of commissioning the ADMS is the planned, progressive enabling of the integral FLISR functionality.

It is expected the future implemention of real-time, dynamic feeder ratings (line and cable) will also add significant stakeholder value by enabling existing feeder ratings (as specified by manufacturers based on defined parameters and conditions) to be exceeded, increasing asset utilisation and enhancing asset capacity (without a corresponding increase in the risk of failure) and deferring the expensive upgrading of some circuits. Unison has a dedicated asset intelligence team developing the required advanced, complex algorithms in order to implement this functionality.

Fast Protection

Another key example of how new technology is being deployed and utilised to promote efficiency gains is the implementation of fast protection schemes incorporating both line and transformer differential schemes. The Centralines network has a number of double 33kV circuits and 33kV/11kV circuits installed on the same structures. The probability of fault propagation from one circuit to another in these instances is significantly increased especially with the much slower operating characteristics of legacy electro-mechanical protection relays. Spurious tripping can result, due to fault propagation from one circuit to the other, thereby adding confusion for operational staff and delaying restoration times. The traditional network solution to this problem would be to construct each circuit on individual structures which would result in very large capital investments. Fast protection provides Centralines with a cost efficient alternative to this problem by utilising the new enabling fibre network as the required high speed communication medium. Line differential protection relays have been installed on the main Waipukurau and Waipawa 33kV lines. Line distance protection has been installed on the Wilder Road 33kV circuit and will be installed on the Takapau 33kV circuit by the end of the 2017/18 financial year.

5.3.2 Standardised Assets & Designs

To enable Centralines to optimise the cost efficiency of the network there is a requirement for a suite of comprehensive, pertinent, practical and highly accessible standards and designs that align with international best practice Asset Management. Centralines, as part of the management contract, utilises the suite of Unison standards, drawings, and equipment. Centralines purchases equipment from the Unison store and recognises the benefits of standardising equipment on its network which include:

- Reduction in procurement costs;
- The formation of strong, functional vendor relationships leading to high levels of service and support when required;

- Cost efficiencies around reduced inventory levels due to fewer assets as well as vendors holding minimum stock levels on behalf of the utility for common stock items;
- Reduction in strategic stock levels and spare components;
- Enhanced contractor familiarity thereby optimising the installation, operation and maintenance of standardised network assets;
- Reduction in the number of reference drawings resulting in less updating of designs when common componentry changes.

From an efficiency perspective it is imperative that standardised designs are an integral part of the selection criteria and process when evaluating and selecting new network hardware and technologies. The evolving and more demanding requirements of new technologies, and lessons learnt from the deployment of these technologies to date, have led to a more stringent and robust evaluation of new products and technologies. This new process, which involves Centralines and Unison engineers, critiques, in much more detail, many more aspects and requirements than those that were previously evaluated, including:

- Technical evaluation and cost considerations associated with standard design;
- Inter-operability with existing and new systems e.g. ADMS, SCADA, PI;
- Security considerations;
- Communication options / requirements / protocols;
- Asset Intelligence considerations (i.e. the range of network data that can be provided to support Smart Grid operations);
- Asset Lifecycle considerations;
- Remote engineering access;
- Retro fitting of existing products or technology (optimizing existing infrastructure and standard designs).

It is expected this revised process will provide the tool for engineers, from Centralines and Unison, to introduce new products and technology with renewed confidence that all aspects have been considered to efficiently deploy these assets.

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5.4 Energy Efficient Network Operation

Unison Networks, the contracted operator of the Centralines network, is in the process of implementing a new Advanced Distribution Management System (ADMS). Once commissioned, the platform will provide a wide range of advanced, intelligent functionality, designed to optimise the control and operation of the Centralines distribution network.

The ADMS has a number of advanced applications that specifically target energy efficient network operation. The following applications are aligned with this objective:

- Network Reconfiguration
- Volt VAr Optimisation
- Operational Losses

The functionality provided by these modules is explained below.

5.4.1 Network Reconfiguration

The Network Reconfiguration (NR) application is used for determining optimal distribution network configuration based on a number of predetermined objectives including the minimisation of active power and energy losses.

Optimal locations of normally open (NO) switches in a distribution network depends on the demand and dynamic power flows within the network. Power demand is constantly changing throughout the day and across the various seasons. These load changes have an impact on the optimal locations of NO switches. Network Reconfiguration (NR) is used for testing any network state and obtaining appropriate solutions for the optimal location of NO switches. The NR application enables selection of the most important switching manipulations only. These are potential network configurations that have the highest influence on optimisation objectives. By selecting important switching manipulations only, it is simple to change network configurations in order to optimise the energy efficient operation of the network.

5.4.2 Volt VAr Optimisation

Volt VAr Optimisation (VVO) is one of the basic applications that allow the management of voltages and reactive power flows in the distribution network. VVO, as a part of ADMS, operates in centralised way on the entire portion of network that is selected (HV substation or network supplied from a HV/MV transformer).

Optimal voltages and reactive power flows, based on defined objective target levels, are achieved by calculating optimal voltage set points for voltage regulators, tap positions for on-load tap changes and no–load tap changes, switch statuses of capacitor banks and reactive power injections for distributed generators (if the control of the DG is allowed).

Optimisation objectives within this application can include:

- Minimal real power demand;
- Minimal reactive power demand;
- Minimal power losses;
- Optimal (desired) power factor;
- Optimal (desired) voltage profile of the entire network.

All of these objectives will contribute to operating a more energy efficient network.

5.4.3 Operational Losses

The Operational Losses (OL) application quantifies the real operational power/energy losses in the entire distribution network, radial or meshed, balanced or unbalanced, or segments thereof. The OL application provides data about total active/reactive energy injection/generation, active/reactive energy losses and active/reactive energy consumption. In general, energy losses can be divided into technical (copper and iron) and non–technical (commercial sources). OL calculates technical losses only.

The OL application outputs will provide a clear insight into losses on particular network segments and the cumulative effect across the entire network. This visibility will provide a basis for reduction of losses and further improvement of energy efficient network operation. Reduction of losses means not only cost reduction for retailers and consequently consumers, but implicitly leads to enhanced voltage profiles, the balancing of loads and improved network utilisation.

5.4.4 New Technology

Centralines has also recently employed technologies and devices that will lead to energy efficient operation of the network. An example of this is the installation of capacitor banks. This technology provides an alternative cost-effective non-network solution to conventional network development projects. It is predominantly used on 11kV feeders on which large numbers of irrigation loads are installed. Benefits include:

- Reduction in system losses;
- Improved asset utilisation;
- Improved voltage profile;
- No impact on fault level.

Centralines has now installed two capacitor banks on its network. These units are switched in and out based on predetermined reactive power thresholds. This technology forms part of the non-network solution toolbox which is used to address identified constraints and provide the benefits detailed above.

SECTION 5 Network Development Planning

5.5 Capacity Determination

In determining the security performance of the network, there are a number of key assumptions regarding the electrical and mechanical ratings of new conductor and plant to be installed which aim at ensuring that decisions are appropriate for the life of the asset, considering foreseeable load growth. These form a set of network design parameters discussed following:

Sub-transmission network: The sub-transmission network is designed to ensure zone substations can be supplied according to their target rating levels.

a. 33kV Overhead – All new 33kV overhead is steel reinforced aluminium "Dog"[1] conductor, which has been assessed as suitable for the tensions and electrical load requirements for all 33kV feeders on Centralines' network for the planning period.

b. 33kV Underground – All new 33kV underground cables are selected based on having a similar or better electrical rating as "Dog" conductor.

c. Power Transformers – For all substations excluding Wilder Road, transformer capacity is required to meet security criteria for the planning period, and operational requirements.

d. Sub-Transmission Switchgear - Selected such that the capacity and fault rating are at least equivalent to the forecasts to the end of the planning period, and have a maintenance requirement that is equivalent to or less onerous than current plant and able to be maintained using skills available locally.

Distribution Network: Feeder Loading Criteria – In order to maintain distribution network transfer capacity between zone substations and provide backup to feeders within zone substations, a feeder loading criterion is adopted. Where possible, maximum routine feeder loads are maintained within 67% of the rating of the feeder, if one feeder fails the load can be divided among neighbouring feeders.

a. 11kV Overhead Backbone - All new 11kV overhead for feeder backbones is steel reinforced aluminium Dog conductor, which has been assessed as suitable for the tensions and electrical load requirements for the planning period.

b. 11kV Overhead Spur - All new 11kV overhead for feeder spurs is steel reinforced aluminium Gopher conductor, which has been assessed as suitable for the tensions and electrical load requirements for the planning period.

c. 11kV UG Backbone - All new 11kV underground for feeder backbones is 185mm^2 Al XLPE insulated cable, which has been assessed as suitable for the electrical load requirements and fault levels for the planning period.

d. 11kV UG Spur - All new 11kV underground for feeder spurs is 35mm^2 Al XLPE insulated cable, which has been assessed as suitable for the electrical load requirements and fault levels for the planning period. Any length greater than 100m is installed along with 3 phase isolation, to ensure ferroresonance risks are mitigated.

e. LV OH Backbone - All new LV overhead for backbones is steel reinforced aluminium Ferret conductor, which has been assessed as suitable for the tensions and electrical load requirements for the planning period.

[1] A designation indicating the size (100mm^2) and capacity (current carrying capability) of this type of conductor.

f. LV OH Spur - All new LV overhead for backbones is steel reinforced aluminium Gopher conductor, however this is dependent upon local LV distribution load characteristics for a given transformer area.

g. LV UG Backbone - All new LV underground for backbones is either 185mm^2 Al XLPE or 120mm^2 Al XLPE insulated cables, dependent upon local LV distribution load characteristics for a given transformer area and assessed voltage regulation under peak loading conditions.

h. LV UG Spur - All new LV underground for spurs is 120mm2 Al XLPE insulated cables.

i. Distribution Transformers – These are selected such that the capacity exceeds the assessed long term after diversity maximum demand of the current and potential load.

j. Distribution Switchgear – Selected such that the capacity and fault rating are at least equivalent to the forecasts to the end of the planning period, as well are capable of meeting the operational requirements, such as being able to interrupt load current if required.

Note: *Steel reinforced aluminium conductor is used as standard given the rural nature of the Centralines network, which often sees relatively high span tensions required for cost effective construction that exceed the capability of solely aluminium conductors.*

In addition, the role of load management (including interruptible load) and the flexibility of the sub-transmission and distribution network to transfer load are considered, in addition to the known operational limitations of each item of plant or feeder.

The following additional factors are considered in determining capacity limitations:

- Point of supply – Coincident maximum demand less the load management and sub-transmission transfer capability is compared to supply capacity.
- Zone substations – The maximum demand of the substation less the load management and distribution transfer capability is compared to the available substation firm capacity during contingent events.

SECTION 5 Network Development Planning

5.6 Prioritisation Methodology

The process of prioritising discretionary projects to build the annual programme of work is based on the output of a planning tool developed by Unison that is entitled the "Investment Prioritisation Tool" (IPT). This provides a bottom up approach to programme development.

The output of the IPT is used to prioritise all candidate projects, enabling the determination of a final project list for discretionary projects for each financial year.

5.6.1 Investment Prioritisation Tool (IPT)

Centralines has implemented Unison Networks' IPT to formalise the prioritisation of network projects. The tool provides a decision-support framework to optimise the wide range of network investment projects considered each year.

The benefits of this tool include the following:

- Alignment of the capital programme with company strategic intent, customer needs and regulatory thresholds;
- Maximisation of the long-term value creation and financial return from the capital investment programme;
- Sustainable achievement of customer service levels, network security, reliability and safety targets;
- Enhanced efficiency of investment process (limited demands on management time).

The IPT prioritises each project in the programme in terms of its contribution to Centralines' strategic drivers, summarised in Table 5-4 below:

Strategic Drivers	Strategic Sub Drivers

Financial	• Direct financial
	  ○ Revenues (including probable future revenues)
	  ○ Customer contributions
	  ○ Cost savings by design
	  ○ Costs (Capex & Opex)
	• Indirect financial
	  ○ Renewal of network elements
	  ○ Mitigation of risks
	  ○ Miscellaneous gains
	  ○ Consequential gains/losses

Quality of Supply	• Network reliability
	  ○ Direct impact on network reliability
	  ○ Mitigation of risk of decrease in network reliability
	• Network security

Company Policies and Standards	• Conformance to company policies that must be strictly adhered to

Strategic Drivers	Strategic Sub Drivers
Legal and Statutory	• Legal & Statutory
Stakeholder Satisfaction	• Gain in Stakeholder Satisfaction
Shareholder Obligations	• Conformance to shareholder obligations that must be strictly implemented
Strategic Benefit	• Strategic option value • Strategic alignment

Table 5-4: Network investment framework strategic objectives

In brief, the IPT enables a comparison of the relative contribution to the strategic objectives for each project, across the various investment categories (e.g. renewal, growth, performance, customer, compliance). Each project is assessed for its contribution to each objective, and each objective category has a weighting which determines its contribution, enabling overall evaluation of the project, relative to other candidate projects. In this way all proposed projects are allocated a score and can be ranked by order of importance based on the corporate drivers.

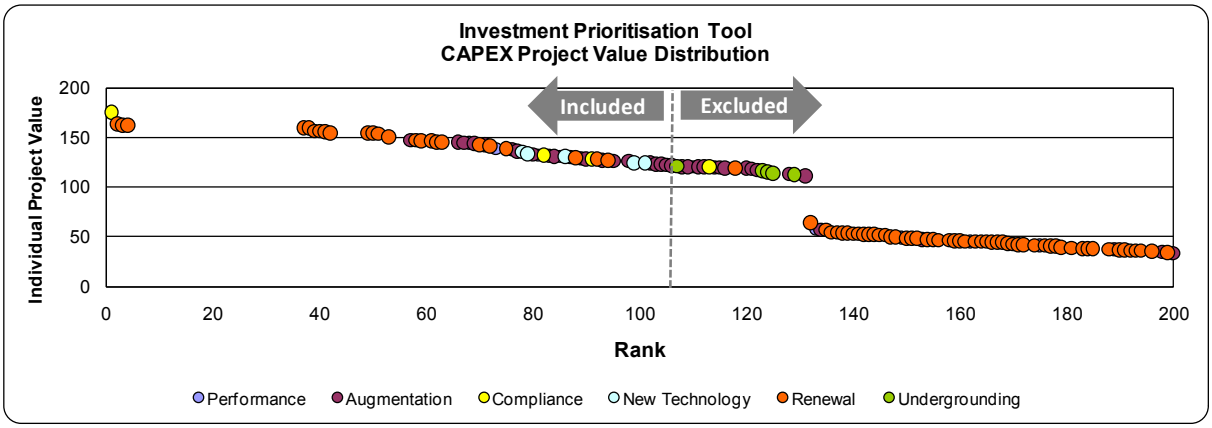

Figure 5-3: Typical distribution of individual CAPEX projects according to their individual score/mix

Figure 5-3 above is an example output from the IPT. It shows the distribution of CAPEX projects according to their individual score and ranking. The dotted line indicates the project inclusion threshold according to the approved budget envelope. Projects not included will be moved out into later years, where they will be re-entered into the IPT and re-assessed and ranked with new projects to compete for inclusion in the following CAPEX programmes.

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5.7 Demand Forecasts

5.7.1 Load Forecasting Methodology

Centralines utilises the Unison Load Forecast Tool (LFT) which is updated annually with the latest expected growth figures across all consumer classifications. The tool forecasts future peak demand based on relationships between key economic indicators and electricity demand. Projections extending out to 2032 are available for those key indicators enabling the model to forecast demand within this time horizon. Forecasts are made at an 11kV feeder level based on simple models of domestic, commercial and industrial sectors. They are then rolled up to a zone substation and grid exit point (GXP) level. The following diagram outlines the high level process followed by the LFT:

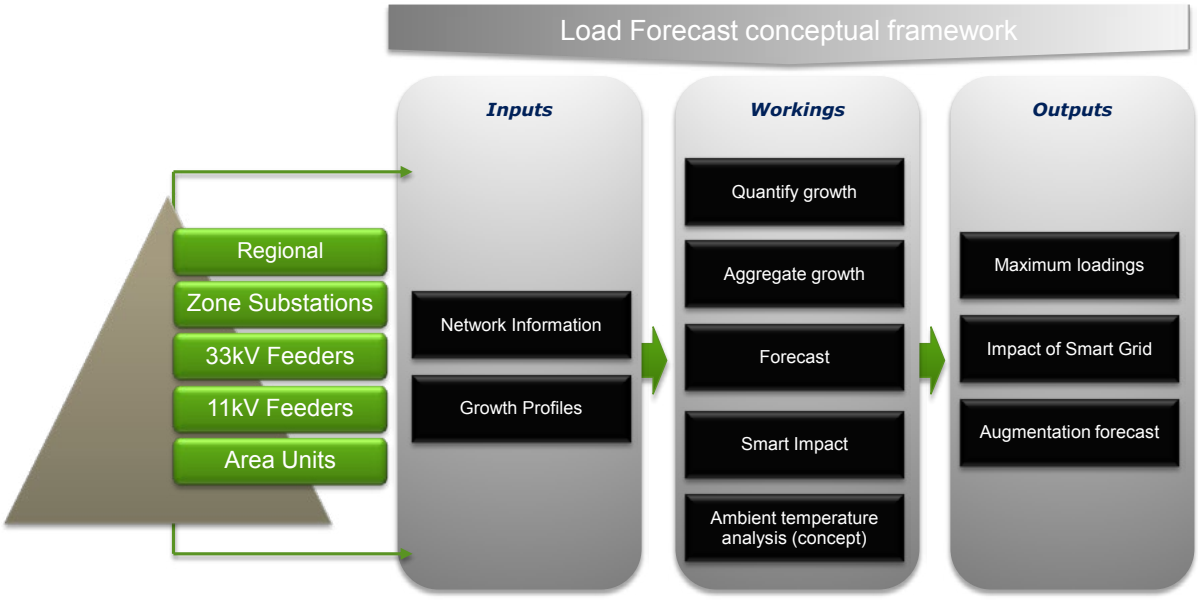

Figure 5-4: Load forecast tool

Household data, network connectivity and installed transformer capacity data is extracted from various Centralines' databases. This is combined to become what is known as the 'network information' in the LFT and is updated annually prior to the running of the tool.

GDP projections, household building consent applications, and population growth forecasts are provided by the New Zealand Institute of Economic Research (NZIER) and this data is updated every 3-5 years. All forecasts are calculated for a 20-year horizon.

GDP growth forecasts are split by regions and then by industry types. The heavy industries such as manufacturing and construction are grouped into the industrial category, the lighter industries such as retail/commercial businesses, health sector facilities and community services are grouped into the commercial category.

Residential growth forecasts are calculated from household building consent applications and population growth projections over a 20-year horizon. The residential, industrial, and commercial forecasts are combined to form the "Growth Profile".

Network information is combined with growth profiles, specific to the Centralines network area. The result is a unique growth forecast for each area unit within the Centralines network. By applying weighted area unit growth to the Centralines feeders, a growth forecast for every 11kV feeder is obtained.

Zone substation demand forecasts are calculated by applying a diversity factor to the sum of the feeder forecasts. Similarly, the GXP demand forecast is calculated by applying a diversity factor to the sum of the substation demand forecasts.

The LFT produces output values for both summer and winter peaks for each feeder. The summer and winter periods are aligned with those used by Transpower (summer – October to April, and winter – May to September).

5.7.2 Impact of Embedded and Distributed Generation on Load Forecast

No distributed generation currently exists on the Centralines network, and no allowance has been made for distribution generation capability on the network during the planning period. This is justified by the fact that no distribution generation investigations are beyond preliminary feasibility investigation stages, or have been deferred following preliminary investigations.

5.7.3 Impact of Developments and Large Consumer Projects on Load Forecast

The LFT has the flexibility to include any 'substantial' load growth or reduction that may occur within the planning period. However, it should be noted that Centralines' network supplies a predictable and historically slowly changing load. As such, there are not currently any substantial changes to the loading on Centralines' network during the planning period. This is based on changes to demographic forecasts and major customer indications regarding changes in load.

5.7.4 Load Forecast Assumptions - Uncertain load types and external factors

- The energy intensity is likely to increase overall for household consumers. This is due to affordability of the electronics and redundant devices in use (i.e. using 2 TVs at the same time). As the intensity increase is unknown, and could be mitigated to some extent by appliance efficiency improvements, this has not been factored into the load forecast.
- The load forecast assumes a constant load power factor (0.95) throughout the forecast period. The increase in usage of compact fluorescent lamps and power electronic devices will create distorted supply which results in poor power factor and high harmonics (increased feeder loading). However, the impact of this is also unknown and has not been factored into the load forecast.

The load forecast does not include allowance for a potentially significant increase in load in the Ruataniwha Plains area, where a study has been initiated by the Regional Council to investigate the feasibility of establishing a lake to irrigate approximately 22,500ha of farm land. No details are available at this stage, thus the impact of any new load and possible generation cannot be enumerated. If this project proves feasible, and ultimately progresses it will enable significant changes to land use and may drive the need for significant upgrades to electricity infrastructure to service the area.

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5.7.5 Impact of Demand Side Management on Load Forecast

Ripple control of specific consumer loads forms an integral part of Centralines' load management strategy and provides a network investment deferral option. The load control scheme operates at a frequency of 475Hz.

There are estimated to be around 6,000 water heaters supplied by Centralines' network. The after diversity demand of these heaters in Centralines' network is estimated to total 1.5MW at the time of the co-incident peak on a cold winter afternoon.

5.7.6 Reactive Demand

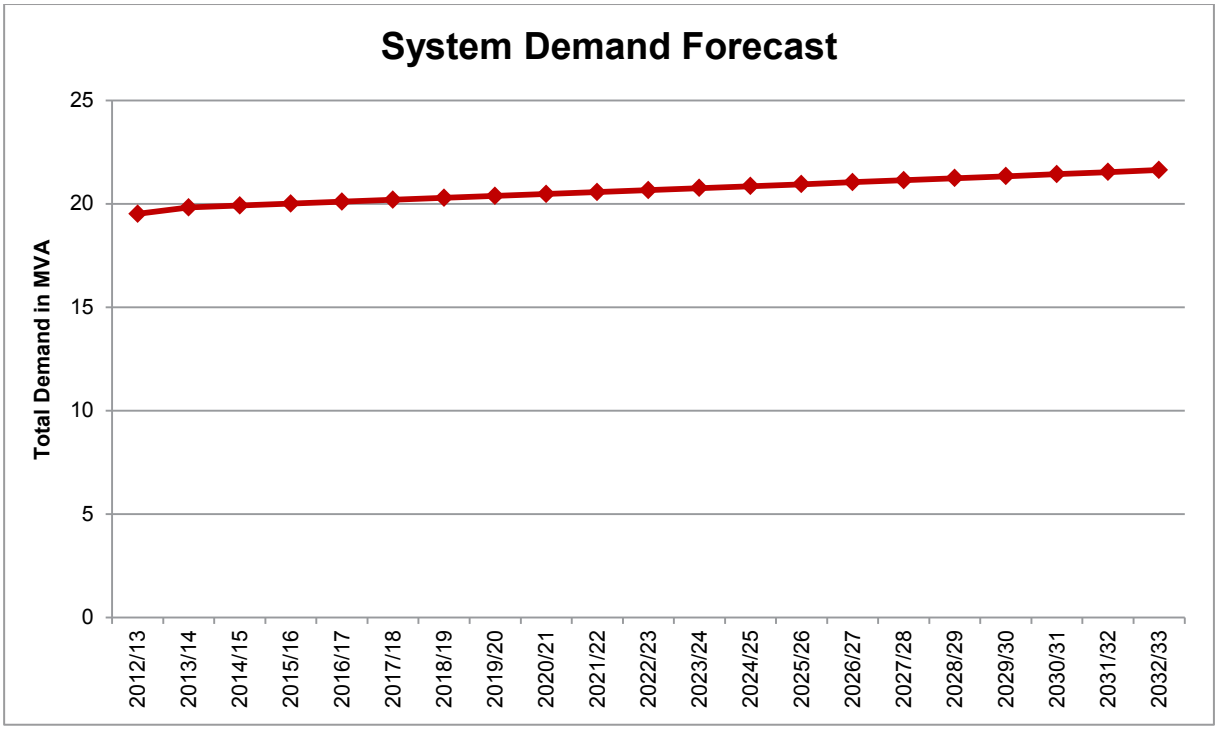
At present the demand forecast is developed based on a constant load power factor, using the power factor which is the average of the current and past year. This assumption is reasonable only when there are no expected major changes to demand composition. The advent of a significant increase in irrigation (reactive) loads on a number of feeders has during the summer of 2008 resulted in capacity and voltage regulation issues with a number of feeders. Capacitors have been commissioned on two 11kV feeders and further installations will be investigated once the results of these initial deployments are analysed.

The use of shunt capacitors for voltage support in the distribution network has the additional effect of lowering apparent power (MVA) demand and freeing up capacity on the transmission GXP, sub-transmission network, and zone substation transformers. Experience elsewhere in New Zealand shows that for a large GXP with a reasonable installation of capacitors the capacity freed up can be approximately equal to the demand growth for one year. The known issue of shunt capacitors adversely interacting with load control ripple frequency signals has been considered and the impact will be monitored.

Centralines has implemented power factor penalty charges to encourage consumers to maintain an efficient power factor. The effect and success of this will also be monitored.

5.7.7 GXP Load Forecast

The forecast demand increase for the next 20-years is presented in Graph 5-1 below (forecast system demand). This is also the load forecast for Transpower's Waipawa GXP.



Graph 5-1: System demand forecast

Load density maps are produced using a combination of load forecasting tools and graphical (GIS) capabilities. These density plots assist with identifying parts of the region with potential load growth. With the aid of GIS capabilities, the existing sub transmission network and distribution network can be superimposed to outline the extent of the constraints. The load density maps are used by planning engineers to identify long term plans for the region. A load density map for the Central Hawke's Bay region is shown below in Figure 5-5.

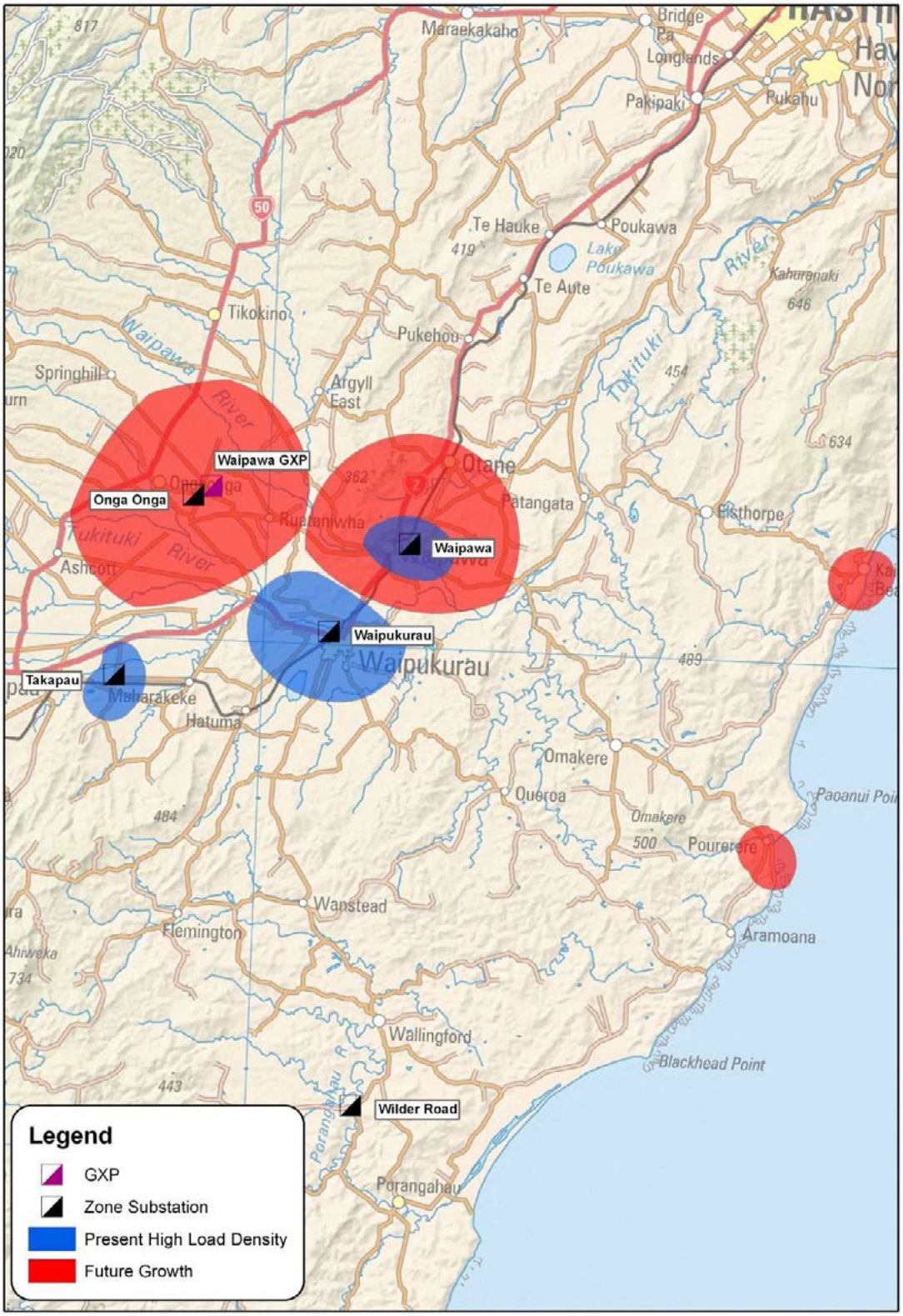


Figure 5-5: Load growth areas

Zone Substation Load Forecasts

Figure 5-6 details the forecast load at each zone substation.

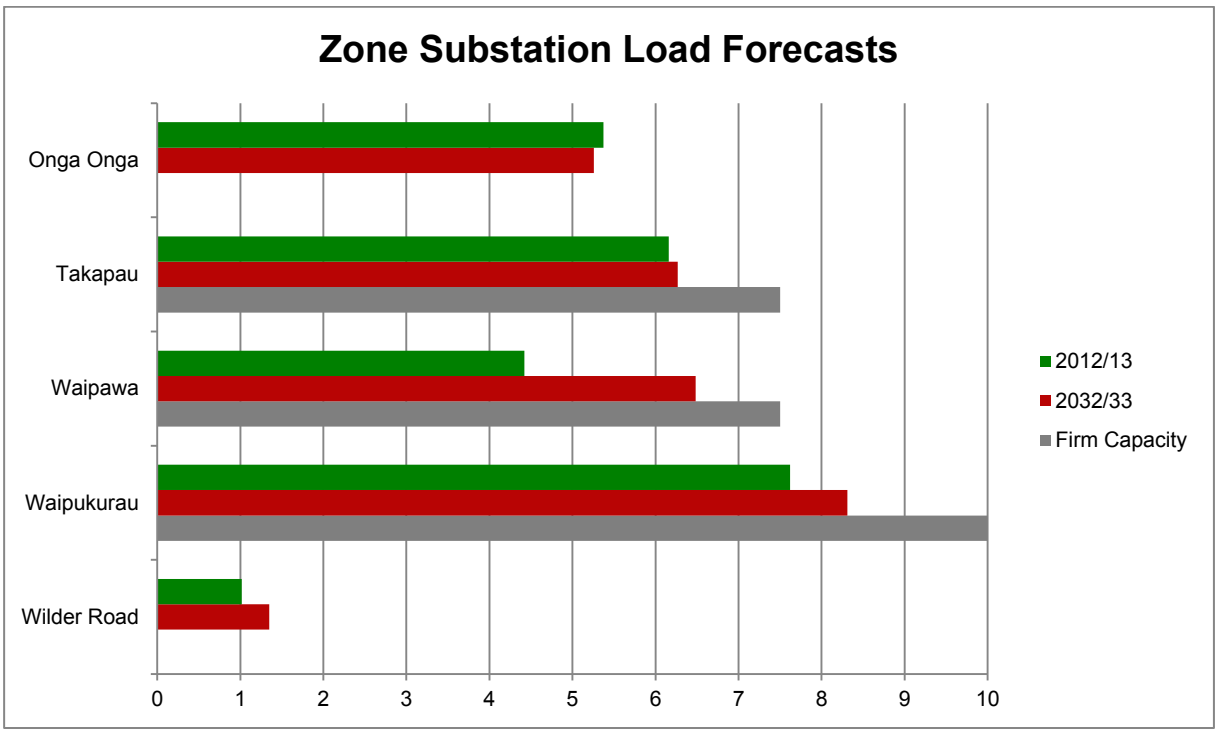


Figure 5-6: Zone substation load forecasts

SECTION 5 Network Development Planning

11kV Feeder Load Forecasts

Figure 5-7 details the forecast load at each 11kV feeder.

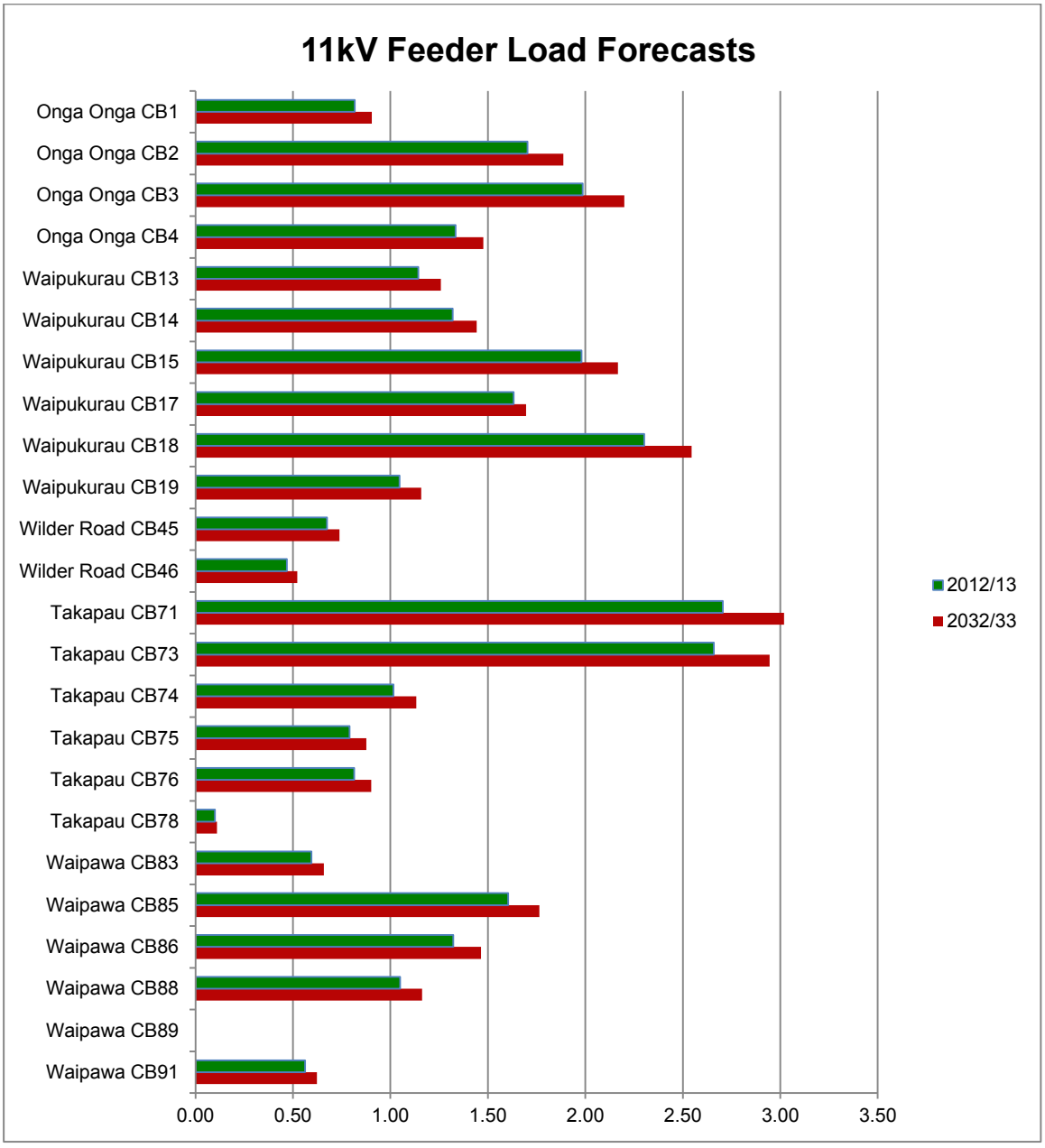


Figure 5-7: 11kV feeder load forecasts

5.7.8 Distributed Generation

Centralines has adopted the distributed generation (DG) policy that Unison developed some years ago which is based on the following key principles:

- Distribution generation will be able to connect to Centralines' electricity distribution network on fair and equitable terms which do not discriminate between different DG schemes.
- Centralines will make the terms under which DG can connect and operate to its electricity distribution network as clear and straight forward as possible and Centralines will progress all applications to connect DG to its electricity distribution network as quickly as possible.

Technical and safety standards for the connection and operation of DG on Centralines electricity distribution network will be based on best practice and will aim to meet the needs and protect the interests of DG schemes, as well as those of other consumers and Centralines.

Centralines will comply with all legislation and regulatory requirements regarding the connection and operation of DG on its electricity distribution network.

To date, distributed generation projects within Centralines' area have never progressed beyond the feasibility stage, for a variety of reasons. Given that there is a relatively low level of load supplied via the Centralines network, there is not the level of interest in DG options that is experienced in more load intensive networks. This is not expected to change in the foreseeable future therefore Centralines has not incorporated a DG solution in the load forecasts for the planning period.

5.8 Non-Network Solutions

Centralines is expanding its non-network solutions toolbox to be able to draw on different and new ways to enhance the efficiency of its network, by maximising network performance and optimising asset utilisation. Centralines is leveraging off Unison's initiatives currently underway to do this. The following initiatives at Unison include:

- Scenario Planning, as detailed earlier in this section;
- Realisation of Non-Network Smart Grid benefits;
- Research and Development (R&D) Programme.

5.8.1 Realisation of Non-Network, Smart Grid, Benefits

A range of benefits to be realised through the smart grid initiative has been comprehensively defined and quantified. This has enabled prioritisation of smart grid technologies as well as related asset intelligence investments. These benefits include themes such as enhanced asset capacity, extension of asset life, and enhancement of network reliability. It is important to note that the desired non-network, smart grid benefits can be realised through at least the following four pathways:

a. Smart Devices, i.e. devices with embedded intelligence:
A range of smart grid technologies have adequate embedded intelligence to enable their relative independent operation and consequent realisation of benefits, with minimal centralised data analytics. Such devices include:

- Capacitor banks
- Advanced on-load tap changer controllers
- MV stepped Voltage regulators
- Ground Fault Neutralisers
- Line Differential Protection
- Transformer Differential Protection
- Arc Flash Protection

b. Functions within the future Advanced Distribution Management System (ADMS):
Several embedded functions will actively enable the realisation of benefits from selected smart grid technologies. Such functions include:

- Large area restoration
- Incident management
- Fault location
- Load flow: actual and modelled
- Volt/VAr control

c. Dynamic Rating of Selected Asset Classes:
Dynamic rating refers to methods by which the maximum capacity of network assets can be assessed in real-time, contingent upon operating and local environmental conditions. Situational awareness is provided by smart grid technologies including a range of sensors and externally provided data feeds (e.g. weather information from MetService), enabling real-time optimisation of operations. Dynamic ratings are being developed as part of the Asset Intelligence initiative for the following asset classes:

- Power transformers
- 33kV lines
- 33kV cables

d. Asset Health Analytics:
A range of algorithms are to be developed which will capture data from smart grid sensors designed to perform advanced asset condition monitoring, diagnostics and advance warning of failure. Forecasting of remaining asset life and expected operating performance, conditional upon present age and asset condition, is also envisaged. It is expected that asset health analytics will constitute a major part of smart grid benefits realisation, and it is recognised that this venture will be part of the medium to longer-term Asset Intelligence journey.

5.8.2 R&D Programme

Unison has established and formalised an R&D programme in 2012/13 to identify and pursue useful and pragmatic emerging technologies. An example project from the R&D programme is the development, in conjunction with ETEL (Unison's subsidiary transformer manufacturing business), of a Smart Transformer. This includes the application and integration of Magtech technology: stepless voltage regulation. A further example is the investigation of Unmanned Aerial Systems and its application and benefits to EDBs. In other cases Unison's R&D projects involve leveraging the advantages from combining several technologies – particularly the combination of in-field monitoring, distributed communications and localised computing capabilities.

SECTION 5 Network Development Planning

5.9 Network Development Plan

5.9.1 Network Development Programme for 2013/14

Constraint No.	Constraint Title
1	During peak load conditions, feeder 3 does not comply with 11kV voltage regulation.
2	Limited ablitiy to isolate a feeder fault on feeders 3 and 18.
3	11kV security constraint at Ongaonga outdoor zone substation if Transpower needs to carry out inspections and/or maintenance on their 11kV equipment supplying the four Ongaonga feeders.

Constraint 1 –11kV voltage regulation on feeder 3
During peak load conditions, feeder 3 does not comply with 11kV voltage regulation.

Description
Through network analysis and modelling, feeder 3 has been identified as having poor 11kV voltage regulation under peak loading conditions. Feeder 3 is of particular importance as it mainly supplies an agricultural area which demands a high level of irrigation. Feeder 3 also provides back feeding options for feeders 2 and 13. Historically, given a fault on either feeder 2 or 13, back feeding via feeder 3 has been unsuccessful due to low voltage. The risk of not rectifying the constraint is that it will lead to an increase in customer complaints due to low voltage, and increase in interruption to customers.

Development Options

Class of Option	Description	Advantages	Disadvantages or Risks	Cost
Network	Install voltage regulator to improve the 11kV voltage	• Can be used to solve the voltage constraint irrespective of the load type (inductive, resistive etc). • Can cater for long term load growth on the feeder.	• Expensive. • Easements are required at optimal sites. • Add additional load on the feeder.	$200k
	Upgrade conductor	• Can solve the problem long term and thereby improving back feed reliability. • Can cater for long term load growth on the feeder.	• Very expensive. • Easements are required. • Substantial amount of conductor upgrade is required on both feeders (approximately 5-10km).	$1.5M

Class of Option	Description	Advantages	Disadvantages or Risks	Cost
Non-Network	Install pole top capacitor banks	• Cheapest option. • Provide reactive VAR to high reactive loads, thereby, reducing the feeder load current.	• Can be used only near inductive loads. • Amplify harmonics and may cause resonance. • Can interfere with ripple load control signal on feeder. • Variable voltage control is not possible.	$150k
	Install mobile regulators during peak loading conditions	• Can provide voltage support during peak demand period. • Can be utilised elsewhere on the network. • Provides flexibility in back feeding capability.	• Consent is required from local authorities, Iwi or Transit. • Health and safety issues associated.	$200k each
Do Nothing		• No capital investment required.	• The feeders will not comply with the voltage regulations. • Increase in customer complaints due to under voltage.	N/A

Preferred Option & Justification

Install a voltage regulator on feeder 3 on Tikokino Road ($200k).

This option is selected as the preferred solution, since it provides back-feed capability to the adjacent feeders such as feeders 2 and 13. This solution will cater for future load growth on the above-mentioned feeders.

Targeted Service Level(s)

- Improvement in Network Reliability (SAIDI/SAIFI).
- Delivery of regulatory compliant voltage to consumers (230V +/- 6%).
- Improvement in customer service.

Network Efficiency Considerations

The key network efficiency consideration is to improve the voltage regulation and thereby enhance quality of supply for the customers. The network performance under contingency conditions will also be improved due to improved voltages.

The alternative solutions were discounted for the following reasons:

- Installation of capacitor banks will somewhat relieve the load flow on the feeders providing they are installed at strategic locations (closer to the more reactive loads). These capacitors will be rated to meet the kVAr of irrigation loads. Hence, the size of the capacitor banks is likely to be smaller. This, however, does not provide the flexibility to back-feed the adjacent feeders given a feeder fault.
- Conductor upgrade is uneconomic and will not provide the same voltage support as other options detailed in the table above.
- Installation of mobile regulators is not an ideal solution, because the feeders concerned have identical load profiles and same peak load periods. This means that a number of mobile regulators will need to be designed and manufactured. This becomes much more expensive than installing voltage regulators at permanent locations.

Doing nothing is an option, however, the number of customer complaints will rise. The cost to provide compliant voltage to rural customers will escalate and exceed the cost of installing voltage regulators on the 11kV backbone.

Project Details

Project Category: System Growth

Project Titles: Project 1123 – Install a Voltage Regulator on feeder 3

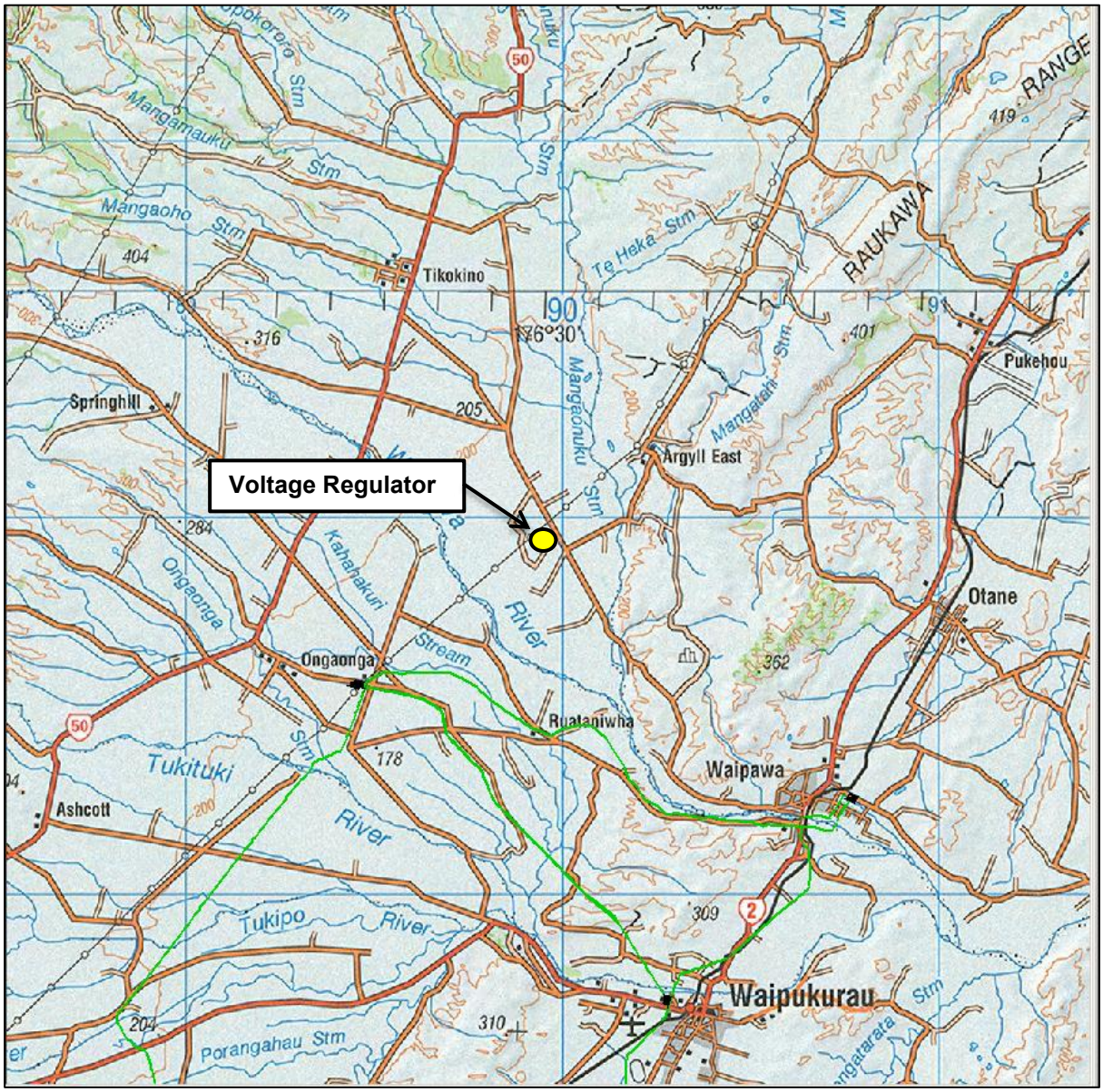


Figure 5-8: Feeder 3 regulator – Tikokino Road

SECTION 5 Network Development Planning

Constraint 2 - Limited ability to remotely isolate a feeder fault on Feeders 3 and 18

Lacking in the ability to remotely restore supply to urban consumers given a feeder fault.

Description

The ability to quickly isolate a fault on feeders 3 and 18 and restore supply to the remaining customers is limited due to the type and location of existing protection equipment. The existing equipment also lacks the ablitity to supply fault indications and information which would otherwise assist in the identification and location of the fault. This lack of remote switching capability and information means slower restoration times and therefore higher contribution to SAIDI and SAIFI.

Development OptionsClass of Option	Description	Advantages	Disadvantages or Risks	Cost
Network	Feeder 3 Rearrangement of reclosers/sectionalisers to improve reliability Feeder 18 Install Entec switches programmed as sectionalisers to improve reliability	• Improves reliability. • Ensures Centralines' Service Level and Network Reliability Targets can be met. • Provides useful planning information from these devices.	• Expensive.	$215k
Non-Network	Implementing self-healing technology	• Improves reliability significantly. • Restoration of supply to consumers within one minute. • Provides useful planning information from devices.	• High initial set up cost. • Fast communication is required between switches. • Increase in maintenance costs due to additional equipment.	$800k
	Install Ground Fault Neutraliser (GFN)	• Improves reliability for earth faults. • Quicker identification of faults.	• Installation of a GFN is not favoured by Transpower at present as it falls outside of their solution toolbox. • One GFN per substation site.	$400k[2]
Do Nothing		• Least cost option.	• Contribute towards and can lead to breaching Service Levels and Network Reliability Targets.	N/A

[2] Cost of installing a single Ground Fault Neutraliser unit

Preferred Option & Justification

One of the preferred solutions to improve reliability on poor performing feeders is to install automated Entec switches programmed as sectionalisers. The ability to detect and isolate the fault quicker will improve the reliability significantly. These switches will also provide useful network planning data that will feed into simulation tools employed at Centralines. This will give the engineers greater ability to understand the load characteristics on each feeder.

Targeted Service Level(s)

- Improvement in Network Reliability (SAIDI/SAIFI) and customer service.

Network Efficiency Considerations

The key network efficiency improvement is to maximise network reliability, as customer impact will be minimised through automated fault response.

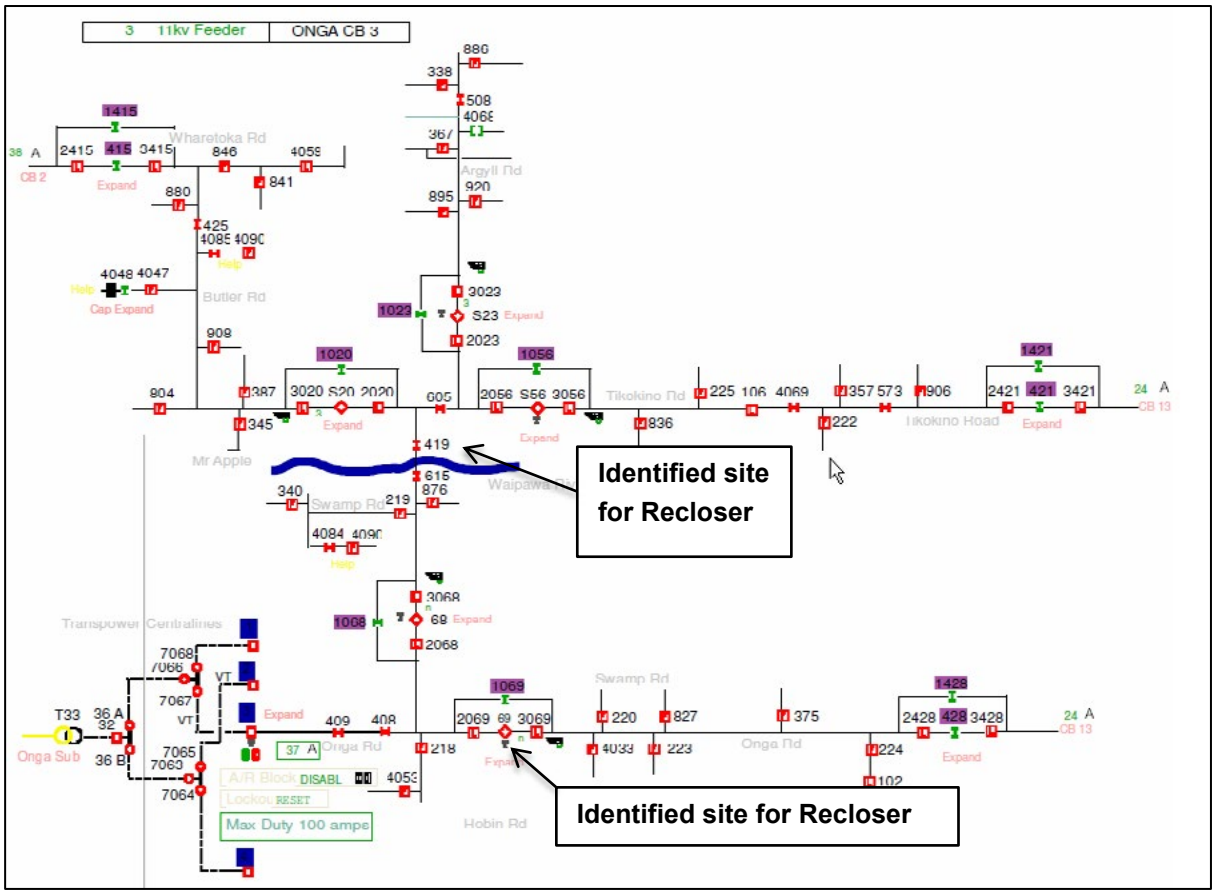
The alternative options are discounted for the following reasons:

- Installation of Ground Fault Neutraliser is not favoured by Transpower at present as it falls outside of their solution toolbox. One of the feeders that has been identified as having poor reliability is supplied from the Transpower 11kV site at Ongaonga.

Ground Fault Neutraliser cannot be used in conjunction with Self-Healing Technology. The Self-Healing Technology caters for all fault types and is significantly cheaper to implement.

Project Details

Project Category:	Reliability, Safety and Environment
Project Titles:	Project 1053 – Rearrangement of Reclosers/Sectionalisers to improve reliability on Feeder 3 Project 1100 – Install Entec switches programmed as Sectionalisers to improve reliability on Feeder 18



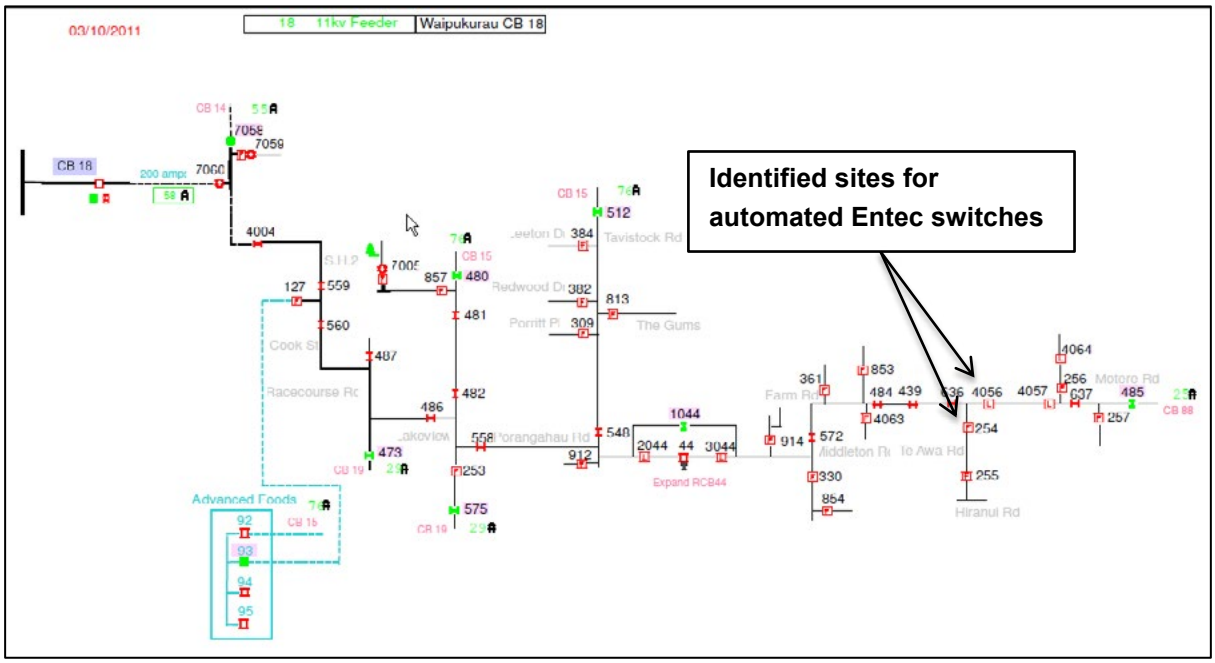


Figure 5-9: Identified switch sites for automation in CB3 and CB18

Constraint 3 – 11kV Security constraint at Ongaonga Outdoor Zone Substation

11kV security constraint at Ongaonga Outdoor zone substation if Transpower needs to carry out inspections and/or maintenance on their 11kV equipment supplying the four Ongaonga feeders.

Description

The current 11kV configuration at Ongaonga substation does not allow sufficient switching options when Transpower wants to carry out inspections and/or maintenance on their 33kV/11kV transformer or 11kV circuit breakers.

Development Options

Class of Option	Description	Advantages	Disadvantages or Risks	Cost
Non-Network	Install automated Safelink switches to improve security of supply at Ongaonga zone substation	• Improves security of supply. • Improves reliability. Ensures Centralines' Service Level and Network Reliability Targets can be met.	• Expensive.	$210k
Do Nothing	Run the system as is	• Least cost option.	• The current scenario will remain where switching options are limited when Transpower needs to carry out inspections/ maintenance on their 11kV equipment.	N/A

Preferred Option & Justification

The preferred solution to improve security is to install additional automated Safelink switches. This will provide more switching and back feed options when Transpower wishes to carry out maintenance on their equipment.

Targeted Service Level(s)

- Improvement in Network Security and Reliability (SAIDI/SAIFI).

Network Efficiency Considerations

The installation of additional automated Safelink switches will improve network security and reliability of supply in the Ongaonga area by allowing alternative switching and back feeding options when Transpower needs to carry out inspections and/or maintenance on their 11kV equipment.

The alternative solution was discounted for the following reason:

- Doing nothing is not considered as an option as the current scenario will remain where switching and back feeding options are severely limited when the Transpower 33kV/11kV transformer and 11kV circuit breakers are out of service.

SECTION 5 Network Development Planning

Project Details

Project Category: Reliability, Safety and Environment

Project title: Install automated Safelink switches at Ongaonga outdoor substation.

Project Diagram

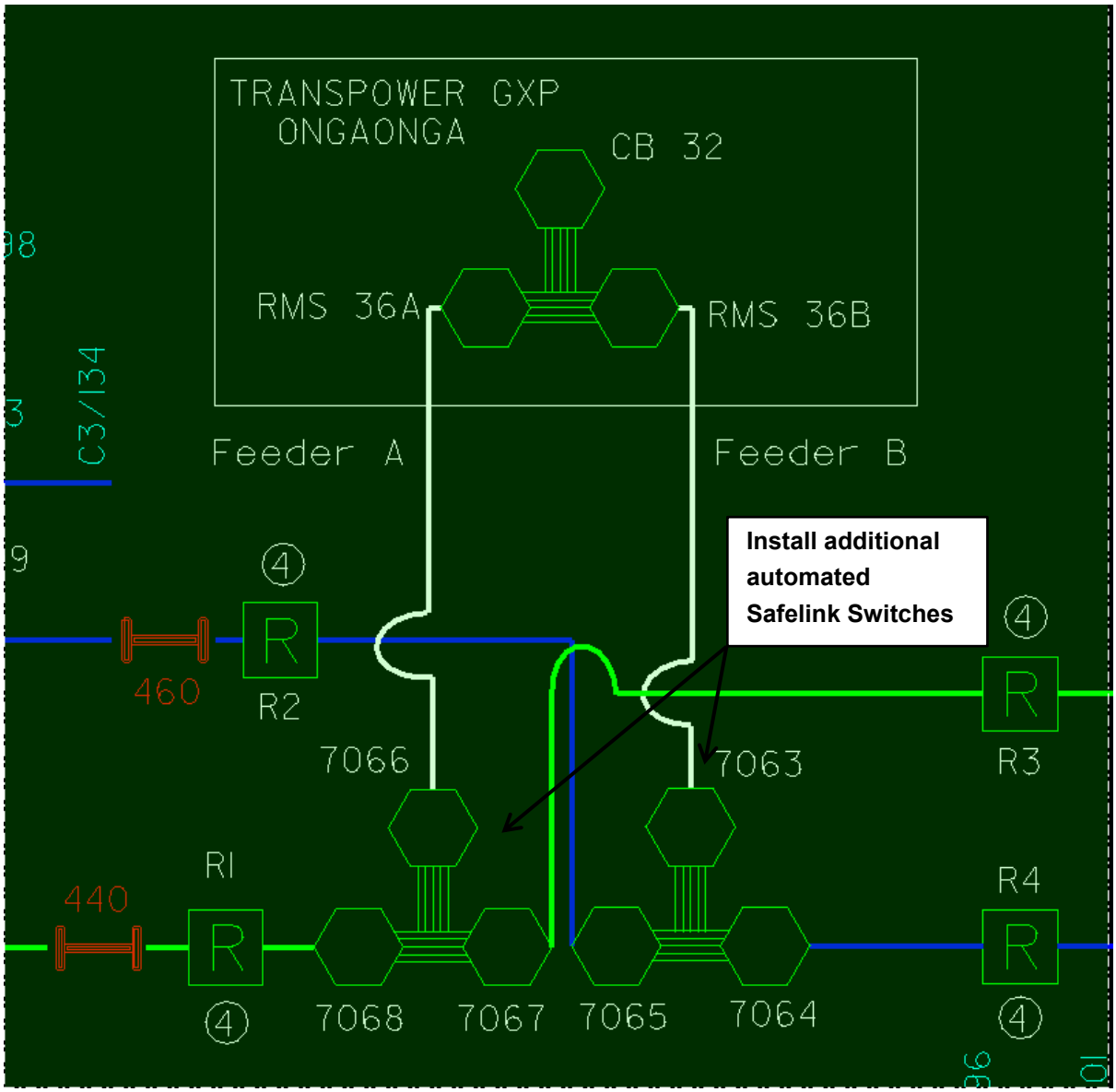


Figure 5-10: Install safelink switches at Ongaonga

Summary table of non-material projects for 2013/14.

Primary Driver	Project Number	Budget	Description
Reliability, Safety and Environment	1074	$95k	Installation of Fault Passage Indicators (FPI's) to assist with the quick location of feeder faults on Feeders 45 and 46, as well as enabling the Control Room operators to monitor feeder loads when back-feeding is required.
System Growth	1103	$40k	Bucket to address power quality issues that arise during 2013/14.

5.9.2 Network Development Programme for the period 2014/15 to 2018/19

Constraint No	Constraint Title
1	Loss of supply at Wilder Road substation due to power transformer failure.
2	Outage at Takapau substation due to failure of 33kV substation equipment.

Constraint 1 – Wilder Road

Loss of supply at Wilder Road substation due to power transformer failure.

Description

If the single power transformer at Wilder Road substation fails, an outage will be seen by approximately 700 customers. Back feeding is possible from Waipukurau substation but due to distance from the Waipukurau substation, there are some low voltage issues during peak load periods.

Development Options

Class of Option	Description	Advantages	Disadvantages or Risks	Cost
Network Option 1	Upgrade transformer foundation and bunding at Wilder Road substation to accommodate a second transformer	• If the transformer faults, one of the two 7.5MVA transformers can temporary be removed from Waipawa substation and installed relatively quickly. • Long term solution.	• None.	$90k
Non-Network Option 2	Setup mobile regulator sites	• Under contingency situation, regulators can be set up to ensure compliant voltage when back feeding from Waipukurau feeder 19.	• Expensive solution as a minimum of two regulators are required to maintain compliant voltage when back feeding from CB19. • Short term solution.	$200k
Do Nothing Option 3	Run the system as is	• Least cost option.	• Under n-1 situation it will be difficult to maintain compliant voltage at peak periods.	N/A

Preferred Option & Justification

The preferred long term solution is to upgrade the transformer bunding and foundation to enable the temporary installation of a spare transformer. In the short term, mobile regulators will be used to resolve this constraint.

Constraint 2 – Takapau

Outage at Takapau substation due to failure of 33kV substation equipment.

Description

A fault on one of the power transformers at Takapau substation will lead to an outage of the entire substation as the transformers do not have individual protection installed.

Development Options

Class of Option	Description	Advantages	Disadvantages or Risks	Cost
Network	Install automated switches at the substation to remotely isolate faulted equipment	• Reduce outage time.	• Short term solution.	$200k
Network	Install circuit breakers and related protection schemes	• Clear the faulted equipment instantaneously. • No intervention required by the control room. • Reduce SAIDI and SAIFI.	• High cost option. • Only viable if freezing works (biggest customer on the substation) require improved reliability.	$600k
Do Nothing	Run the system as is	• Least cost option.	• High outage times affecting SAIDI and SAIFI in the event of total substation outage.	N/A

Preferred Option & Justification

The preferred solution is to install remote controlled switches. This will significantly reduce the outage time as the faulted transformer can be isolated remotely. At present, a faultman has to be despatched to isolate the faulted equipment.

Summary table of non-material projects for the period 2014/15 to 2018/19.

Primary Driver	Project Number	Budget	Description (What or Why)
Reliability, Safety and Environment	1085	$35k	Establish automation and communication for the Paget Road 11kV Regulator.
System Growth		$40k p.a.	Annual bucket to address power quality issues that arise during the period 2014/15 to 2018/19.

SECTION 5 Network Development Planning

5.9.3 Network Development Programme for the period 2018/19 to – 2022/23

33kV Feeder Constraint – Takapau

Loss of 33kV supply to Takapau substation from Waipawa GXP.

Description

Takapau substation only has a single 33kV line supplying it from Waipawa GXP. If this line faults, the substation will see an outage. As this substation supplies the single largest customer on the Centralines network (Silver Fern Farms freezing works), it is prudent to address this constraint if improved security of supply is desired.

Possible Solutions

Class of Option	Description	Advantages	Disadvantages or Risks	Cost
Network	Install a new line from Waipawa GXP to Takapau substation, and install 2 x 33kV CBs and associated protection	• Provides n-1 security to the substation if one of the 33kV lines fault.	• Expensive option as it requires construction of 13kms of line. • No room in the 33kV switchyard at the GXP to cater for a new outdoor breaker. • Possible operational constraint as the new line will be on the same structure as the existing one. • Possible easement requirements which could lead to significant increase in costs.	$3.0M
Network	Install a new line which will tee-off from the Waipukurau-Wilder Road 33kV line to Takapau substation, and install 2 x 33kV CBs and associated protection	• Provides n-1 security to the substation if one of the 33kV lines fault. • Creates a ring network between Takapau, Waipukurau and Wilder Road substations.	• Expensive option as it requires construction of 15kms of line. • Increase in losses as the total route length from Waipukurau substation is 22kms.	$2.3M
Do Nothing	Run the system as is	• Least cost option.	• No n-1 security if the fault occurs on the existing 33kV line.	N/A

Preferred Solution & Justification

At present, Silver Fern Farms freezing works are satisfied with their security of supply, so the do nothing option suffices. If added security is required then the preferred solution is to install a new line which will tee-off from the existing Waipukurau-Wilder Road 33kV line to Takapau substation.

5.9.4 2018/19 to 2022/23 Network Development Works

Network development works for the period 2018/19 to 2022/23 for Centralines will be dependent upon a number of factors common to most electricity distributors. These include:

- economic drivers;
- changes to energy usage patterns driven from reduced cost of technology;
- the emergence of a greater focus on sustainable and energy efficient solutions;
- increased sustainable distributed generation solutions; and
- customer and shareholder views of acceptable levels of service.

Specifically, the Regional Council has initiated a study to investigate the establishment of a substantial dam (covering 375ha and storing up to 90M m^3 of water) on the Ruataniwha Plains which will drive extensive change to the land use in the district in the event that the works proceed. It should be noted that this study was commissioned in March 2010 and as such the impact on the Centralines Network is still under investigation at the time of preparation of this plan. These factors could potentially realise significant changes to the way Centralines needs to manage its network, however, given the uncertainty around the emergence and impact of these, the network development requirements presently planned for this period do not cater for this.

Based upon current customer and shareholder perspectives, there appears to be little need to invest heavily in reliability driven capital, as customers have indicated that the current level of reliability and price are appropriate. As a result, beyond the presently planned projects it is suggested that further investment will generally be limited to relatively minor upgrades to the worst performing feeders to ensure that customers experiencing the worst reliability are progressively upgraded closer to the average.

Safety driven upgrades are expected to remain relatively minor during the planning period, due to the current relatively robust nature of the network, age profiles of components, the high level of current expenditure on substation primary plant and the relatively high levels of investment in renewals and replacements that are discussed in Section 6.0.

SECTION 6 Life Cycle Asset Management

CENTRALINES
LIMITED

SECTION 6 Life Cycle Asset Management

6 Life Cycle Asset Management 6-3

SECTION 6 Life Cycle Asset Management

6 Life Cycle Asset Management

6.1 Lifecycle Asset Management Process

Asset management planning transforms Centralines' strategic intent into optimal decisions and actions. The central objective of Centralines' asset management and planning processes is to strike an optimal balance between maximising asset performance, minimising risk, and maximising long-term value, subject to constraints such as regulation and specific requirements of the shareholder.

This section discusses Centralines' Asset Management Plan and the delivery of the lifecycle activities which includes the capital investment to renew assets which are at the end of its serviceable lives, the operational and maintenance regime, disposal of assets and the rationalisation of assets. Capital investment to build new assets or augment existing infrastructure is discussed in the network development section of this document.

6.1.1 Lifecycle Activities

Centralines has undertaken a review of its lifecycle asset management processes. This is part of a continuous improvement initiative to implement best practice Asset Management and to align with the internationally recognised PAS 55 standard[1]. Centralines has adopted the asset management system implemented at Unison Networks and the core of this system, the lifecycle activities, are discussed in more detail in this section. Consistent with PAS 55, Centralines has adopted four core lifecycle activities which are summarised in Figure 6-1 and discussed in further detail below.

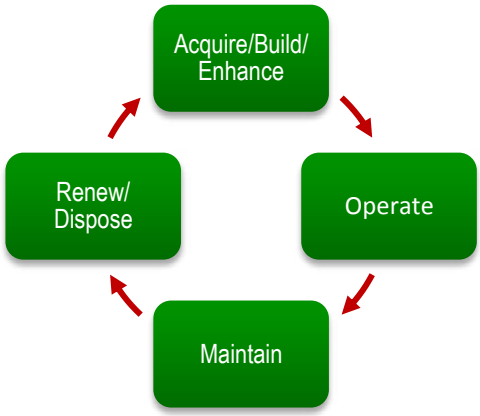


Figure 6-1: Four core lifecycle activities

Asset Creation/ Acquisition

This activity involves decision making on the type of capitpal investment required followed by the delivery of the appropriate investment programmes. The asset creation or acquisition is the result of having to:

- Building new networks due to subdivision development;
- Upgrade existing assets due to increased demand (discussed in Section 5);
- replace existing assets that have reached the end of its economic life;
- Acquisition of existing assets from another network company or industrial customers.

A set of comprehensive network, design and construction standards set the parameters within which Centralines' assets are created or acquired.

[1] British Standards Institution (BSI) PAS55:2008 – PAS55-1 Asset Management, Specification for the optimised management of physical assets, and PAS55-2 Guidelines for the application of PAS55-1

SECTION 6 Life Cycle Asset Management

Operate/Utilise the assets

The Operations phase of the asset lifecycle is unquestionably the longest phase of the overall asset lifecycle delivery and has a significant contribution to risk management, asset life, operating and maintenance costs, and improved user and community outcomes. Centralines' strategy for the operation of its assets is to comply with legislation, guidelines and company policy for the safe and efficient operation of its assets and to minimise any disruption to the system that may occur during planned and unplanned events.

- Effective risk management and compliance with statutory obligations is achieved by following industry specific Safety Manuals and Guidelines and company System Operating procedures and manuals
- Extended asset life is achieved by monitoring via Scada loadings and ratings of all major assets and careful outage management practices to limit overloads.
- Reduced operating and maintenance costs are achieved via managing outage requests via an electronic application system and under taking multiple tasks at the same time where possible.
- Improved user and community outcomes are achieved by carefully applying outage management rules of the Retailers Use of System Agreements and company policy regarding customer notification requirements.

Maintain Assets

The Maintain assets phase of the asset lifecycle runs simultaneously with the Operations phase and similarly has a significant contribution to risk management, asset life, operating costs, and improved user and community outcomes of the overall asset lifecycle delivery. Centralines' key objective in managing the life cycle of its assets is to ensure that these assets perform their required function, remain safe and operational throughout the duration of their engineering lives, at least cost, while conforming to Centralines standards and remaining compliant with applicable legislation. To achieve this, maintenance management is delivered through the following maintenance practices:

- Routine and Corrective Maintenance and Inspection including;
- Asset Replacement and Renewal;
- Service Interuptions and Emergengies.

These maintenance practices are discussed in detail in section 6.1.4.

Disposal of Assets

As a key part of the lifecycle management of the assets, Centralines continuously reviews the effectiveness of its assets and whether it remains fit for purpse. A number of factors are considered when the decision is made to dispose of or rationalize assets. Key considerations are:

- Changes to the operating philosophy of the network, i.e. automation of assets;
- Changes to Health and Safety legislation, e.g. working on energised assets which are deemed unsafe due to failure history;
- Assets considered to be unfit for purpose due to environmental impact and risk assessments;
- Changes to the Design and Maintenance Standards;

- Assets at the end of their serviceable lives which are no longer supported.

6.1.2 Asset Management Decision Making

Asset Management Decision Making is critical at all stages of the lifecyle of assets. A key component of this is having good knowledge about the assets and applying this to the decision making process. Centralines uses decision support tools at various stages of the asset lifecycle (create, operate, maintain, dispose). These tools assist in making effective asset management decisions by providing structure, repeatability, transparency and auditability to the decision making process. That is to say that decision support tools are the processes, algorithms and frameworks that enable effective decision making. Three key tools used to support decision making for the renewal of assets are the:

- Renewal Envelope – a tool to quantify the level of renewal expenditure required annually to maintain the physical integrity of the network.
- Triple-R (repair, replace, refurbish) – a tool to assist in determining whether to repair, replace or refurbish a compromised asset.
- Investment Prioritisation Tool – a tool to prioritise Network Capital investment options (projects) across a range of drivers as determined by management.

6.1.3 Centralines' Asset Hierarchy

Centralines manages its assets at three distinct levels i.e. Asset Portfolio, Asset System and Individual Assets, as represented below in Figure 6-2.

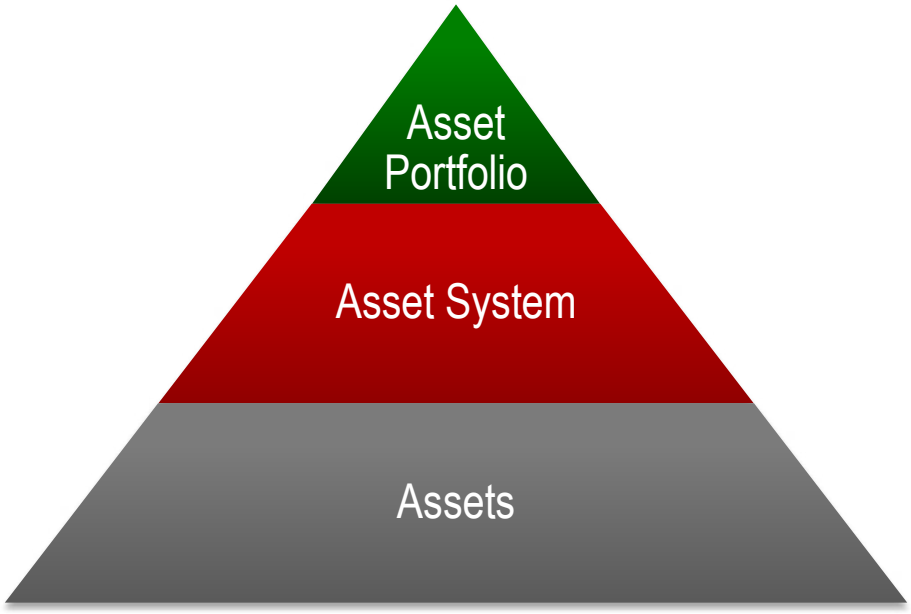


Figure 6-2: Hierarchy of assets in Centralines' asset management system

SECTION 6 Life Cycle Asset Management

In further detail these layers denote:

Asset Portfolio
At the highest level, Centralines manages a portfolio of electrical assets for the purpose of transporting and distributing electricity from the source at the GXP to the end consumer.

Asset System
At the intermediate level a group of assets working together to perform a common function, i.e. the delivery of electricity to the consumer, is considered an Asset System. Examples of Asset Systems at Centralines are zone substations and feeders.

Individual Assets
Managing assets at a granular level such as individual assets provide detail on asset performance, risk and lifecyle costs. This approach to manage asset at a granular level has the added advantage when assessing and managing asset system performance risk and lifecycle costs.

6.1.4 Maintenance Planning Criteria and Assumptions

Objective
Centralines' key objective in managing the lifecycle of its assets is to ensure that assets perform their required function throughout the duration of their engineering lives at least cost while conforming to Centralines standards and remaining compliant with applicable legislation.

The 2013/14 maintenance programme and ten year forecast are driven by the following principles:

- Reliable operation to meet the needs of the consumer;
- Ensure existing assets are safe and compliant with all applicable legislation;
- Reach the least cost trade-off between different modes of maintenance (repair, refurbishment, replacement);
- Reach the optimal reactive:preventative maintenance ratio for the Centralines asset base;
- Condition monitoring and predictive analysis form the foundation of asset maintenance; and
- Achieve the optimal mode of managing assets, specific to each asset class.

Lifecycle Asset Strategy
Centralines' key objective in maintaining its assets is to ensure that assets continue to provide their required function during the terms of their realistic service lives at appropriate least cost. As a general principle, and in line with the objective of implementing life cycle cost minimisation, an asset will be replaced or refurbished when:

- It ceases to be suitable for the intended purpose;
- It becomes unsafe;
- The present value of preventative replacement cost becomes less than the present value of reactive replacement cost;
- The probability and consequences of failure become an unacceptably high risk;
- Its replacement or refurbishment forms part of the least cost development of the network.

At a macro level, comparative analysis of Centralines' total maintenance spend to asset value is regularly compared to other distribution utilities. At a lower level, the effectiveness of each maintenance strategy is monitored to ensure it is delivering against objectives. Asset failure rates are monitored and maintenance cycles are increased/reduced appropriately to balance failure risks against cost.

Alternatives to Replacement

Replacement is only one option to restore asset performance. Other options that are evaluated include refurbishment, relocation, retrofitting or de-rating the assets and retaining them in service.

Procurement Practices

Centralines follows a product procurement process whereby all network materials are supplied via Unison Stores. Unison employs a product approval process on products entering its networks, to ensure that all operational and life cycle considerations are taken into account before a product is approved for use on the network. This enables Centralines to ensure rapid response to outages (like-for-like replacements), minimise inventory and spares holding levels, confirm sufficient after sales support is available and ensure that short term cost saving drivers do not lead to a higher overall lifecycle cost of operating the network.

6.1.5 Maintenance Practices

Assets' operational importance and their respective consequences of failure (in respect of the asset itself and the relevant customer) are key considerations in the establishment of Centralines' maintenance practices. An overview is provided below of the maintenance practices and where they sit within the categories defined in the Commerce Commission's 2012 Information Disclosure Requirements:

- Routine and Corrective Maintenance and Inspection; and
- Asset Replacement and Renewal.

The asset-specific sub-sections that follow also provide further detail on Centralines' maintenance practices.

SECTION 6 Life Cycle Asset Management

6.1.6 Routine and Corrective Maintenance and Inspection

Condition Monitoring and Asset Inspection
Condition assessment and inspection is performed to establish an understanding of the assets and their service status and is used as one of the key drivers for maintenance and renewal activities.

Centralines runs an extensive programme of condition monitoring and assessment on its assets. Inspection processes generating high volumes of data utilise electronic field capture systems to minimise data processing. The field capture devices are predominantly PDA devices using in-house software that allows uploading of data directly into Centralines' core business applications.

Routine Servicing
Time-based cycles of routine servicing are undertaken where condition-based monitoring is not practical or possible. The application of these techniques is based on manufacturer's recommendations and industry practice.

Corrective and Preventive Maintenance
Corrective and preventative maintenance work is initiated based on:

- Asset condition assessments;
- Performance analysis of the assets in terms of failures and defects;
- Predicting asset failures as a result of failure mode analysis;
- Asset operational importance;
- Consequences of failure (asset and consumer).

6.1.7 Asset Replacement and Renewal

Asset replacement and renewal maintenance relates to the replacement or renewal of non-capital items and the operational expenditure incurred in the process. This covers planned remedial work, replacement of asset components and asset refurbishment.

Asset replacement and renewal maintenance is initiated based on:

- Asset condition assessments; and/or
- Defect reporting.

6.1.8 Service Interruptions and Emergencies

This relates to reactive work (temporary or permanent) undertaken in the immediate or short term in response to an unplanned event. The initial fault location and isolation, ensuring that the fault site is electrically safe, and restoration of supply where possible, is categorised as First Response. Further reactive work required beyond the scope of First Response to restore supply is considered to be Second Response.

Faults requiring immediate or short term action are classified as critical or urgent. The initial, reactive work may only be a temporary measure, in which case the fault status is downgraded to non-urgent,

after completion of the immediate or short term action. The remaining remedial work is then scheduled for completion as a planned, lower-cost, activity.

6.2 Identification of Maintenance and Inspection Policies, Programmes and Actions

6.2.1 Maintenance Strategy

Overhead lines

Asset Class	Maintenance Type	Action	Related Standards[1]
33kV	Asset Inspection/ Condition Assessment	• Annual visual inspection. • 5 yearly detailed inspections.	NK5020
	Routine and Preventative Maintenance	Preventative Maintenance: • Maintenance identified by inspections and the defect process. Vegetation Control: • Tree maintenance identified by inspections and the defect process.	NK5119 NK1003
	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Preventative 'like for like' replacements of non-capital assets.	NK5119
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5119
11kV	Asset Inspection/ Condition Assessment	• 5 yearly detailed inspections.	NK5020
	Routine and Preventative Maintenance	Preventative Maintenance: • Maintenance identified by inspections and the defect process. Vegetation Control: • Tree maintenance identified by inspections and the defect process.	NK5119 NK1003
	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Preventative 'like for like' replacements of non-capital assets.	NK5119
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5119
Low Voltage	Asset Inspection/ Condition Assessment	• 5 yearly detailed inspection.	NK5020
	Routine and Preventative	Preventative Maintenance:	NK5119

SECTION 6 Life Cycle Asset Management

Asset Class	Maintenance Type	Action	Related Standards(1)
33kV	Asset Inspection/ Condition Assessment	• Annual visual inspection. • 5 yearly detailed inspections.	NK5020
	Routine and Preventative Maintenance	Preventative Maintenance: • Maintenance identified by inspections and the defect process. Vegetation Control: • Tree maintenance identified by inspections and the defect process.	NK5119 NK1003
	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Preventative 'like for like' replacements of non-capital assets.	NK5119
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5119
	Maintenance	• Maintenance identified by inspections and the defect process. Vegetation Control: • Tree maintenance identified by inspections and the defect process.	NK1003
	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Preventative 'like for like' replacements of non-capital assets.	NK5119
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5119
Poles (All Voltages)	Asset Inspection/ Condition Assessment	• Annual visual inspection (33kV). • 5 yearly detailed inspection (all voltages). • Wooden poles – 5 yearly below ground inspections. • Other poles – Visual inspection.	NK5020
	Routine and Preventative Maintenance	Preventative Maintenance: • Maintenance identified by inspections and the defect process.	NK5119
	Refurbishment and Renewal Maintenance	• Refurbishment - Not applicable. • Renewal – Capital asset.	N/A
	Fault and Emergency Maintenance	• First response. • Minor reactive repairs.	NK5119

Underground Cables

Asset Class	Maintenance Type	Action	Related Standards[1]
33kV 11kV Low Voltage Streetlight and Security	Asset Inspection/ Condition Assessment	• 5 yearly visual inspection of High Voltage Pole Rise Cable Terminations (as part of the Overhead Line Feeder Inspection). • Annual visual or detailed inspection (depending on accessibility) of High Voltage Cable Terminations to Ground Mounted Equipment (as part of GMI-Inspection). • Cable testing.	NK5020 NK5017 NK4020
	Routine and Preventative Maintenance	Preventative Maintenance: • Maintenance identified by inspections and the defect process.	Manufacturer's Standard
	Refurbishment and Renewal Maintenance	• Refurbishment - Not applicable • Renewal - Capital asset	N/A
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	Manufacturers' Standards

Zone Substations

Asset Class	Maintenance Type	Action	Related Standards[1]
Power Transformers (including Tap Changer and Voltage Regulator): 33kV/11kV	Asset Inspection/ Condition Assessment	Station Inspections: • Level 2 – Weekly detailed inspection. • Transformer – Annual DGA Oil Test. • Regulator – Oil test when serviced.	NK5013 NK5043 NK5043
	Routine and Preventative Maintenance	Routine Services: • Transformer – 2 yearly. • Tap changers – 2 yearly or 6 yearly, depending on tap changer type. • Regulator – 2 yearly, 5 yearly or 10 yearly depending on make and model. Preventative Maintenance: • Maintenance identified by inspections and the defect process.	NK5042
	Refurbishment and Renewal Maintenance	• Refurbishment – Transformer and oil refurbishment. • Renewal – Capital asset.	NK5043
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5042

SECTION 6 Life Cycle Asset Management

Asset Class	Maintenance Type	Action	Related Standards[1]
Circuit Breakers: 33kV (Indoor and Outdoor) 11kV (Indoor and Outdoor)	Asset Inspection/ Condition Assessment	Station Inspections: • Level 2 – Weekly detailed inspection. • Partial Discharge Test – 2 yearly. • Oil Test – When serviced.	NK5013 Outsourced NK5043
	Routine and Preventative Maintenance	Routine Services: • SF6 – 3 yearly. • Vacuum – 3 yearly. • Oil – 2 yearly. • Oil – Fault service after every fault operation. Preventative Maintenance: • Maintenance identified by inspections and the defect process.	NK5038 & NK5040
	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Capital asset.	N/A
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5038 & NK5040
Load Control Plants: Ripple Injection Plants	Asset Inspection/ Condition Assessment	Station Inspections: • Level 2 – Weekly detailed inspection.	NK5013
	Routine and Preventative Maintenance	Routine Services: • Annual service. Preventative Maintenance: • Maintenance identified by inspections and the defect process.	Outsourced NK5024
	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Capital asset.	N/A
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5024
Substation Buildings and Equipment: Station Batteries and Battery Chargers Protection relays Station Control Indicators and Alarms Earth Testing Thermovision Grounds and Buildings	Asset Inspection/ Condition Assessment	Station Inspections: • Level 2– Weekly detailed inspection.	NK5013
	Routine and Preventative Maintenance	Routine Services: • Batteries – 2 monthly general service, 6 monthly discharge tests. • Relays – Electro-Mechanical (4 yearly), Electronic (6 yearly), Microprocessor (6 yearly). • Station Control Indicators and Alarms – 4 yearly. • Earth Tests – 5 yearly. • Thermovision – Annually. Preventative Maintenance: • Maintenance identified by inspections and the defect process.	NK5041 NK5022 NK5023 Outsourced NK5080 NK5014

Asset Class	Maintenance Type	• Action	Related Standards[1]
Substation Buildings and Equipment: Station Batteries and Battery Chargers Protection relays Station Control Indicators and Alarms Earth Testing Thermovision Grounds and Buildings	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Preventative 'like for like' replacements of non-capital assets.	N/A
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5014

Distribution Transformers and Voltage Regulators

Asset Class	Maintenance Type	Action	Related Standards[1]
Transformers: Ground Mounted Pad Mounted	Asset Inspection/ Condition Assessment	• Annual GMI-Inspection. • Earth Test – 5 yearly.	NK5017 NK5011
	Routine and Preventative Maintenance	Routine Service: • Corrective maintenance (asset alive) as part of the annual GMI-Inspection. Preventative Maintenance: • Shutdown Maintenance identified by the GMI-Inspection and the defect process.	NK5017
	Refurbishment and Renewal Maintenance	• Refurbishment – Transformer refurbishment and painting. • Renewal – Capital asset.	NK6001
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5017
Pole Mounted Transformers	Asset Inspection / Condition Assessment	• 5 yearly visual inspection (as part of the Overhead Line Feeder Inspection). • Earth test – 5 yearly.	NK5020 NK5011
	Routine and Preventative Maintenance	Preventative Maintenance: • Maintenance identified by inspections and the defect process.	NK5020
	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Capital asset.	N/A
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5020

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Asset Class	Maintenance Type	• Action	Related Standards[1]
Voltage Regulators	Asset Inspection / Condition Assessment	• 2 monthly detailed inspections. • Oil test - When serviced. • Earth test – 5 yearly.	NK5015 NK5043 NK5011
	Routine and Preventative Maintenance	Routine Service: • 2 yearly or 5 yearly depending on make and model. Preventative Maintenance: • Maintenance identified by inspections and the defect process.	NK5042
	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Capital asset.	N/A
	Fault and Emergency Maintenance	• First response. • Reactive repair.	NK5042

Distribution Switchgear

Asset Class	Maintenance Type	Action	Related Standards[1]
Ring Main Switches: ABB Other	Asset Inspection / Condition Assessment	• Annual GMI-Inspection. • Earth Test – 5 yearly.	NK5017 NK5011
	Routine and Preventative Maintenance	Routine Service: • Corrective maintenance (asset alive) as part of the annual GMI-Inspection. Preventative Maintenance: • Shutdown Maintenance identified by the GMI-Inspection and the defect process.	NK5017
	Refurbishment and Renewal Maintenance	• Refurbishment – Painting. • Renewal – Capital asset.	NK6001
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5017
Air Break Switches	Asset Inspection/ Condition Assessment	• Annual visual inspection (33kV). • 5 yearly visual inspection (11kV). • Both inspections form part of the overhead line feeder inspection. • Earth Test – 5 yearly.	NK5020 NK5020 NK5011
	Routine and Preventative Maintenance	Preventative Maintenance: • Maintenance identified by inspections and the defect process.	NK5020
	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Capital asset.	N/A
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5020

Asset Class	Maintenance Type	• Action	Related Standards[1]
Reclosers/ Sectionalisers (including Auto Links)	Asset Inspection / Condition Assessment	• Reclosers/Sectionalisers – Annual detailed inspection. • Auto Links – Annual visual inspection. • Earth Test – 5 yearly.	NK5016 NK5016 NK5011
	Routine and Preventative Maintenance	Routine Service: • 2 yearly or 5 yearly depending on make and model. Preventative Maintenance: • Maintenance identified by inspections and the defect process.	NK5052
	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Capital asset.	N/A
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5052

Miscellaneous Distribution Equipment

Asset Class	Maintenance Type	Action	Related Standards[1]
Pedestals: Lo-Ped Hi-Ped Steel	Asset Inspection / Condition Assessment	• Inspection of Ground-mounted Low Voltage Distribution Equipment as and when required by Centralines (including minor repairs).	NK5019
	Routine and Preventative Maintenance	Preventative Maintenance: • Maintenance identified by inspections and the defect process.	NK5019
	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Preventative 'like for like' replacements of non-capital assets.	NK5019
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5019

SCADA Control and Communications

Asset Class	Maintenance Type	Action	Related Standards[1]
SCADA Control and Communications Equipment	Asset Inspection / Condition Assessment	• General Communications Equipment Inspections – 2 monthly. • Station UHF Equipment Inspections – 6 monthly. • Station VHF SCADA Equipment Inspection – 6 monthly.	NK5028
	Routine and Preventative Maintenance	Preventative Maintenance: • Maintenance identified by inspections and the defect process.	NK5028

SECTION 6 Life Cycle Asset Management

Asset Class	Maintenance Type	• Action	Related Standards[1]
SCADA Control and Communications Equipment	Refurbishment and Renewal Maintenance	• Refurbishment – Not applicable. • Renewal – Capital asset.	N/A
	Fault and Emergency Maintenance	• First response. • Reactive repairs.	NK5028

Maintenance Standards

Reference No	Title
NK1003	Vegetation Control Procedure
NK4020	Testing of Cable Assets
NK5011	Inspection and Testing of Standard and SWER Earths
NK5013	Station Level 2 Inspections
NK5014	Substations Grounds Maintenance
NK5015	Voltage Regulator Inspections (Under review)
NK5016	Line Recloser Inspections
NK5017	Ground-mounted Distribution Equipment Inspection
NK5019	Safety Inspection Standard for Ground-mounted Assets – Low Voltage
NK5020	Feeder Survey and Condition Monitoring
NK5022	Protection Relay Maintenance and Testing
NK5023	Station Control Indication and Alarm Testing (Under review)
NK5024	Ripple Injection and Cyclo Plant Maintenance and Inspection (Under review)
NK5028	Substation Communication Equipment Maintenance Standard
NK5038	Metalclad Switchgear Maintenance
NK5040	Outdoor Circuit Breaker Maintenance (Under review)
NK5041	Station Battery Maintenance
NK5042	Power Transformer and Regulator Maintenance (Under review)
NK5043	Insulating Oil Maintenance
NK5052	Recloser and Sectionaliser Maintenance Requirements (Under review)
NK5080	Thermovision Inspection (Under review)
NK5119	Basic Distribution Line Maintenance
NK6001	Network Painting Standard

6.2.2 Defect Remediation

Defect remediation to refurbish assets is undertaken following identification of the defect via the asset inspection or condition monitoring programmes. While the remediation process is similar for remediation of all defects, the timing of the response varies based upon the priority assigned.

The process for defect identification is mostly via a PDA mobile device, with the defects uploaded into WASP. Manual entry into WASP is employed where PDAs are not used. Note that urgent priority defects are notified in parallel to this process via a phone call, enabling swift action. Once loaded, these defects are assessed, and considered for refurbishment or renewal. Where the refurbishment option is selected, these defects are then packaged, approved and released for works scheduling. Once completed, the defects are closed out. Where the renewal option is selected, a capital project is initiated to renew the defective asset, and closed out after completion.

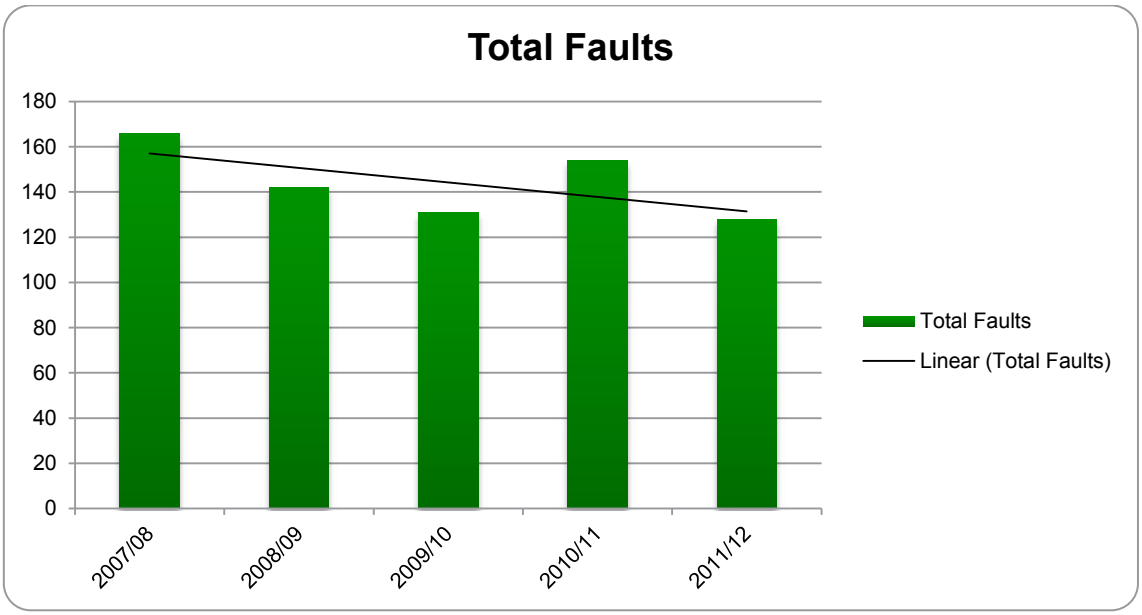
Priority One Defects (P1)
These defects are associated with assets that have either failed in service, or are in imminent danger of failing in service within the next three months, resulting in an unacceptable risk or loss of supply. These defects are attended to/assessed either immediately where a safety issue or loss of supply is involved or within three working days where this is not the case. In all cases remediation of the defect is required within ten working days of identification.

Priority Two Defects (P2)
These defects generally arise from the asset inspection and condition monitoring activities, and are components that are currently serviceable, but are forecast to remain serviceable for the next three months but are forecast to fail in service prior to the next scheduled inspection/condition assessment.

These defects are programmed for remediation within 12 months of identification.

6.2.3 Systemic Asset Failures

Graph 6-1 following summarises total network HV faults longer than 60 seconds experienced on the Centralines network up to the end of 2011/12. This includes faults where causes were not able to be identified, and shows a declining trend over recent years. An increase in the number of Vegetation related outages (Graph 6-7) and the number of Weather related outages (Graph 6-5), mainly caused by an increase in lightning strikes, have contributed to the increase in the total number of faults for 2010/11. Predominately, most failures are experienced on the overhead network. However, to get a better understanding of the situation, it is necessary to consider the trends of the major contributors to overhead line faults, which are inclusive in the failure mode discussions following.



Graph 6-1: Centralines all network faults

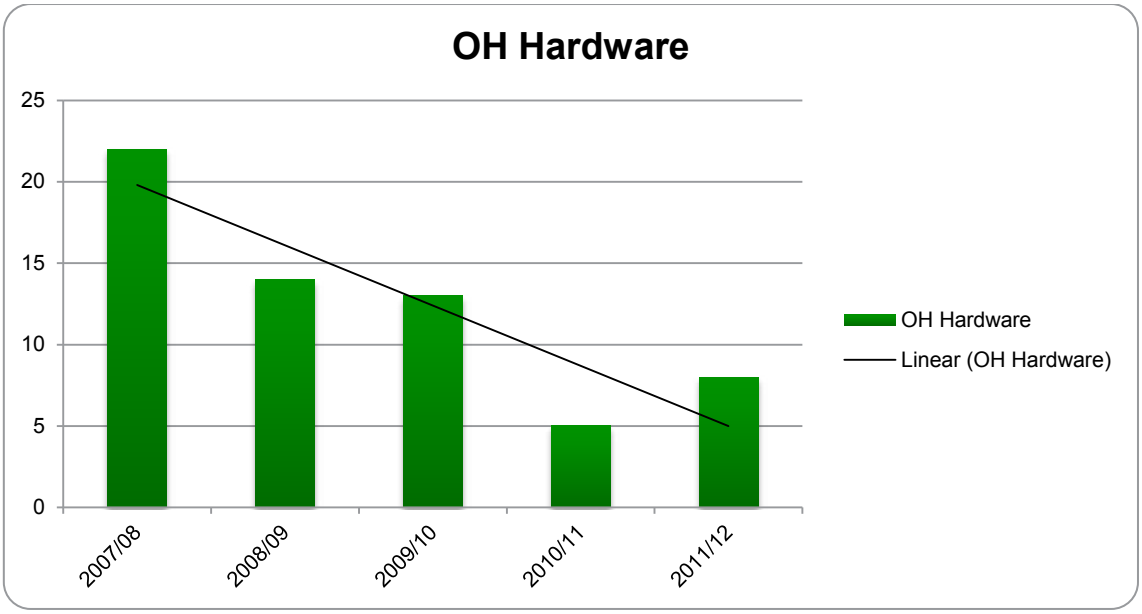
6.2.4 Overhead Lines

Failure Modes and Risks

The poles in the Centralines network are almost entirely concrete, and have not suffered accelerated deterioration due to a mild environment, hence the overhead network is somewhat fortunate to have avoided the levels of deterioration experienced in other networks of similar age with larger proportions of wooden poles. As a result failure modes and risks are generally limited to the following:

- Slab side concrete poles installed in the early 1940's are approaching the end of their serviceable life, especially in the coastal areas. Salt in these areas impregnates the concrete of the pole, causing the steel reinforcing to rust. The rusting steel expands and cracks the concrete, which eventually falls off, thereby substantially weakening the pole. The asset inspection programme is progressively enabling prioritisation of deteriorated poles, being progressively replaced via the asset renewal programme. To date there have been no unassisted in-service failures.
- Old "kidney" shaped porcelain shackle insulators have traditionally been a source of a high proportion of controllable forced outages, with the insulator cracking then generally failing during periods of wet weather. Despite the extensive wet weather experienced during 2010/11 and 2011/12, there have been few instances of such failures.
- The failure of the 11kV jumper between the bottom of the HV fuse mount and the transformer bushing. These are mainly aged related faults with the short jumper being exposed to weather conditions over time and breaking at or about the connection point.

The number of faults attributable to overhead hardware failures is detailed in Graph 6-2 following. Evident from this data is that the number of failures shows a declining trend in recent years, which indicates that asset strategies are having a positive effect.

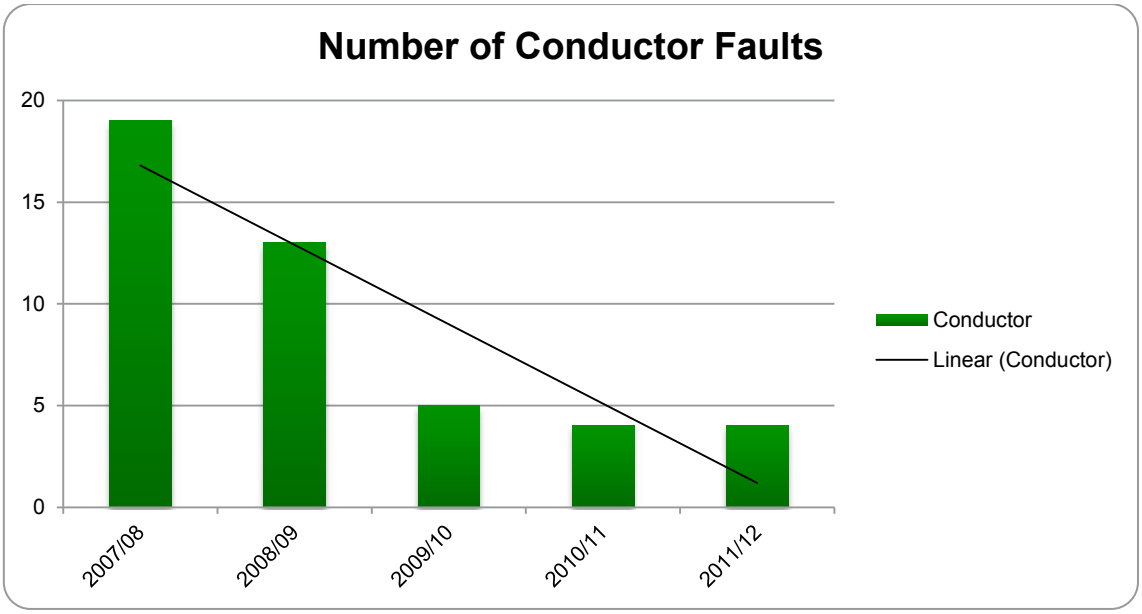


Graph 6-2: Overhead hardware faults

Inclusive in the graph above is failures attributable to loosening of the centre kingbolt securing crossarms to concrete poles has also been a source of in-service failures. This is limited to poles erected prior to 1997, following which construction standards were changed to include the installation of a lock nut on king bolts. The asset inspection programme is used to identify loosened king bolts, which are prioritised and programmed for remediation.

Crossarm failures through degradation have been a significant contributor of in-service failures, however this has been decreasing over recent years, with very few failures experienced during 2011/12. This would indicate that asset renewal and refurbishment strategies are beginning to have a positive impact on performance for these assets. The asset inspection programme is used to identify degraded crossarms at risk of failure, which are classified as a priority 2 defect and programmed for remediation as part of the defect remediation process.

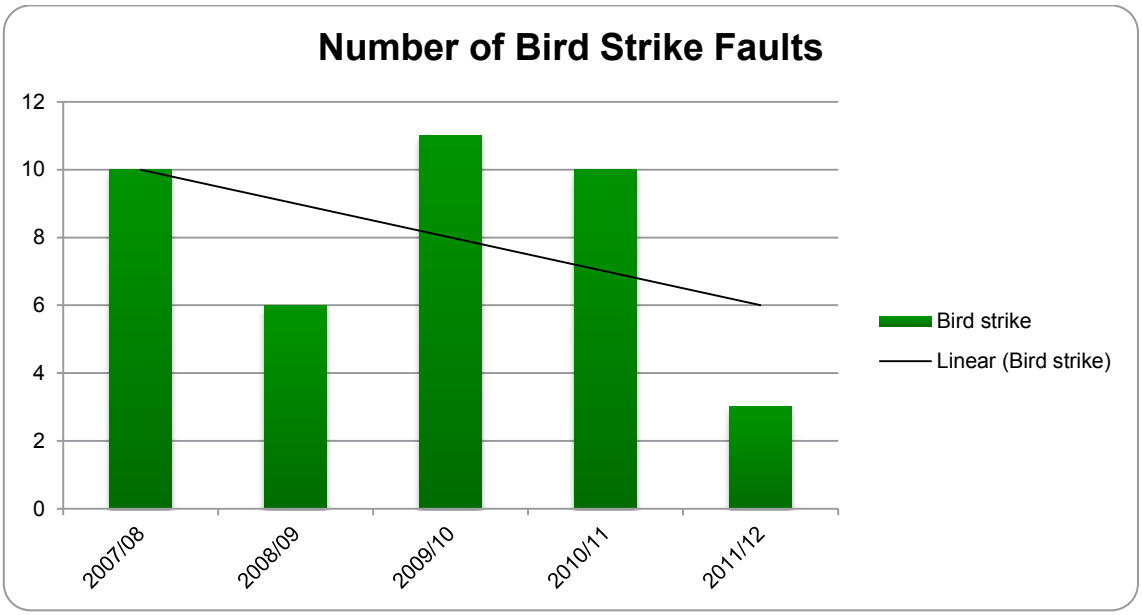
Conductor failures continue to be a source of failure of the HV network, as illustrated in Graph 6-3 following, however the number of failures being experienced continues to decrease, which is a pleasing result. The assessment of the condition of conductors is undertaken as part of the 5 year asset inspection programme, with defects identified then programmed for remediation.



Graph 6-3: Overhead conductor faults

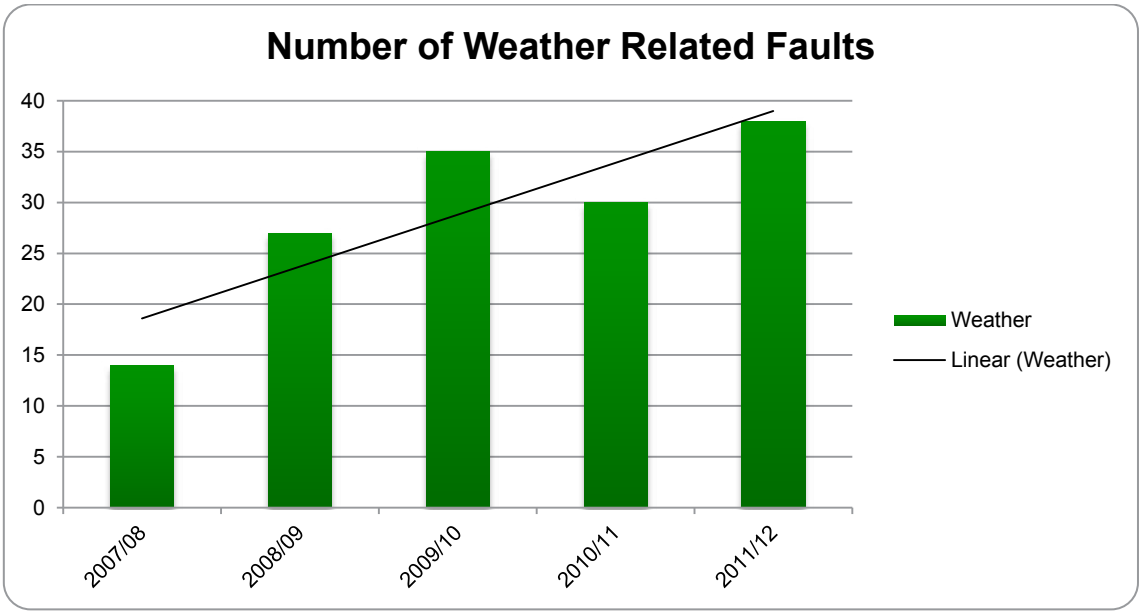
Animal or bird contact can occur when possums access conductors through the lack of an effective guard, or line clashes caused by bird strikes. Cattle rubbing against stays are also a cause of line clashes and subsequent protection system operation.

Graph 6-4 details the number of faults attributable to bird strikes. It shows a declining trend of failure cause.



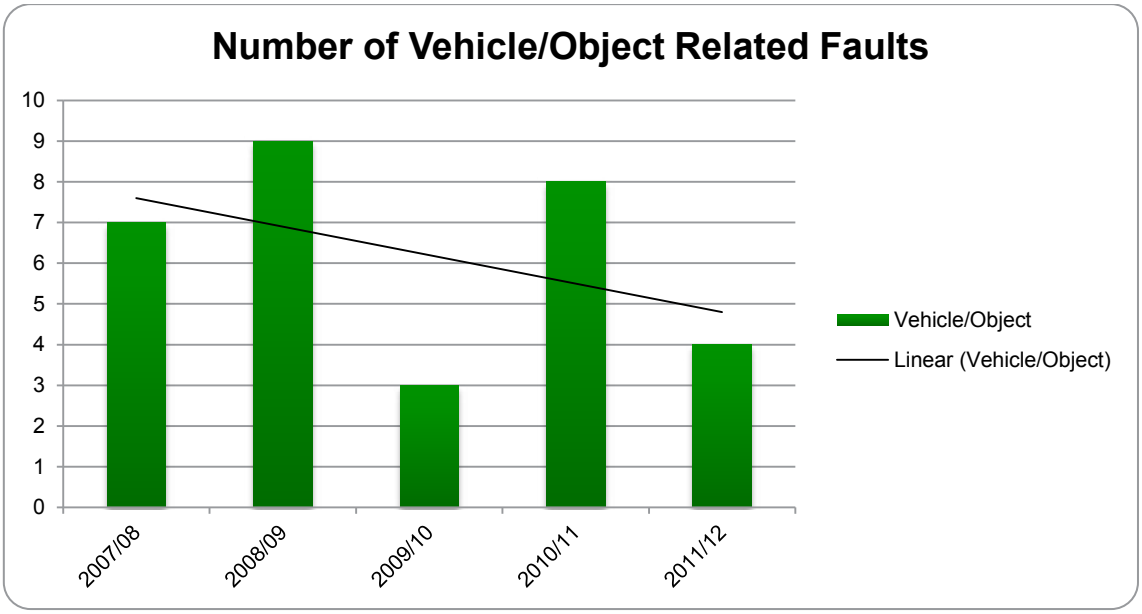
Graph 6-4: Bird strike faults

Severe adverse weather conditions continue to be experienced, with 2011/12 being an unusual year with severe flooding experienced in April 2011, as well as strong wind storms at times throughout the year. Faults experienced during adverse weather over time are detailed in Graph 6-5 following, which show a massive increase experienced in recent years. In part this increase results from a change in cause assessment, with all transient faults experienced during adverse weather now being attributed to this cause.



Graph 6-5: Weather related faults

Asset damage through vehicle accidents continues to occur on both rural and urban networks across the Centralines area. Graph 6-6 following details the number of faults attributable to vehicle collisions.



Graph 6-6: Motor/Object related faults

SECTION 6 Life Cycle Asset Management

Maintenance Philosophy and Practice

Centralines' maintenance philosophy is to use the asset inspection assessment methodology, followed by either defect remediation or asset renewal projects to ensure the ongoing reliable performance of the overhead network. In addition, the practice of review of in-service failures to enable continual improvement to the asset assessment methodology is incorporated into the process.

6.2.5 Underground Cables

Failure Modes and Risks

The underground network at Centralines is predominately modern HDPE and XLPE 33kV and 11kV cables, and PVC insulated LV cables. There are a small number of PILC 11kV cables, mostly in service as feeder tails, that are in sound condition for their age. As a result Centralines has experienced reliable operation from all HV underground cables, with no in-service failures in the last 5 years.

LV Cable failures have been limited to sites where a small number of Denso joint covers have failed due to moisture ingress at tee joints in recent years. The failures are experienced prior to cable failure and are generally readily repairable, and being LV cabling have a relatively low impact.

The greatest risks looking forward are considered to predominately be limited to:

- Failure of PILC 11kV cables due to age based deterioration, particularly at bitumen filled potheads. This is based on experience with other utilities however no such failures have been experienced at Centralines. The condition of these cables is currently monitored via the 5 yearly asset inspection programme. Feeder tails are being progressively replaced as part of asset renewal projects to upgrade 11kV switchgear.
- Damage from third parties excavating around the cables.

Maintenance Philosophy and Practice

Asset condition inspections of all cable terminations and risers are undertaken as part of annual patrols in the case of 33kV underground cables, and 5 yearly asset inspection programmes for 11kV and LV cables. This is currently a visual inspection to determine exposed defects.

As maintenance on a buried asset is very difficult in practice, Centralines' focus is to ensure that high standards of workmanship are used when laying, jointing and terminating cables. This is mainly done through technical construction standards and auditing of contracted work.

6.2.6 Power Transformers

Failure Modes and Risks

Centralines' power transformers and tap changers are inspected weekly, have their condition assessed annually and are lightly loaded. Careful operating practices and routine maintenance has resulted in reliable service with generally longer than forecast service lives.

The probability of faults occurring is very low considering the current maintenance regime and operational practices. Given that all substations with the exception of Wilder Road are two transformer substations, with sufficient capacity to operate on a single transformer without supply

limitations or risk of overload, it is suggested that the risk of loss of supply is adequately addressed. Note that loss of Wilder Road can be mitigated through load transfers and installation of mobile regulators. A longer term solution is included in the Network Development Plan in section 5.9.2.

Replacement parts for tap changers, particularly contact replacement, will become a problem for some of the older models in the future.

Maintenance Philosophy and Practice

Due to the operational importance and age profile of these assets, extensive condition monitoring and preventative maintenance programmes are in place to ensure reliability of service, as discussed in Section 6.2. This includes dissolved gas analysis (DGA) tests, performed on all zone substation transformers on an annual basis to monitor internal conditions and consideration for refurbishment. DGA testing has now been performed for a number of years on Centralines assets, and the trends emerging from these results give valuable insight into the state of the transformer, and rates of decay and subsequent urgency of corrective measures.

The exterior condition of all transformers is reasonable with paint work and rust treatment being part of the regular maintenance activities.

Given that the transformers at Waipukurau were replaced in 2008, the Takapau transformers refurbished in 2008/09, and the Waipawa transformers replaced with the refurbished ex-Waipukurau transformers in 2010, it is expected that no unplanned replacements will be necessary.

Thermo-vision photography on an annual basis is also used as another means of non-invasive condition monitoring. This method uses an infra-red heat detecting device to create an image that locates hot spots to be repaired prior to in-service failure.

6.2.7 Circuit Breakers

Failure Modes and Risks

Centralines' circuit breakers are inspected weekly, and are maintained on either a 2 yearly or 3 yearly cycle dependent upon type. In the event of a close in 3 phase fault, reactive maintenance is also undertaken. This has resulted in generally reliable service with appropriate service lives.

The replacement of all 1965 installed 33kV CBs and 11kV CBs at Waipukurau was undertaken during the 2009/10 year, as part of an asset renewal capital programme for 2009/10. The remaining circuit breakers are relatively new, have been well maintained and as such are expected to offer reliable service for the remainder of the planning period.

Maintenance Philosophy and Practice

Centralines has a policy of purchasing only circuit breakers of proven manufacture and reliability but recognises that a full reliable service life can only be achieved by conservative condition monitoring and sound operating and maintenance practices.

As mentioned above, circuit breakers are subject to a routine preventive maintenance programme, varied where any circuit breaker has been required to interrupt a high fault current fault. The reasoning for a routine based approach is due to the fact that some circuit breakers may not be

required to operate between maintenance intervals and are at risk of becoming slow to operate because of the mechanisms sticking. Regular time based maintenance is performed to ensure reliable operation.

Thermo-vision photography on an annual basis is also used as another means of non-invasive condition monitoring.

Partial Discharge Test

This is a relatively new tool for non-invasive condition assessment of insulation on indoor switchgear at zone substations. It measures and records audible discharges and transient earth voltages from insulation material. The information is then analysed and the location of the discharge identified. This test has been utilised at Centralines substations for the first time in the 2009/10 year and some activity has been identified. The Partial Discharge testing is now integrated into a regular maintenance schedule on a two year cycle with defects and areas of concern being tested more frequently.

6.2.8 Other Substation Equipment and Buildings

This category includes:

- Local AC and DC Supply;
- Secondary systems;
- Control Buildings and Grounds;
- Substation Earthing;
- Current Transformers and Voltage Transformers;
- Outdoor busbar and support structures;
- External switchgear.

Failure Modes and Risks

All of the above equipment is routinely inspected and maintained as detailed in Section 6.2, and is performing reliably. The asset renewal programme for 2009/10 included the replacement of aged CTs and VTs at Waipukurau substation during 2009/10, which was completed in conjunction with the 33kV CB replacement. The continuation of the approach of condition monitoring, routine maintenance and asset renewal of these assets is expected to proactively manage risk of in-service failures.

Maintenance Philosophy and Practice

All substations are inspected on a regular basis, with weekly detailed inspections (Level 2 inspections), annual thermo-vision photography, and six yearly inspection and maintenance of CTs, VTs and protection relays, with the exception of two yearly testing of voltage regulation relays. Station and equipment security is the primary driver for these inspections.

Generally maintenance is performed on defects identified by condition monitoring and routine inspections.

6.2.9 Distribution Transformers and Voltage Regulators

Failure Modes and Risks

Ground mounted transformers are often situated in locations frequented by the general public and therefore require adequate locking devices to prevent unauthorised access. Signs and notices are also placed on equipment to advise of the electrical danger, and these sites are visited annually for conditions assessment and general maintenance. There have been no in-service failures in recent years.

A proportion of the pole mounted transformers are mounted on two pole structures. These are predominately urban based larger transformers and are aged sites, with this design no longer in use. This design has been identified as a potential seismic risk due to the fixing security and are being progressively replaced with ground mounted transformers under the asset renewal programme on a priority basis. To date there has been no in-service failures due to this risk.

The main causes of failure for pole mounted transformers are lightning strikes, which are predominately installed without surge diverters. These are addressed reactively following failure. In addition, a small number of aged transformers are replaced annually as part of asset renewal projects. In brief, where a distribution substation structure is being replaced, where the transformer is greater than 40 years of age they are replaced as a matter of course.

Centralines has a small number of voltage regulators, which are regularly inspected and generally have performed reliably. The only instance of in-service failure has been limited to an aged voltage regulator site where a centre kingbolt became loose on a crossarm which fell, damaging a bushing and rendering the regulator unserviceable.

The main environmental risks are exceeding noise limits as defined in town planning controls and oil discharge when tanks fail from rust or damage.

Maintenance Philosophy and Practice

Transformers are inspected and condition assessed as part of the 5 year asset inspection programme for overhead transformers, and annually for ground mounted transformers. Defects are identified and remedial action scheduled as required.

There are a number of transformers at the end of their expected operational life that are still in service and there are no plans to systematically replace all transformers once they reach the end of their economic life. Rather the approach employed is more one of replacing at risk or defective units, with a small number of aged transformers replaced as part of larger asset renewals as opportunity arises. This approach has not led to large scale in-service failures experienced due to age, however this situation will be monitored.

Transformers that are retrieved from service are condition-assessed for re-use in the field. Relatively new, larger transformers recovered as part of an upgrade project are assessed for suitability for re-use. Older transformers recovered from the field are generally scrapped.

Regular condition monitoring of transformers including insulation testing or oil testing are not considered economic for these assets unless specifically required for the largest of distribution transformers following being exposed to a close in three phase fault.

Repainting of ground transformers is performed either following instances of vandalism such as tagging, or where the asset is assessed as deteriorating because of presence of rust.

All earths including transformer earths are tested on a 5 year cycle. Where single earths are located at transformer sites, these are upgraded reactively following identification.

Voltage regulators are inspected on a 2 monthly basis, with major maintenance conducted in accordance with manufacturer's recommendations.

6.2.10 Distribution Switchgear

This category includes:

- Disconnectors - Air Break Switches (ABSs) and Links;
- Ring Main Switches (RMS);
- Reclosers;
- Sectionalisers;
- Dropout fuses.

Failure Modes and Risks

RMS units have performed reliably to date as is expected for their age. These have been inspected annually as part of the ground mount transformer inspection programme and have not suffered any in-service failures.

Occasionally ABS contacts may not align correctly, or the operating rods have insufficient ability to close the contacts properly. These events are usually isolated to aged switches that are infrequently operated, and are rectified in a reactive manner. A number of in-service failures have been experienced in the past with "Canterbury" ABS switches, where the insulator failed destructively during a close operation, creating a reliability and safety issue. These have all been replaced.

Reclosers and sectionalisers have performed reliably to date, are subject to 3 monthly minor inspections and annual detailed inspections and function tests. In rescent years one in-service failure was experienced with a pole mounted 11kV recloser, which was a control circuitry failure that required the unit to be withdrawn from service and returned to the manufacturer. This appears to be an isolated incident.

Older dropout fuses are considered a higher risk during operation than the modern design types. The failure is generally experienced during the fuse close operation when the aged insulator breaks at the centre joint. An unplanned outage is then required to complete the replacement of the entire fitting.

All earths including switchgear earths are tested on a 5 year cycle.

Maintenance Philosophy and Practice

ABSs are visually inspected and condition assessed as part of the 5 year asset feeder inspections on a time based cycle, except for 33kV ABSs which are inspected annually. Defects are identified and actions taken as required. Given the age profile of ABSs, the asset renewal programme includes the pro-active replacement of aged ABSs.

RMS units are inspected annually as part of the ground mounted equipment inspection programme, and repainting of RMS units is performed either following instances of vandalism such as tagging, or where the asset is assessed as deteriorating because of the presence of rust.

Recloser, sectionaliser and remote control switches are maintained on a 3 monthly cycle, with annual major inspections and function testing. This inspection regime includes regular battery tests and battery replacements, which is believed to have contributed significantly to the reliable service experienced.

6.2.11 Load Control Plant

Failure Modes and Risks

Centralines purchased its ripple injection plant back from the retailer (Meridian). The ripple plant provides Centralines with the capability to manage controlled load within the network. This plant is maintained under contract and condition reporting made available to Centralines to enable understanding of any serviceability issues. As a result the plant has performed reliably to date. Although the plant is still performing reliably, it is scheduled for replacement during the 2012/13 financial year as part of the preventative renewal programme.

Centralines has in operation many hot water control circuits (pilot wire systems). When planning OHUG or LV distribution renewal projects these control circuits are discontinued and the load control equipment is fitted on the meter board of each ICP that has, or requires, controllable load.

During 2006/08 Arc Innovations undertook a major meter replacement programme and installed a modern smart meter system into the Centralines network that reduced the number of connections to the hot water pilot system.

Where an existing hot water control circuit fails beyond repair it is discontinued and the load control asset owner is requested to install individual control relays on affected ICP meter boards.

6.2.12 Miscellaneous Distribution Equipment

Failure Modes and Risks

There are no major issues with asset performance in this category, principally because the consequences of failure (loss of supply) associated with these items are usually localised.

Predominate failures include:

- LV Primary fuse bases associated with supply to an individual customer;
- Insulation failure of single insulated “jumpers” used to connect service mains to the overhead mains.

These failures are generally due to age, corrosion and deterioration, with low risk to network operations due to the localised impact of failures.

Maintenance Philosophy and Practice
There is limited ability to undertake preventative maintenance work on assets in this category and it is considered uneconomic to do so.

Pole mounted fuses and service jumpers are visually inspected as part of the asset inspection programme, but most replacements are identified when faultmen visit the assets to service a unit that has operated under fault.

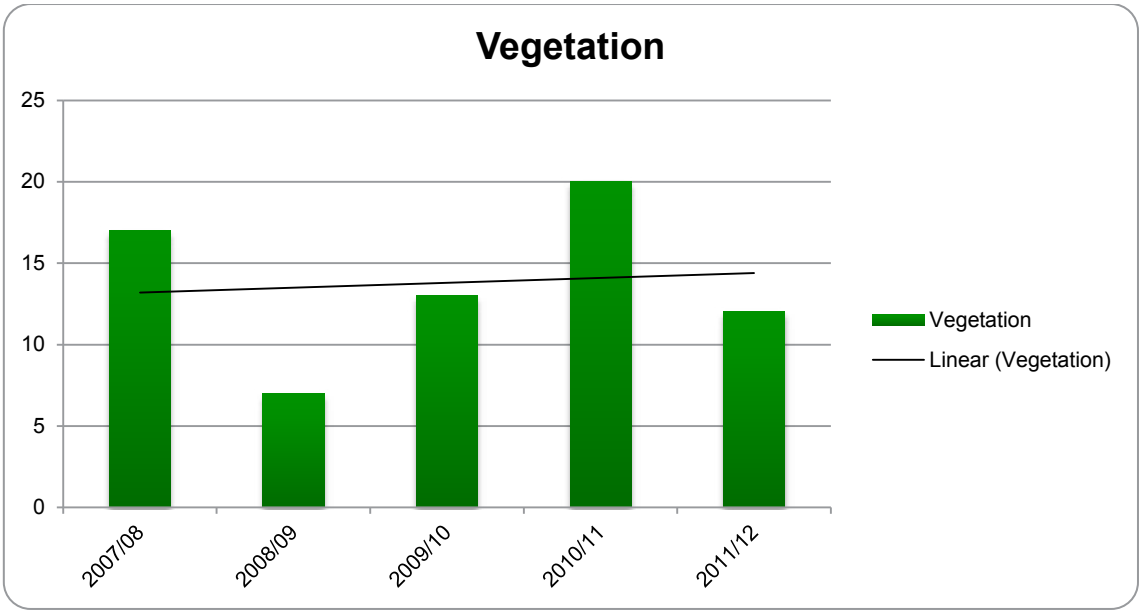
General conditions of fuses located inside transformer housings are checked as part of Centralines GM inspection regime.

6.2.13 Vegetation

Failure Mode and Risks
While trees are not a Centralines' asset, to enable economic and reliable performance of an overhead network a comprehensive management framework of vegetation is necessary. Centralines undertakes a vegetation management approach that involves the annual assessment of trees encroaching overhead lines, followed by a proactive approach to routine trimming dependent upon growth rates, or clearing where agreed.

In brief, routine trimming enables the achievement of minimum clearances to be maintained in accordance with regulated clearance zones. However, this does not necessarily enable a prevention of all tree related faults, with branches or trees from outside the clearance zones blown into the lines during adverse weather.

The number of faults caused by vegetation has been reasonably consistent in recent years. Graph 6-7 details the vegetation initiated faults on the network, which shows an increase in vegetation related faults in the 2010/11 year due to strong wind storms. Although wind gusts have been experienced as well in the 2011/12 year, vegetation related faults have reverted to normal levels due to an extensive Vegetation Control programme.



Graph 6-7: Vegetation initiated faults

No occurrences of vegetation growing into ground-mount transformer cabinets and causing flashover have been experienced, with existing annual inspection of these assets enabling proactive management of vegetation for these sites.

Maintenance Philosophy and Practices

Centralines currently employs dedicated vegetation staff to perform vegetation assessments, trimming and removal, as well as access to national contractors for the larger projects requiring additional resources. Relationships with Central Hawke's Bay District Council, Hawke's Bay Regional Council, and Department of Conservation are excellent with co-operation between parties enabling better tree management.

The recent assessments have enabled identification and prioritisation of vegetation works. As a result, expenditure has been increased substantially for coming years to enable a significant number of known problem sites to be proactively managed.

From a financial perspective, Centralines' undertakes vegetation control in private property on a first cut or trim basis at Centralines' expense, with recovery of expenses for any subsequent trimming from property owners.

6.2.14 SCADA Control and Communications

Failure Modes and Risks

To date, the SCADA infrastructure installed at Centralines has performed without fault. However, there is a variety of components at risk of failure. The most common cause of failures is anticipated to be:

- Electrical faults that affect the Rangitoto Radio VHF transmitter site on Tourere Hill. (This site has on-site automatic generator support in the event of loss of supply, mitigating the risk);
- Electronic component failures;
- Loss of power supply to an individual RTU;
- Computer server failures for the Abbey and RealFlex systems;
- Outages on the VHF channels.

Failure of these systems causes a considerable inconvenience, resulting in a reduced network outage restoration response, but does not compromise safety as manual systems can be used for switching of the network.

Maintenance Philosophy and Practice
Routine maintenance and condition monitoring cycles ensure these assets perform reliably and identify future renewal requirements.

Centralines is monitoring installed RTUs on a 3 monthly basis with particular focus on the battery systems built into the RTU and the Line Fault Indicators (where connected) to ensure communications, indication and control of the sites are maintained.

6.3 Non Network (Smart Grid) Solutions

In section 5.8 Centralines discusses the benefits of smart network technologies as non-network solutions. Centralines intends to follow Unison's lead in the use of the latest innovations. These new technologies also apply to life cycle asset management by providing improved information on asset health through condition monitoring and diagnostic information to predict remaining asset life. This should enable Centralines to extend the service life of its assets, and will become an integral part of the renewal investment programme.

Included in the network development programme for this planning period, is the installation of automated Entec switches programmed as sectionalisers. The ability of Entec switches to detect and isolate the fault quicker will improve the reliability of the Centralines network significantly. Additional benefits are the data provided by these switches to assist engineers in future network development planning.

6.4 Identification of Asset Replacement and Renewal Policies, Programmes and Actions

6.4.1 Asset Renewal Policy

Asset renewal is 'like for like' replacement of assets and encompasses two distinct modes: reactive renewal and preventative renewal. Preventative renewal is a planned project that replaces an asset

based upon a number of factors, such as condition and probability of failure. Reactive renewal is affected after an asset has failed in service, and is generally in the order of 150% of the cost of a preventative renewal.

Factors such as the consequence of failure, cost of inspection, and difference in cost between renewal modes are used to determine the optimal renewal mode for each category of asset.

Although renewals are seen as an inevitable stage in the life cycle of assets, they are undertaken only if supported by condition assessment as well as the economic trade-off between the future cost of maintenance and the cost of renewal. Centralines is in the process of implementing Unison's Renewal Envelope (RE), and the Triple-R Model (Repair, Replace, or Refurbish). Engineering judgment based on condition data is used to choose the optimal time for renewal of each asset.

6.4.2 Assumptions in Renewal Expenditure Modelling

The key assumptions underlying Centralines' approach to modelling renewals are:

- At a very high level, long run investment levels should be equal to the rate of depreciation;
- Network assets become less reliable as they age;
- There is a risk management trade-off between replacing assets preventatively (i.e. pre-failure) and replacing assets reactively (i.e. post-failure).

6.4.3 Replacement Costs

Replacement cost (RC) values are based on Centralines revised 2009 ODV valuation, adjusted by CPI, or updated based on latest market pricing where sufficient project history is available.

6.4.4 Renewal Envelope

Centralines is progressively implementing Unison's Renewal Envelope (RE) to determine the optimal level of renewal for its asset base. The RE envisages individual assets stepping through time and calculates a benefit:cost ratio of renewal for each year on the planning horizon. Where this ratio exceeds one the asset is flagged for renewal (or other remedial action depending on asset class).

The key input into calculation of the benefit to cost ratio is the cost differential between replacing assets reactively and replacing assets preventatively. To determine this, each type of asset is assigned a reactive to preventative cost ratio (R:P ratio). R:P ratios are calculated using a combination of historical project costs and assumptions about the points of differentiation between the two modes of renewal. The capital weighted R:P ratio across the total asset base tells us that on average it is 56% more costly to replace assets post-failure.

Inputs to the RE are:

- R:P ratio for each asset type;
- Remaining life expectancy for each asset;
- Replacement cost for each asset type;

- Scope of renewal for each asset type (is the whole asset renewed, or can some components be re-used?);
- Discount rate;
- Expenditure constraints (optional).

6.4.5 Indirect Renewals

There is potential for other categories of network expenditure to contribute to the asset renewal programme indirectly. Centralines' renewal modelling does not currently recognise this contribution, as the contribution is considered to be relatively insignificant given the annual capital expenditure levels.

6.4.6 Alternatives to Renewal

Replacement is only one option to restore asset performance. Other options that are evaluated include refurbishment, relocation, retrofitting or de-rating the assets and retaining them in service. In order to arrive at the optimal solution, Centralines is considering implementation of Unison's Triple-R model as follows:

The Triple-R model performs a comparative discounted cash flow analysis at the asset class level for the lifecycle of each applicable solution. The key inputs for this model are:

- The cost of each solution for the asset;
- Standard life expectancy of the asset;
- Expected increase in life expectancy of the asset;
- Annual maintenance cost of the asset.

6.5 Life Cycle Asset Management Expenditure Forecast

Centralines' asset renewal and refurbishment forecasts are developed based upon the asset management practices discussed in this plan. The forecasts are initially constructed from a top down perspective developed and based upon current service life expectations, depreciated replacement cost and company financial capability. This view is then compared to a bottom up, project specific perspective based upon already identified capital projects and programmes, as well as asset maintenance programmes including forecasts of defects based upon historical defect rates.

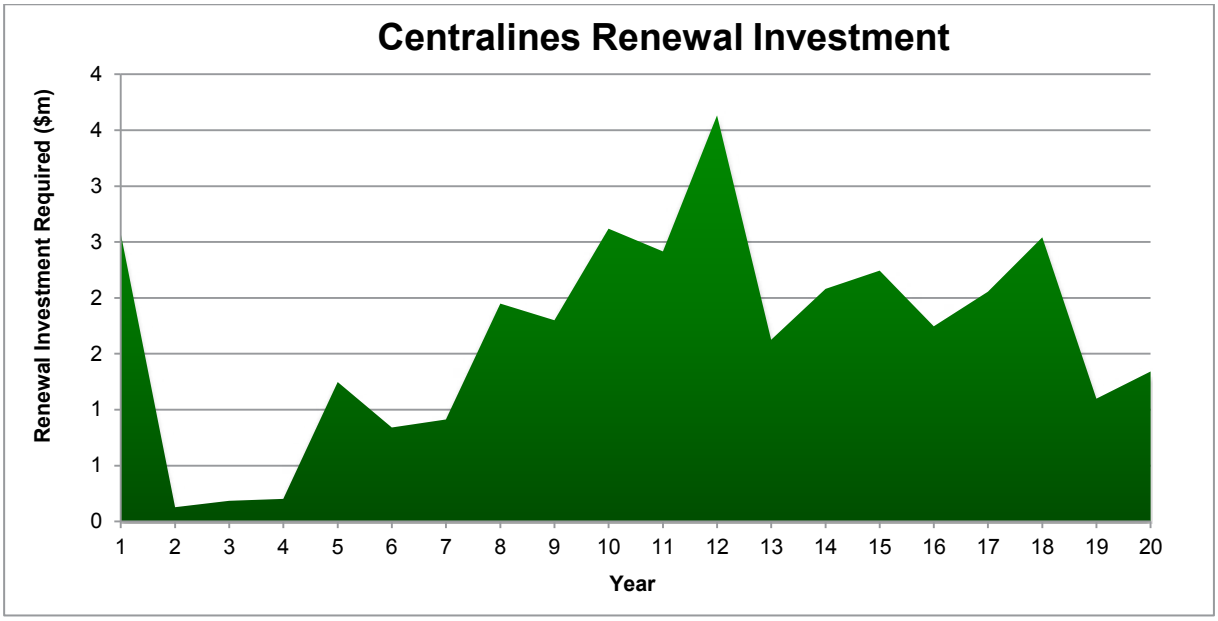
Centralines' asset management plan and resultant expenditure forecasts have evolved over recent years. This has been driven by the improvement in asset information and a focus on achievement of sustainable outcomes for the customers, stakeholders and the assets. The improved information has enabled improved forecasting of asset renewal and asset refurbishment requirements, and fine tuning of condition assessment requirements. The approach employed is enabling improved customer outcomes.

Centralines' asset management strategies and philosophies have not changed significantly since 2006, but the better understanding of asset condition and forecast expenditure requirements has resulted in a significant increase in forecasted capital and maintenance expenditure during the planning period, underpinned by an increased level of capital asset renewal projects and maintenance refurbishment works.

6.5.1 Renewal Expenditure Forecast

The initial step in deriving a renewal expenditure forecast at Centralines is to run the RE unconstrained (i.e. no bound on CAPEX from year to year). This provides a top down view of the renewal needs of the asset base (Graph 6-8).

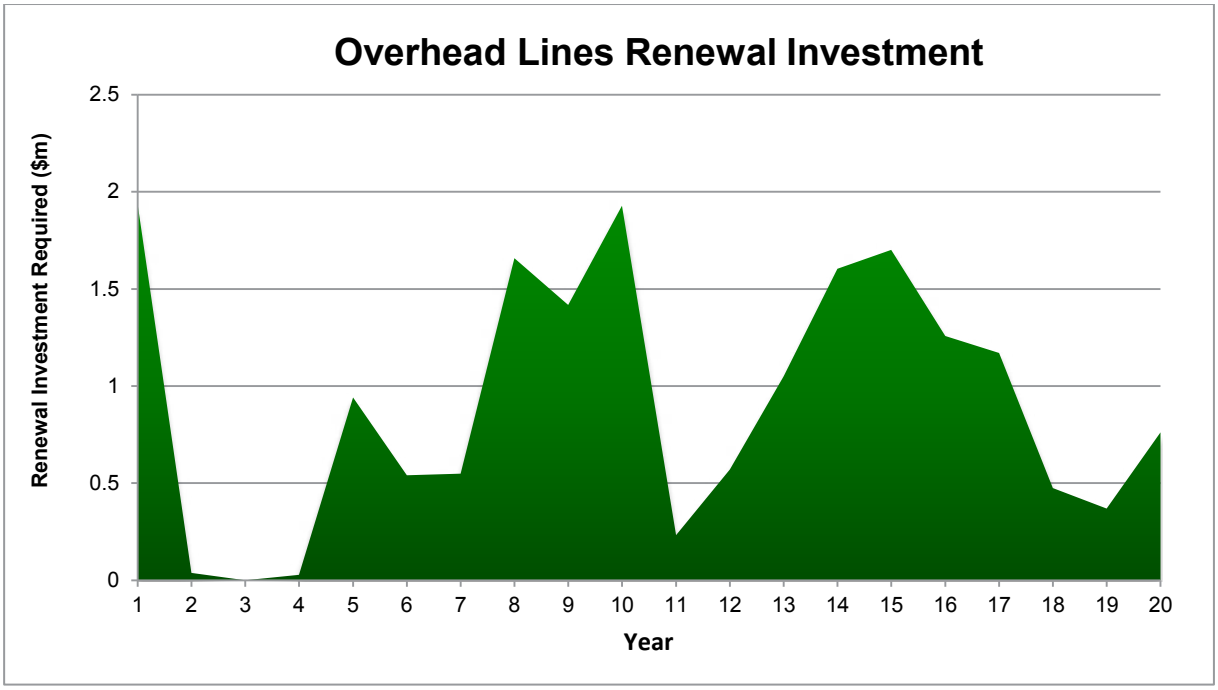
Features of the curve include the large spike in year one, reflecting a large number of assets operating beyond their expected engineering lives, and an upward trend in required investment over the planning period with significant spikes in years twelve and eighteen. These spikes are partially attributable to the fact that where age and condition data has been unavailable for assets, standard lives (and therefore RLE) have been set at default values. As asset condition data is collected for these assets over the planning period, it is expected that the spikes will be spread.



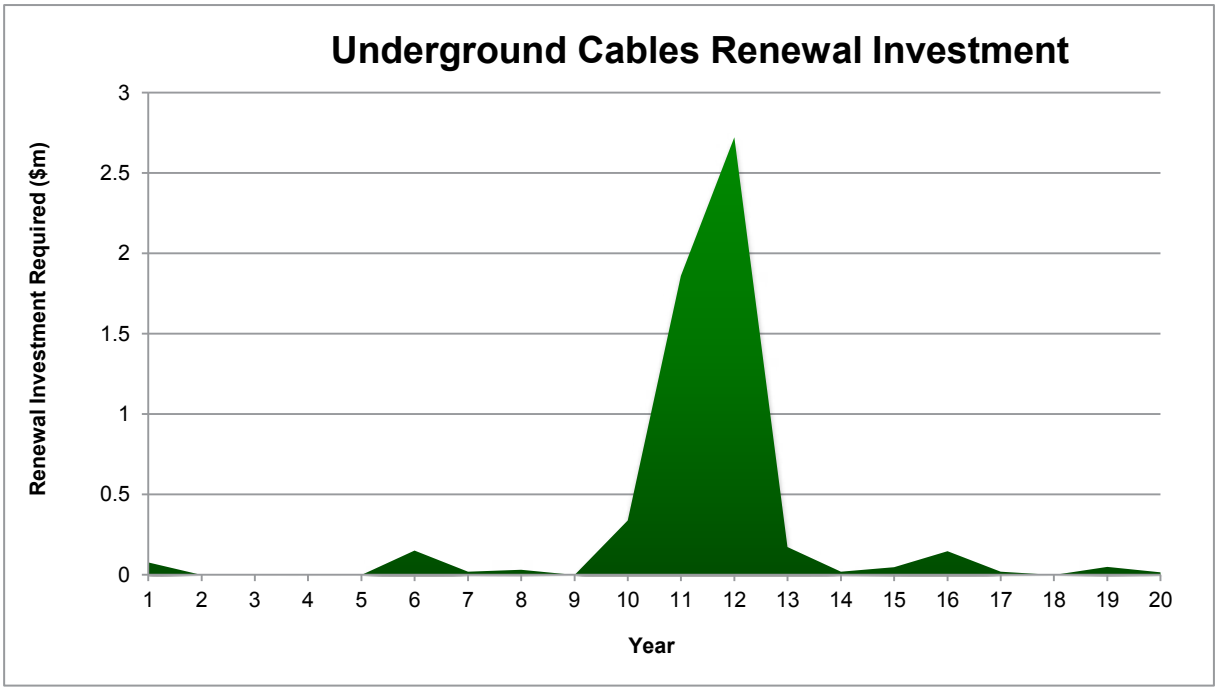
Graph 6-8: Centralines renewal investment

Asset Classes

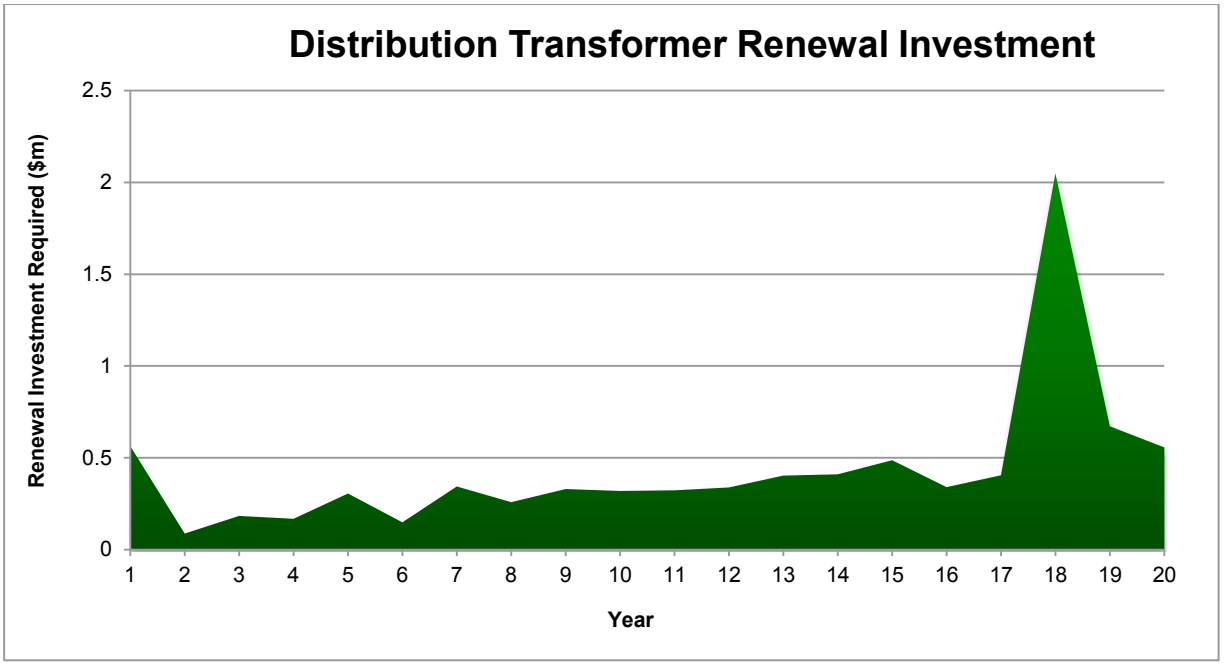
Centralines has adopted Unison's philosophy by using condition based maintenance and asset renewals based on asset condition surveys completed in accordance with the technical standards. The surveys are also used to assess remaining asset life, and are conducted on a five year cycle for distribution circuits and annually for sub-transmission. The results of these RLE assessments are fed back into the NRIM model.



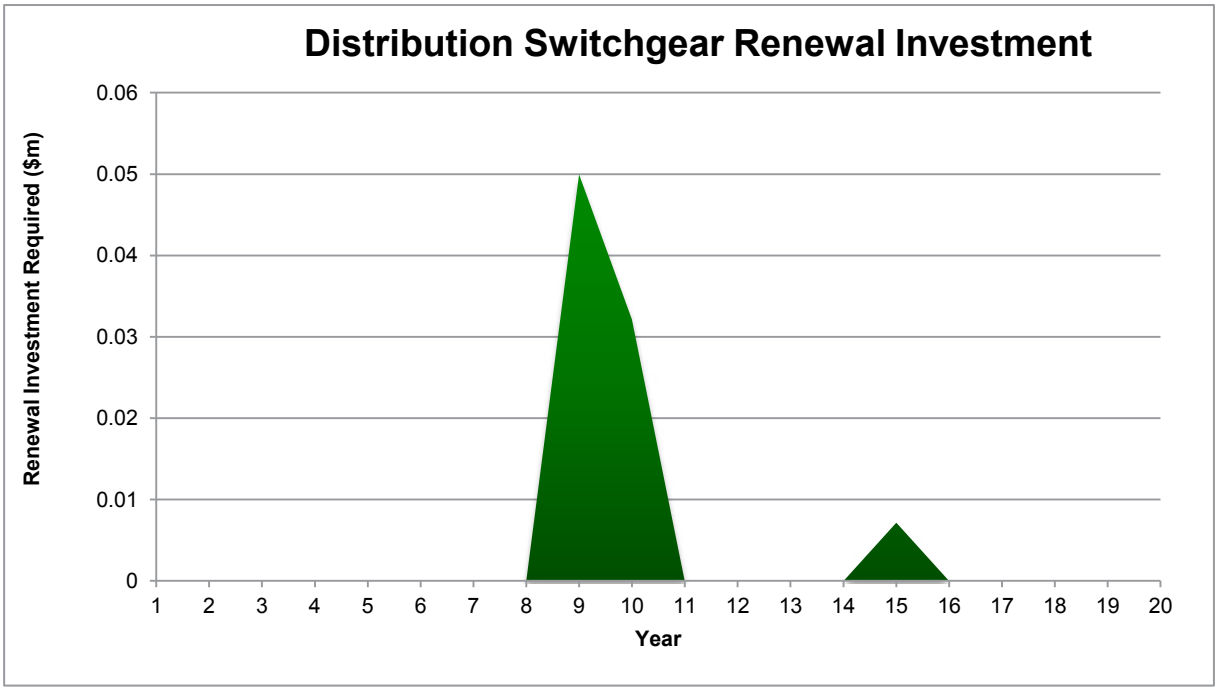
Graph 6-9: Overhead lines renewal investment



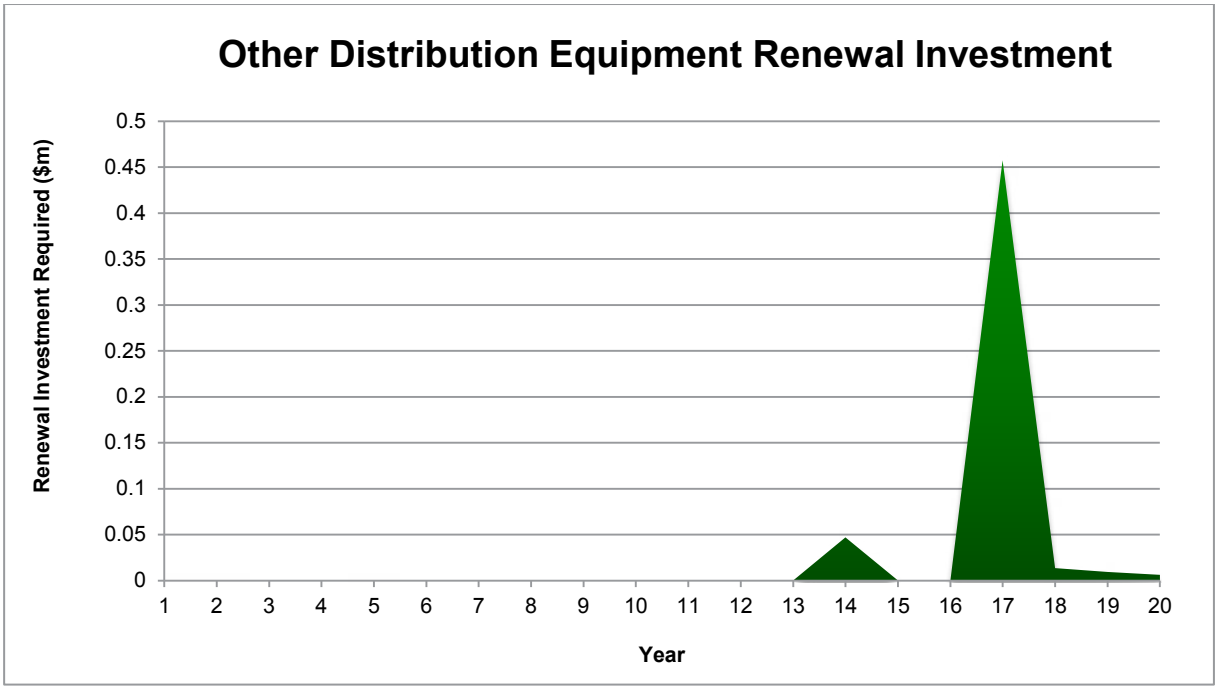
Graph 6-10: Underground cables renewal investment



Graph 6-11: Distribution transformer renewal investment



Graph 6-12: Distribution switchgear renewal investment



Graph 6-13: Other distribution equipment renewal investment

6.6 Summary of Renewal Projects Planned

The following section lists the proposed renewal Capex projects for the 2013/14 financial year.

Centralines also retains a provision to manage urgent projects that may be identified during the course of the year. Budgetary provisions for planned and reactive renewals have been included in the table below and an assumption has been made to include these in the overhead lines asset category.

2013/14

Asset Category	Project Name	Project Description	Estimated Expenditure ($000)	Project Status
Lines	Unplanned and Reactive Renewals	Provisional sum for the preventative replacement of aging assets, or assets which are in a poor condition, or deemed as unsafe. Reactive 'like for like' replacement of failed assets.	$300	New Project
Lines	Wilder Road 33kV Feeder Upgrade (Phase 2 of 5)	Preventative replacement of condemned poles and hardware, and the installation of additional staywires where required.	$150	New Project
Distribution Transformers and Regulators	Replacement of aged Long Range Road Voltage Regulator	Preventative replacement of aging asset.	$200	New Project
Lines	Feeder 1 (11kV) – Pole Feeder Maintenance	Preventative replacement of condemned assets.	$113	New Project
Lines	Feeder 2 (11kV) – Pole Feeder Maintenance	Preventative replacement of condemned assets.	$150	New Project
Lines	Feeder 4 (11kV) – Pole Feeder Maintenance	Preventative replacement of condemned assets.	$68	New Project
Lines	Feeder 74 (11kV) – Pole Feeder Maintenance	Preventative replacement of condemned assets.	$113	New Project
Lines	Feeder 75 (11kV) – Pole Feeder Maintenance	Preventative replacement of condemned assets.	$53	New Project
Lines	Feeder 76 (11kV) – Pole Feeder Maintenance	Preventative replacement of condemned assets.	$23	New Project
Lines	Feeder 78 (11kV) – Pole Feeder Maintenance	Preventative replacement of condemned assets.	$15	New Project
Lines	Feeder 91 (11kV) – Pole Feeder Maintenance	Preventative replacement of condemned assets.	$30	New Project
Underground Cables	Feeder 18 – Hill Street and Goodger Street 400V OHUG	Undergrounding of the aging 400V overhead network in Hill Street and Goodger Street.	$150	New Project

Table 6-1: Centralines asset renewal projects 2013/14

6.6.1 Proposed Renewal/Refurbishment Projects – 2014/15 to 2017/18

Project Name	Project Description
Abbotsford Road	Pole replacement, 11kV conductor and hardware upgrade and 400V OHUG.
Marlborough/River Terrace	Pole replacement, 11kV conductor and hardware upgrade and 400V OHUG.
Long Range Road	Pole replacement and 11kV conductor and hardware upgrade.
Farm Road	Pole replacement and 11kV conductor and hardware upgrade.
Acklin Street/Harris Street/Coughlan Road OHUG	Undergrounding of 400V and Streetlight circuits.
Church Street/Waverley Street Upgrade	Pole replacement, 11kV and LV conductor and hardware upgrade and undergrounding of the lines between Poles 904816 and 904818.
Takapau Substation – Removal of 11kV Overhead Structure	Removal of the entire structure with feeders coming straight from the circuit breakers. Install Ring Main Switches to retain the existing connectivity.
Feeder 1 Reconductoring	Upgrade the existing Ferret conductor to Dog conductor on feeder 1 (11kV feeder) between poles 910181 and 910219.
11kV Spur Line Reconductoring	Progressive replacement of aged No 8 Steel/Copper conductors on spur lines.
Waipawa Substation – 11kV Circuit Breaker Replacement	Replace all 11kV circuit breakers and protection equipment associated with the circuit breakers with modern equipment.
Takapau Substation – 11kV Circuit Breaker Replacement	Replace all 11kV circuit breakers and protection equipment associated with the circuit breakers with modern equipment.
Pole Feeder Maintenance – 33kV Feeders	Preventative replacement of condemned assets following the feeder inspection.
Pole Feeder Maintenance – 11kV Feeders	Preventative replacement of condemned assets following the feeder inspection.
Wilder Road 33kV Feeder Upgrade (Phases 3 to 5 of 5)	Preventative replacement of condemned poles and hardware, and the installation of additional staywires where required.
2-pole Transformer Structure Replacement	Progressive replacement of 2-pole transformer structures with ground mount tranformers (Target = 2 units/year).
11kV Recloser Replacement	Progressive replacement of aged 11kV Rcelosers (Target = 1 unit/year).
11kV Air Break Switch (ABS) Replacement	Progressive replacement of aged 11kV ABS's (Target = 7 units/year).
Unplanned and Reactive Renewals	Provisional sum for the preventative replacement of aging assets, or assets which are in a poor condition, or deemed as unsafe. Reactive 'like for like' replacement of failed assets.

Table 6-2: Centralines asset renewal projects/programmes 2014/15 to 2017/18

6.6.2 Proposed Renewal/Refurbishment Projects – 2018/19 to 2022/23

Included in the Unplanned and Reactive Renewals, there are a number of renewal programmes that are currently underway to renew ageing or at risk assets, which continue through for much of the planning period. These are:

- Replacement of two pole distribution transformer structures. Based on the current rate of replacement, this programme is forecast to conclude in the planning period;

- Replacement of timber poles. Based on the current rate of replacement, this programme is forecast to conclude in the planning period;
- Replacement of aged 11kV Air Break Switches. This replacement programme is structured to keep up with depreciation, and as such is forecast to continue beyond the planning period;
- Replacement of aged 11kV Reclosers. This replacement programme is structured to keep up with depreciation, and as such is forecast to continue beyond the planning period.

Beyond these programmes, the additional works anticipated to be undertaken between 2018/19 and 2022/23 is expected to be similar to the projects identified in Table 6-2 albeit at different locations on different feeders. The identification of the requisite works will be initially identified via the asset inspection programme, and is expected to progress in line with the overhead asset reaching end of life, and a renewal strategy being assessed as more appropriate than a refurbishment strategy.

SECTION 7 Non-Network Development Maintenance & Renewal

CENTRALINES
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SECTION 7 Non-Network Development Maintenance & Renewal

7 Non-Network Development Maintenance & Renewal

7.1 Information Management

Centralines have outsourced the majority of the information management platform, and utilise applications and infrastructure provided by Unison Networks Limited as part of the Unison Management Contract.

7.1.1 Decsription of Assets

Desktop Hardware
Centralines owns office and field desktop and mobile equipment.

Although not owned by Centralines, access to key assets are enabled by Unison:

Corporate Data Network
The Unison Corporate Network is based on the hierarchical internetworking model. The redundant Core/Distribution layer ensures that the network is able to provide the uptime demands that services such as SCADA require, and allow the network to be used for other business critical services. The network utilises switching hardware from HP Networking, firewall technologies from Juniper and Fortinet. The Core/Distribution network is connected to over 40 remote sites, including zone substations (using the Substation Network outlined above), branch offices, and other companies, primarly utilising services obtained from UnisonFibre.

Server Infrastructure
Unison provides server hardware from HP, and utilises virtualisation technology from VMware. Where possible Unison virtualises servers and applications, which offers Unison increase availability, reduced power usage, and overall total cost of ownership.

Storage Infrastructure
The storage area network (SAN) provided by Unison. The SAN enables Unison to provide an adaptable storage environment, where the increasing storage requirements can be met.

Unison has utilised the EVA technology from HP for the past nine years, and has recently introduced live, real time replication to another SAN located at the Unison DR ste.

7.1.2 Development, maintenance and renewal

The Unison Information Management Group (IMG) uses the ITIL framework to manage IT services and uses the Microsoft Systems Center Service Manager software platform to manage IT related requests (service requests including change requests and incidents).

The Unison Change Management policy defines the process relating to IT related service requests and incidents, in addition all change requests with a spend greater than fifty thousand dollars is

managed as a project and assigned an IMG project manager and governed by the IMG Project Management Policy and Guidelines

IMG provide a 24/7 service desk providing 1st to 3rd level support for business applications and communications, utilising vendor supplied maintenance and support structures where available. Unison Information Technology infrastructure is supported via internal resources, with onsite sparing, or Highly Available platforms deployed. Unison also has support contracts in place with our key technology partners.

All aspects of the Unison server, storage and network infrastructure are monitored for exceptions. An on-call engineer is paged in the event of abnormality, and service level agreements are in place with key hardware suppliers and service providers to provide extended support when required.

Hardware Replacement
Unison and Centralines ensures that all hardware is replaced before the end of its useful life expectancy. Each hardware category is replaced in line with the following, although in case where the equipment is still able to be supported by the hardware vendor, and is meeting the requirements of the business, the production life of the hardware may be extended. These replacements are ongoing:

Desktop Hardware
Centralines has a hardware refresh cycle of 3 years.

Network Equipment
Deployed with an expected 5 year life cycle, although parts of the current network have been deployed for 4 years, and is unlikely to be replaced in the near future as the equipment is still covered by vendor support, and meeting the requirements of the business.

Server Hardware
Replacement now between 3 and 5 years – depending on Server workload, additional support is purchased from hp to cover the additional years

7.1.3 Material Capital expenditure projects (5 year view)

Advanced distribution management system (ADMS)
The Advanced Distribution Management System provides SCADA functionality Supervisory Control and Data Acquisition services across the distribution network and introduces outage management, call and dispatch, automated fault location, isolation and recovery, optimised network planning functions and reliability reporting.

It also brings mobile crew management and network visibility to the workforce.

For Centralines, this project will align many current systems with those used and operated by Unison Networks Limited as part of the management contract.

Asset management information system

Centralines will migrate from the current WASP asset management system across to the Unison provided ACTIVA system, this is required to make full use of the GIS and ADMS applications.

Mobility tools

The maturing mobility landscape, particularly the availability of enterprise ready mobile devices has enabled Unison to establish a mobility programme on behalf of Centralines that will see significant numbers of mobile productivity tools and applications being deployed.

SECTION 8 Risk Management

CENTRALINES
LIMITED

SECTION 8 Risk Management

8 Risk Management

8.1 Introduction

Risk management is an integral part of Centralines' overall business philosophy. The company uses a Business Continuity Programme to oversee and achieve its business objective of having sound and systematic risk management practices deployed throughout all its business operations.

Centralines' overarching Business Continuity Management Programme has five interconnecting elements.

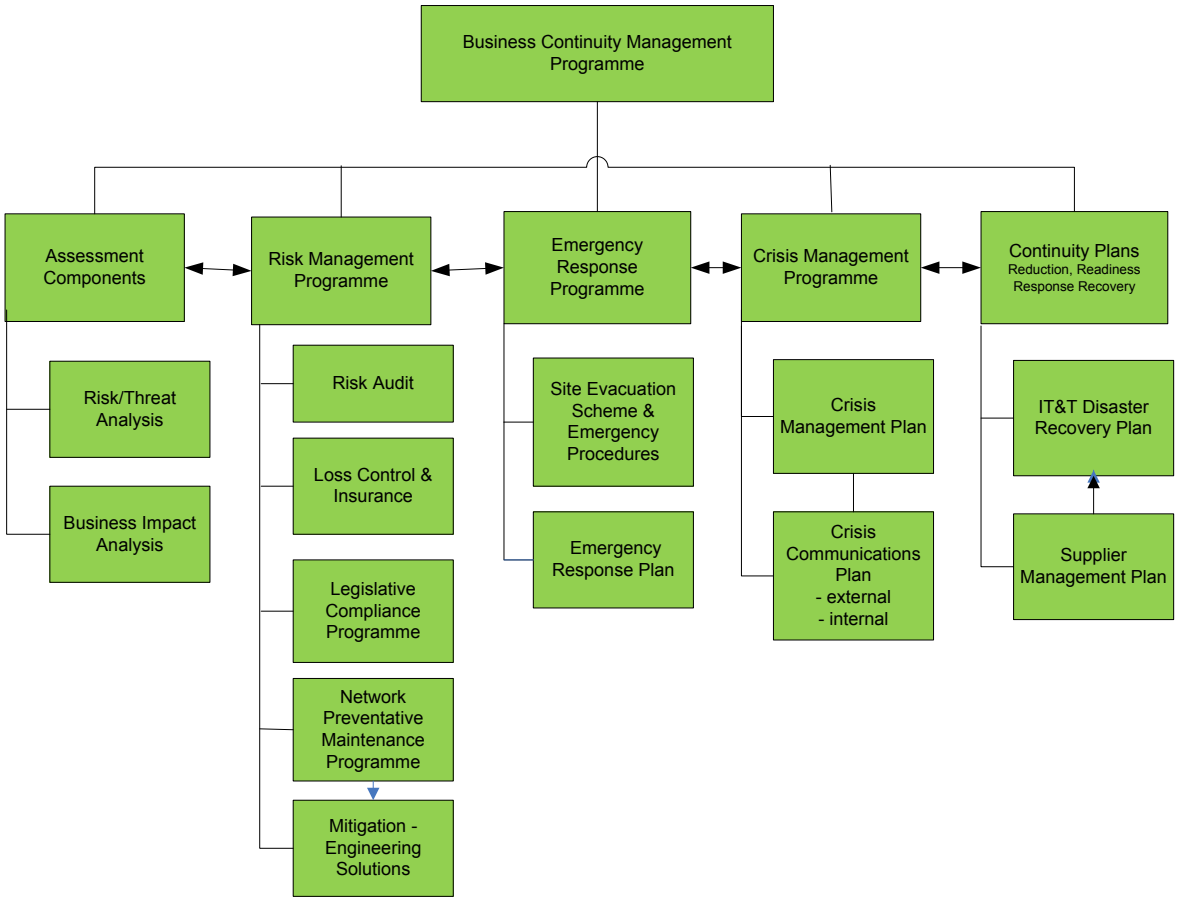

Figure 8-1: Centralines business continuity management programme

The assessment components drive all other aspects of the programme. The risk management programme covers the application of the framework within Company processes which are engaged in the control of identified risks and the remaining three elements – emergency response, crisis management and continuity plans – are all mechanisms for managing the residual risks to which the Company remains exposed.

Centralines' Risk Management Policy incorporates the key elements of the risk management process detailed in AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines.

SECTION 8 Risk Management

The Company has also established a formally constituted Audit & Risk Committee in late 2012. This Committee is charged with overseeing risk management and risk practices in the Company – although ultimate responsibility for risk management still resides with the Board of Directors.

8.2 Risk Management Policy

Policy Objective

The objective of Centralines' risk management policy is to safeguard Centralines' assets and interests, including certain interests of employees and the general public, during the planning and operation of its business.

Statement of Policy

It is Centralines' policy to:

- Systematically identify and assess risks to its assets, interests and employees and to the public and their property, through its business processes;
- Reduce or eliminate those risks to the extent this is cost effective having regard to the Company's tolerance for risk as defined in the policy;
- Minimise and contain the costs and consequences in the event of harmful or damaging incidents arising from those risks; and
- Provide for the continued provision of services through adequate and timely response, restoration and recovery.

8.3 Risk Management Framework

The risk management framework adopted by Centralines is linked to the strategic planning, business planning and budgeting processes. This facilitates achievement of the company's key objectives and delivers effective risk management activities. Centralines has adopted four key business strategies as the cornerstones for all operations and decision making:

- Building and growing an efficient, profitable business;
- Delivering stakeholder management and customer service;
- Actively and continuously improving processes, systems and operational performance; and
- Encouraging employee engagement, motivation and performance.

Key performance indicators underpin these strategies. Particularly pertinent from a risk management perspective are:

- Proactive management of key business risks; and
- Ensuring best practice health and safety.

8.3.1 Risk Responsibility and Governance

The Board sets and monitors the high level parameters for risk management across the business. As noted in the introduction, the newly established Audit & Risk Committee oversees the risk practices and makes recommendations, as necessary. to the Board. The Centralines Management Team facilitates risk management operationally and is also responsible for the implementation and monitoring of asset risk management strategies. The Area Manager and the Centralines Operations Manager are responsible for managing the risks within their areas of operation, in accordance with the established processes, parameters and guidelines.

8.3.2 Risk Tolerance

Electricity lines businesses have traditionally had a relatively low tolerance to risk exposure, as is appropriate for the essential service provided. Centralines concur with this view, and consider it appropriate given the central role the Company plays in the economic and lifestyle aspirations of their shareholders and customers.

Critical features in Centralines' risk tolerance profile are:

- Safety, both of our staff and of the community and its property;
- The need to convey electricity virtually continuously, and
- The need to maintain the Company's reputation and trading position in the long term.

The level of "acceptable risk" has been clearly defined within the risk management policy and communicated throughout the Company. Acceptable levels of risk are those assessed as having a rating of 2 or less:

- A low impact or a low likelihood, or
- A medium impact and medium likelihood.

Where risks are identified with ratings of 3 or 4, risk controls are applied as appropriate to either minimise or eliminate the risk, followed by monitoring to ensure adequate risk minimisation is sustained.

Table 8-1 details the risk matrix employed for the assessment and rating of risks.

		CONSEQUENCES			
LIKELIHOOD		**Low**	**Medium**	**High**	**Very High**
	Very High	2	3	4	4
	High	2	3	3	4
	Medium	1	2	3	3
	Low	1	1	2	2

Table 8-1: Risk matrix

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The risk mitigation priorities assigned to the risk rankings determined via the risk matrix are as follows:

- Risk level 4 (Red) – Unacceptable level of risk requiring immediate management attention. Effectiveness of controls subject to regular review.
- Risk level 3 (Orange) – High level of risk requiring implementation of risk control actions. Effectiveness of controls subject to regular review.
- Risk level 4 (Yellow) – Medium level of risk requiring implementation of risk control actions. Effectiveness of controls subject to operational monitoring.
- Risk level 4 (Green) – Acceptable level of risk. No controls necessary.

8.3.3 Risk Management Tools

8.3.3.1 Key Risk Register

Centralines currently manages the Company's key risks via an excel spreadsheet based risk register. Key risks tend to be those with low Likelihood but very high Consequence. Examples are set out in 8.4.1 following.

The reports generated for Centralines' Management Team and Directors highlight those instances where the current level of risk is greater than the level of risk Centralines is comfortable in accepting. The reports provide an oversight of the control measures for each key risk; and track progress in continuous improvement.

8.3.3.2 Legislative Compliance Programme

The Centralines Legislative Compliance Programme (LCP) provides an overview of the company's current state of compliance with its key legislative obligations. The LCP provides information for the Board of Directors and the Management Team on a 6 monthly reporting cycle. It highlights the corrective actions taken to address identified non-compliance issues, together with a summary of any general matters which may have arisen during the reporting period.

8.4 Risk Identification

In this section we focus on those risks which are specific to asset management. These risks are primarily those which impact on safety, security and continuity of supply.

8.4.1 Key Risks

Centralines' key risk register includes the following asset-related risks, as listed in Table 8-2 following.

Risk Title	Definition
Public Safety – Death or Serious Harm Injury Ref 7.9.5	Risk of fatality or serious harm to a member of the Public – through unauthorised access to Network assets, or as a result of a third party workplace accident or incident involving Network assets.
Workplace Safety – Employees and Contractors Ref 7.9	Risk of fatality or serious harm injury to a Centralines employee or contractor.
Network performance – Deterioration of Network Ref Section 4	Risk of a drop in Network Performance that is unacceptable to stakeholders and may place Centralines in breach of regulatory

Risk Title	Definition
	quality thresholds due to: • A deterioration in Network performance, as measured by SAIDI, CAIDI and SAIFI; • Failure to plan or to plan ineffectively; • Failure to develop, review and implement best practice EI Standards as Centralines Network Standards; • Impaired asset condition (network equipment failure), as a result of inappropriate prioritisation of identified defects and the associated allocation of resources at the operational level.
Loss of Mission Critical Systems Refer 7.8.2 & 7.8.5	Loss or failure of the IT Network, or key substation plant.
Catastrophic event with significant damage to Network assets Refer 7.7 & 7.8	Risk of a natural disaster (such as a major earthquake or volcanic event) may at any time affect a significant portion of the Network area, destroying or damaging assets.

NB: References to specific Mitigation Projects/Initiatives and Response Plans are noted beside each Risk.

Table 8-2: Key risks

8.4.2 Asset Risks

Sub-transmission assets (zone substations and 33kV feeders) have a more significant impact on the reliability of supply when they fail, compared to downstream distribution assets. Some assets may pose dangers to people if they fail in service, or fail to operate correctly. Table 8-3 below describes the critical assets, their associated risks and the mitigating actions adopted by Centralines to control the assessed risks.

Asset Category	Asset Location Level	Risk Type	Failure Mode/Risk	Consequences	Mitigating Actions
Network	Zone Substations	Network	Security breach by intruder/unauthorised access and contact with live parts	Injury or death of the intruder	Network competency and supervision procedures Network security – including: • Security fencing and signage • Network locks • Alarms linked to Control Room • Protocol for access - Restricted Area Entry • Station Entry Log to record legitimate visitors
				Loss of supply	Operational procedures for re-routing supply
		Customer	Interruption to supply caused by intruder interfering with or contacts equipment	Loss of Supply – resulting in loss of productivity, impact on medical dependencies and loss of security	All of the above measures; Operating Contingency Plans

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Asset Category	Asset Location Level	Risk Type	Failure Mode/Risk	Consequences	Mitigating Actions
		Centralines/ Contractor Personnel safety	Risk of contact with live parts Risk to personnel without required competencies	Injury/death	Network controlled locks and keys; Restricted Area Entry protocols; Centralines Competency Requirements; Centralines operating procedures; and Contract terms and conditions
		Public Safety / Property damage	Security Breach by a member of the public (unauthorised access) resulting in contact with live parts	Injury or Death	Security arrangements: • Security fence, intruder alarms; protocols for issuing network keys and locks • Warning signs • Emergency contact phone numbers displayed at the station
Power Transformers	Zone Substation	Network	INTERNAL FAILURES:		
			Massive loss of oil	Environmental contamination	Installation of oil containment system
			Oil leaks	Transformer outage	Regular inspections and repairs Availability of oil spill response kits
			Internal fault/s	Transformer outage	Annual DGA survey indication of potential problem from gas analysis
			Insulation Breakdown	Transformer outage	Insulation testing Depolarisation test Refurbishment
			Overload – Over-heating	Transformer outage	On-Line monitoring by the Control Room
			Failure from old age	Transformer outage	Transformer management Plan Replacement programme Availability of critical network spares
			EXTERNAL IMPACTS:		
			Corrosive environment	General mechanical deterioration	Regular Inspections Preventive maintenance
					Asset renewal

Asset Category	Asset Location Level	Risk Type	Failure Mode/Risk	Consequences	Mitigating Actions
			General deterioration	Mechanical failure of Tap Changer	Painting Refurbishment Regular Maintenance
			Work by inexperienced personnel (Lack of Qualified Staff)	Damage during maintenance	Training and/or supervision
		Customer	Transformer outage	Network Outage	N-1 Security
			Oil Spill	Environmental contamination	Installation of oil containment system Availability of oil spill response kits
		Centralines/ Contractor Personnel safety	Live Equipment Mechanical danger	Personal injury or death	Use of appropriate PPE Operating standards Training and supervision
			Oil spill	Environmental contamination	Oil spill response kits
			Inexperience of maintenance staff	Damage to equipment i.e. tap changers	Staff training/supervision and use of experienced maintenance personnel
		Public Safety / Property damage	Unauthorised access substation – contact with live parts	Access to live parts	As for substations above. Physical asset security – incl. fences, locks, monitored alarms; Public education programmes; Control of alternative methods of access (adjoining structures and vegetation)
			Contamination of ground water by oil	Environmental damage; Drinking water affected	Installation of oil containment system Oil spill response kits
33kV Porcelain Insulators	Zone Substation Sub-transmission Lines	Network	Type Failure	Network Outage	Ultrasonic Survey of installed same-type insulators
			Insulation Failure	Flying materials porcelain	Cleaning programme
			Contamination	Outage	Feeder Inspections
		Customer	Insulation failure	Outages	As above (Network)

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Asset Category	Asset Location Level	Risk Type	Failure Mode/Risk	Consequences	Mitigating Actions
		Centralines/ Contractor Personnel safety	Insulation failure	Flying materials (porcelain)	Appropriate PPE and work procedures
		Public Safety	Insulation failure	Being hit/injured by flying materials (porcelain)	Substation and worksite security Follow-up on type failures Maintenance programmes
Circuit breakers	Zone Substation/ sub-transmission lines Distribution lines	Network	Fail to operate Slow to operate Insulation Failure	Network Outages - Operation of next upstream device causing larger outage Network Outage	Regular preventive maintenance Partial Discharge Survey
		Customer	Equipment failure	Network Outages	Back feed Parallel supplies Provision of generators
		Centralines/ Contractor Personnel Safety	Work by inexperienced personnel	Damage during maintenance	Training/supervision Deployment of experienced staff
		Public Safety / Property damage	Contact with live equipment	Injury or death	Testing, inspection and maintenance programmes
Protective equipment: batteries and battery chargers	Zone Substation 11 kV switches	Network	Battery Failure	Loss of SCADA control Loss of protection	Regular Inspections Battery Testing Battery Monitoring
		Customer	Above failure	Network outages	As above
		Centralines/ Contractor Personnel safety	Contact with battery acid	Injury / burns	Use of task-specific PPE
Protection Relays and Schemes	Zone Substation Sub-transmission network Distribution network	Network	Mechanical relays fail or slow to operate	Operation of upstream device causing larger outage than necessary	Fault Analysis Regular Testing Protection Relay Upgrade to Microprocessor Relays
		Customer	Above failure	Network outage	As above (Network)
		Centralines/ Contractor Personnel safety	-	-	No exposure as able to download fault info on-line
		Public Safety / Property	Loss of protection – risk of contact with	Injury / death	Regular inspections; Monitoring and testing of

Asset Category	Asset Location Level	Risk Type	Failure Mode/Risk	Consequences	Mitigating Actions
		damage	live parts		protection schemes.
Old XLPE cables	Sub-transmission Lines; Distribution Lines	Network	HV cable failure from XLPE Water Treeing	Network outages	Progressive replacement of cable
		Customer	Above failure	Network outages	As above
		Centralines/ Contractor Personnel safety	HV for Testing	On-site injury	Use of task-specific PPE Follow Test Procedures
		Public safety / Property damage	Public access to worksite	Injury	Control of site Fence off hazards
Timber Poles	Distribution Lines	Network	Failure/collapse due to deterioration through age	Network outages	5 Year Asset Inspections to monitor condition; Planned asset renewal programme targeting high risk replacements
		Customer	Pole collapse or failure	Loss of supply Damage to property (possible fire)	As above
		Centralines/ Contractor Personnel safety	Pole collapse or failure	Injury to persons, damage to property, loss of supply	Below ground inspection prior to climbing for any purpose, or works conducted from EWP
		Public Safety	Pole failure or collapse	Injury to persons, fire or damage to property	Condition inspections Asset renewal programme
11kV Feeder Structures	Distribution Lines	Network	Flashover during Fault	Loss of multiple 11kV feeders terminating at structure; Network outages	Progressive replacement of structures to enable greater physical separation between feeder terminations
		Customer	Flashover during Fault	Loss of supply	As above
		Centralines/ Contractor Personnel safety	Flashover during Fault	Burns arising from close proximity to high fault current during switching operation	Operating procedures and Hazard management procedure
		Public Safety	Flashover during Fault	Burns arising from close proximity to high fault current during fault situation	Public education Warning Signs

Table 8-3: Asset risks by failure mode

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8.4.3 Natural Hazard Risks

Earthquake risk continues to be regarded as the maximum credible natural hazard threat within the Centralines network area. This is in line with the findings of hazard studies undertaken by the Hawke's Bay Civil Defence and Emergency Management Group.

Hawke's Bay is one of the most earthquake-prone regions in New Zealand with 22 active faults and folds that are capable of producing very strong earthquakes. As a consequence the following effects add to the vulnerability of the electricity network:

- Ground shaking;
- Grounds rupture and heave;
- Liquefaction potential; and
- Slope instability.

As the Central Hawke's Bay region is reasonably distant from any active volcano it is not at risk from the highly damaging near-source effects of a volcanic eruption, however it is likely to be affected by volcanic ash fall and associated hazards should an eruption occur in the Tongariro National Park.

Any significant eruption would affect the Central Hawke's Bay region if the wind were blowing from the volcano towards Hawke's Bay (as occurred to a limited extent in the 1995/1996 events).

The impact of a volcanic event was tested in a regional civil defence exercise in 2006. It is unlikely that Central Hawke's Bay would be materially affected unless the event proved catastrophic. It is therefore, most likely that Centralines would be in a position to provide support to Unison Networks or another affected lines company in such an event.

Storms and flooding are the natural hazard events that most frequently impact Central Hawke's Bay and for which the Company maintains an Emergency Response Plan (refer Section 7.8 - Response to Network Incidents and Emergencies).

Other potentially significant risk events that have been considered include tsunami, snow storm, landslide and fire.

8.4.4 Network Equipment Failure

Determining the risk of asset failure is the responsibility of the Centralines Management team who draw on both experience and historical data and records.

Asset lifecycle planning is dealt with in detail in Section 6 where failure modes and risks are explored by asset class and Centralines' maintenance philosophy and replacement practices are detailed.

Centralines lifecycle forecasts are developed in consideration of, and in conjunction with the development of the inspection and condition assessment regime, utilising predictive analysis tools.

The asset categories with the highest inherent risk ratings (low likelihood and high consequences) are:

GXP Substation

The control and ownership of the Grid Exit Point (GXP) substation at Ongaonga rests with the National Operator (Transpower) and supply loss to GXPs are under their control. An event leading to an outage of this GXP will have an impact on all Centralines zone substations.

Zone Substations

Part of Centralines' security criteria (refer Section 5) includes mitigating options for the loss of supply from a zone substation or zone substations.

Because different levels of security exist for different areas affected, substations supplying critical load areas, such as CBDs and major customers have a higher level of redundancy than substations supplying remote rural areas, with multiple sub-transmission supply options and good 11kV interconnectivity to ensure sufficient capacity from neighbouring substations. A detailed operational management plan exists for each of Centralines zone substations.

The only zone substation in the Centralines network where this is not achieved currently is the Takapau zone substation, which is considered a critical site as it supplies a large industrial customer. There are plans to install a second sub-transmission supply to this substation in the future.

Overhead 33kV feeders

The impact on customers following an outage of a 33kV overhead line depends on the applicable level of security based on the security criteria. Currently, Waipukurau and Waipawa have n-1 security on the 33kV network, enabling 33kV supplies to be switched to an alternative 33kV supply in the event of a fault.

Sustained faults to the 33kV feeders where n security exists will currently result in a sustained outage.

For sustained 33kV faults to the overhead line supplying the Wilder Road substation, the operational contingency plan allows for alternate supply via the 11kV network. A recently installed regulator on the 11kV at Wanstead ensures compliant voltage is maintained until the 33kV is restored.

For sustained 33kV faults for the line supplying the Takapau substation the operational contingency plan only allows for rectification of the fault. This is considered an acceptable risk due to its ready access, the short length of the feeder, the condition of the feeder and consequently the high probability of rapid restoration. To date there have been no sustained faults on the Takapau 33kV feeder.

Overhead 11kV feeders

The level of interconnectivity between 11kV feeders of neighbouring substations will depend on the supply area and customer grouping. The more critical the load, the more interconnected the 11kV network is. To this end, there is a substantial degree of 11kV interconnectivity within the Centralines network, enabling extensive contingency options in the event of 11kV outages. The replacement of the transformers at Waipawa has corrected the incompatible vector grouping, allowing easier transfer of loads between the substations.

Generally the 11kV security is such that an outage to an 11kV feeder supplying a CBD load will last only minutes as breakers can be operated both manually and remotely to ensure continuity of supply.

An outage to a feeder supplying a remote rural load does not have the same level of connectivity to neighbouring feeders, and as such will experience more lengthy outages in the event of a sustained fault.

Load Control (Ripple System)
As discussed in Section 3.5.8, Centralines purchased the ripple plant back from the retailer (Meridian). The load control plant is operated and remotely controllable by Centralines from the Unison Hastings Control Room.

Given that the loading of Centralines assets is relatively low, load control is used predominately to enable an appropriate load factor, and ensure appropriate voltage regulation particularly to the rural extremities of the network during peak loading periods.

The loss of the load control equipment for Centralines would result in the inability to curtail approximately 15% of load, with financial impacts should this occur co-incident with peak Transpower system loading.

SCADA System
SCADA is the key tool for monitoring and operating the Centralines distribution network in real time. The alarms notify potential or actual equipment operation or failure.

Without the SCADA Network Controllers would be blind in real time to what is happening on the network. This would affect Centralines' response capability, resulting in longer than necessary outages.

To counter this risk Unison's Control Room situated in Hastings, which is also the primary point of operational control has established an alternate operations centre (AOC) with SCADA and corporate computer systems to be used when the main control centre is not accessible or non-operational.

Further, the following levels of redundancy have been incorporated into the Centralines SCADA network:

a. Additional VHF channels made available for SCADA communications; and

b. Alternate communications links to Hastings, via either fibre or the Airnet network, enabling continued SCADA control from Hastings.

8.4.5 Environmental Risk

Many of Centralines' assets contain hazardous substances in varying quantities. Mitigation of both the likelihood of asset rupture and consequence are a focus area for Centralines.

As a responsible member of the New Zealand business community, Centralines recognises the interaction between electricity and the environment and aims to achieve and maintain a compliant standard of environmental care. Centralines has already taken the necessary steps to meet its statutory obligations in accordance with the Resource Management Act 1991 and other relevant legislation.

Ongoing compliance is assessed through the Legislative Compliance Programme.

Centralines aims to achieve continuous improvement in its environmental performance.

8.5 Risk Assessment

8.5.1 Evaluation Process

The Network Development Planning process, Investment Prioritisation Tool (IPT) and the maintenance programme are the primary mechanisms for assessing and prioritising risks pertaining to network assets (refer Sections 5 and 6).

The Network Development Plan is prepared annually to identify the current and forecast limitations associated to the network. In response to these limitations, projects are scoped and included in the IPT for consideration against all identified requirements for network capital expenditure. The IPT is a multi-criteria decision tool and is used to prioritise capital projects across categories (system growth, asset replacement and renewal, reliability, safety and environment). The tool makes use of key drivers prioritised by the company to ensure a managed risk profile for prioritising capital projects.

The maintenance programme incorporates an asset inspection regime which is part of the network preventative maintenance programme, which ensures that all assets are inspected on a regular basis for statutory compliance and public safety, with repairs completed as required and in accordance with regulation.

8.6 Risk Mitigation

8.6.1 Natural Hazard Mitigation

Asset-specific mitigation activities include:

- Strengthening of all electrical equipment installed in substations to protect assets from the impact of earthquakes (seismic strengthening);
- Locating (where possible) substation sites away from areas at risk from landslides or serious flooding;
- Maintaining sufficient partial load shifting capacity in the Central Hawke's Bay region, in the event of an incident;
- The design of all electrical connections with adequate clearances to cope with wind, snow, volcanic ash etc;
- Installation of oil bunding at all new sites where significant quantities of oil are held, and where it is required by the Territorial Local Authority;
- Progressive replacement of legacy structures susceptible to failure during seismic events (e.g. two pole transformer structures).

8.6.2 Engineering Solutions

Design and Construction standards provide engineering controls and direction on all engineering and safety aspects of physical works on Network assets. Centralines employs Unison design and construction standards.

As part of Unison's continuous improvement programme, engineering standards covering design and construction practices are updated from data received from condition assessment activities. This has proved an effective tool, supplying information on aspects of current practice that can be improved.

Network design is also continuously reviewed to ensure that current engineering practice and network configuration is delivering satisfactory performance, providing sufficient operational flexibility, and allowing sufficient alternate configurations in the event of asset failure, thereby mitigating high risks from reliance on key assets.

To this end the single transformer substation at Wilder Road has been assessed as requiring a transformer foundation upgrade, to enable the installation of a larger 7.5MVA transformer from Waipawa substation, in the event of failure of the existing 2.5MVA unit currently at site. A project is being considered for the 2013/14 capital programme to progress this upgrade.

Obsolescence of network assets is also monitored. Assets where spare parts are no longer available represent a higher operational risk. Centralines has to plan for increased outage times due either to longer lead times from manufacturers supplying unique parts or to the time taken to totally change out those parts and replace them with readily available current equivalents. These risks are limited to substation assets.

8.6.3 Equipment Failure Mitigation – Maintenance Programmes

8.6.3.1 Reactive Maintenance

Centralines is responsible for the restoration of service and supply throughout its Network with backup from other EDBs and external contractors if necessary. The internal first response capability is supported by a comprehensive internal second response capability. Where faults, defects and/or losses suggest asset replacement or augmentation is required then a risk assessment is instigated (involving Unison Network Development Engineers) to determine the most appropriate permanent solution.

8.6.3.2 Preventative Maintenance Programme

The asset inspection regime forms part of the network preventative maintenance programme, and provides assurance that all assets are inspected on a regular basis for statutory compliance and public safety. Defects identified during the inspection process are recorded, prioritised and remediation works planned within an appropriate time frame, in accordance with regulations. These inspections include:

- Ground-mounted Asset Inspection Programme – this has a particular focus on security and public safety;

- Network condition assessments of feeders, including installed distribution switchgear, conducted from the ground, using specialist equipment and techniques to highlight potential defects on the overhead distribution network;
- Poles - non-destructive testing, visual inspections and compliance with minimum clearances;
- Earthing installations – assessing compliance to earthing standards and carrying out remedial action as required;
- Substations – Cyclic inspections and maintenance activities at all zone substations.

8.6.3.3 Specific Renewal Projects to mitigate risk of failure

The asset renewal capital programme is utilised to enable the following assets to be systematically replaced:

a. Two-pole structure distribution substations are progressively being upgraded to ground-mounted substations. This is to mitigate risk associated with seismic events, which could see a transformer fall from these structures. Priority is given to those in areas of high density population;

b. Timber Poles. The risk of pole failure has implications for the safety of personnel working on or near the poles and to the general public and their property in the vicinity of such poles;

c. Air Break Switches. The risk with these assets is primarily loss of supply due to unreliable operational performance;

d. Reclosers. The risk with these assets is primarily loss of supply due to unreliable operational performance;

e. Regulators. The risk with these assets is primarily loss of supply due to unreliable operational performance.

8.7 Risk Readiness

Risk readiness encompasses all aspects of preparedness for Network incidents, emergencies and/or disasters. This entails development, maintenance, testing and reviewing of response plans as well as engagement with the Civil Defence Emergency Management sector through networking, joint planning and Lifelines Group participation.

8.7.1 Development, Maintenance, Review and Testing of Response Plans

Centralines Emergency Response and Crisis Response Plans form part of Unison's Business Continuity Planning. They are controlled documents that are tested annually, and are subject to a critique following every exercise, or real-time activation.

A report of issues raised is submitted to Management Team with Recommendations for improvements and an Action Plan for their implementation.

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8.7.2 Civil Defence Emergency Management Engagement

Because of their importance to the nation, lifeline utilities (which include by definition the electricity sector) have clear responsibilities and roles stipulated in the Civil Defence Emergency Management Act 2002.

Centralines recognises its statutory obligation to:

- Plan for and be able to ensure continuity of supply, particularly in support of critical Civil Defence Emergency Management (CDEM) activities;
- Be capable of managing its own response to emergencies;
- Develop plans cooperatively to coordinate across the electricity industry and with other sectors;
- Establish relationships with CDEM Groups.

At the Hawke's Bay CDEM Group level, the Unison Operations Manager holds the Regional Electricity Adviser role, representing Centralines as well, and in a state of local emergency would act as a conduit between the regional electricity industry participants and the Group Controller with information on the status of supply across all the region's electricity networks.

8.8 Response to Network Incidents and Emergencies

8.8.1 Emergency Restoration Plans

The major risks to Centralines' electricity distribution network have been identified as:

- Asset damage (due to natural events or human activity);
- Network equipment failure (including substations); and/or
- Failure of supply from Transpower.

All emergency response activities associated with the continuity of electricity supply within the Centralines network area are governed by the Company's Emergency Response Plan.

The plan is tested in conjunction with the Crisis Management Plan. The Hawke's Bay CDEM Group has published its Adverse Events Plan, and Centralines' arrangements are compatible with regional arrangements.

8.8.2 Alternate Network Operational Control Centre

Having identified a potential exposure to the risk of events that could strike control systems fundamental to Centralines' core role of maintaining continuity of electricity supply, the Operational Control Centre service provider (Unison Networks Limited) has developed an alternate Network Operational Control Centre. The control functions at risk are:

- Monitoring of supply – the process of electronically monitoring the performance and status of equipment in the network; and

- Continuity of supply – the ability to manage assets as part of the network, in order to maintain supply and to de-energise and re-energise equipment before and after physical work is done to the assets.

8.8.3 Centralines' Crisis Management Plan

This plan provides for the strategic oversight of any adverse event affecting the Company irrespective of whether that event involves a worksite, the network, the Company's reputation or brand, or the safety and security of personnel, members of the public or Company assets.

The escalation to crisis level is determined by the event's magnitude, impact and associated risks and/or as deemed by the Chief Executive to require executive involvement or specific management coordination.

The plan is tested annually and to date exercises have covered:

- A major incident at a zone substation co-located with the GXP together with a communications failure between Centralines and the Unison Control Room;
- Centralines' response to a pandemic influenza outbreak which dramatically reduces the workforce; and
- A regional flooding event which was coordinated by the Hawke's Bay CDEM Group.

8.8.4 Centralines Pandemic Influenza Contingency Plan

The purpose of this plan is to manage the impact of an influenza pandemic on both employees and on the business, by addressing:

- Containment of the disease (reducing the risk of its being spread from employee to employee) – including health measures and social distancing;
- Continued delivery of critical business activities (taking into account the increase in absenteeism caused by the pandemic). This has covered identification of key staff, provision of remote access to IT systems, and re-evaluation of stock levels and fuel supplies for such an event;
- Actions identified in the crisis management exercise based on a pandemic scenario have highlighted specific issues that have been addressed.

8.8.5 IT Disaster Recovery Plan

A complete IT Disaster Recovery (DR) facility is provided to Centralines via the Management Services Agreement with Unison. The facility is co-located with Unison's Alternate Operational Control Centre at Eastbourne Street in Hastings. The IT DR Plan includes critical data.

A recent Unison Business Continuity exercise successfully tested (as far as was possible without impacting on Supply and Service Agreements) the ability of the Company to switch to the back-up site and maintain overall control and management of the network.

Work is continuing to ensure that Centralines requirements are met by the current capability and capacity of the IT-DR site.

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8.9 Health and Safety

The ongoing Health and Safety of staff and community is central to the objectives of Centralines. To this end significant progress has been made in raising Health and Safety awareness within Centralines, and in improving health and safety performance.

8.9.1 Health and Safety Policy and Company Commitment

HEALTH AND SAFETY POLICY 2011

CENTRALINES is committed to the health and safety of our employees, contractors, customers and community. Our objective is to achieve an injury-free workplace by creating a culture where each person truly believes that 'Safety First' is a core value and that working safely is part of all employees' everyday activities.

Centralines will

- Comply with all statutory health and safety requirements and other relevant standards or codes.
- Implement safety initiatives that address priority issues, facilitate early intervention, develop knowledge, and reduce the potential of an incident/accident occurring.
- Provide all necessary safety resources.
- Continue a risk management approach, in consultation with employees and contractors, to identify, assess and control risks to a level as low as reasonably practical.
- Consult with employees about health and safety matters to identify ways of reducing risks and improving systems.
- Provide education for our employees so they can perform their duties safely.
- Ensure all accidents, incidents and near misses are accurately documented, investigated and reported on so action can be taken to reduce likelihood of recurrence.
- Reward positive safety behaviour.
- Take disciplinary action when people disregard health and safety procedures and practices.
- Regularly audit safety practices and management systems.
- Provide an effective system of rehabilitation management for injured employees.
- Regularly monitor, review and report on health and safety performance against agreed targets.
- Continue to incorporate ZIP® concepts and processes into uor everyday working procedures and policies to help consolidate our core value of 'Safety First'.

Your Responsibility:

- Adhere to CENTRALINES' company policies, procedures and instructions.
- Take personal responsibility to maintain your own health and safety.
- Stop work and immediately report to your supervisor any hazards that cannot be appropriately controlled.
- Do not act in a manner that places yourself or others at risk of injury or illness.
- Promptly report all near misses, accidents and incidents.

Remember, <u>no task</u> is so important that you need to place yourself at risk.

8.9.2 Workplace Safety Performance

Centralines continues to show marked improvement in Workplace Safety Performance. Of significance is that there have been no lost time injuries (LTIs) in the last twenty-two months.

Centralines' key health and safety initiative in the 2012/13 year has been the continuation of the Zero Incident Process (ZIP) delivered by Sentis. The ZIP programme along with Board, Management and staff commitment has seen improved individual safety awareness. The result is effective safety conversations, increased self awareness and a high safety performance supportive culture delivering a marked improvement in safety performance. Centralines is committed to a great safety culture and will continue with the ZIP programme as well as striving to identify other safety initiatives as part of continuous improvement.

8.9.3 WSMP Accreditation

Centralines has been successfully audited to Secondary Level as part of the ACC Workplace Safety Management Practices (WSMP) programme. The accreditation period is 1 November 2011 to 31 October 2012.

8.9.4 Training, Induction and Network Access

Particular mitigation activities to ensure a safe working environment include:

- Restriction of access to the Network to personnel with Certificates of Competency. Field personnel are deemed competent by their respective employers in accordance with the Electricity Act 1992and associated Regulations pertinent to their particular trade or discipline;
- Targeted training of all personnel whose work requires reference to Centralines operating, design and construction standards. These standards comply with industry safety requirements and relevant regulations;
- Induction programmes for all new personnel, including Contractors. The programmes focus on the needs of the worker/contractor and the safety requirements associated with their role;
- Contractor worksite auditing. Auditing contractor competency and workplace practices is undertaken regularly;
- Training programmes. These are facilitated by Centralines for field staff.

8.9.5 Safety Management System for Public Safety

Centralines is conscious that the Electricity Amendment Act 2006 introduced new provisions requiring electricity distributors to have in place safety management systems (SMS) which prevent the electricity supply system from presenting a significant risk of:

a. *serious harm* to any member of the public; or

b. *significant damage to property* owned by a person other than the electricity distributor.

SECTION 8 Risk Management

The objective of the SMS is to ensure that the electricity industry takes responsibility for the safety and integrity of its assets – designing for safety and managing assets so that the potential for, and consequences of, their failure will be minimised.

The four elements of the SMS as set out in *NZS 7901:2008 Electricity and Gas Industries – Safety Management Systems for Public Safety* are:

- Asset description;
- Hazard identification, risk assessment, and control of significant hazards;
- Safety and operating processes; and
- Performance monitoring.

The SMS was fully implemented and externally audited in March 2012.

Centralines has developed the Public Safety Management System utilising Sharepoint in conjunction with Unison Networks Ltd. The Sharepoint portal houses the main PSMS documents and hyperlinks to Policies, Procedures, AMP and the Hazard Identification data source.

Centralines achieved PSMS registration to NZS 7901:2008 in May 2012. A surveillance audit by the auditing body will be completed in May 2013.

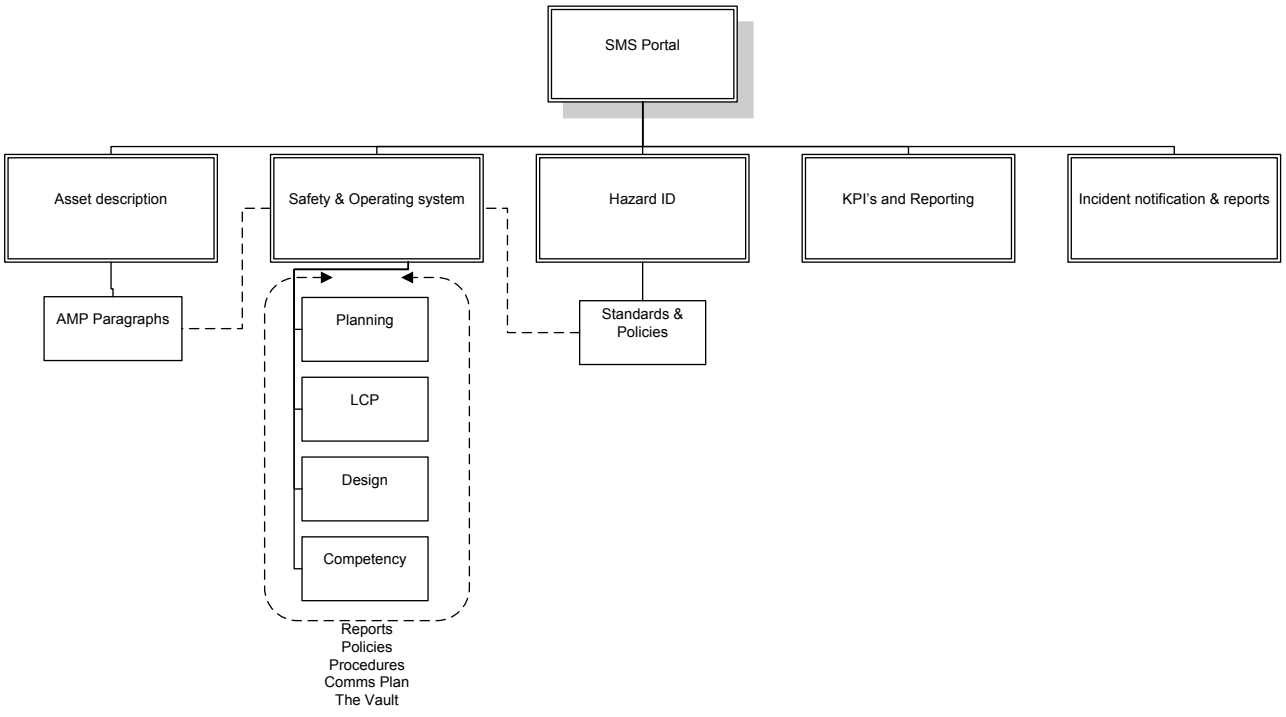
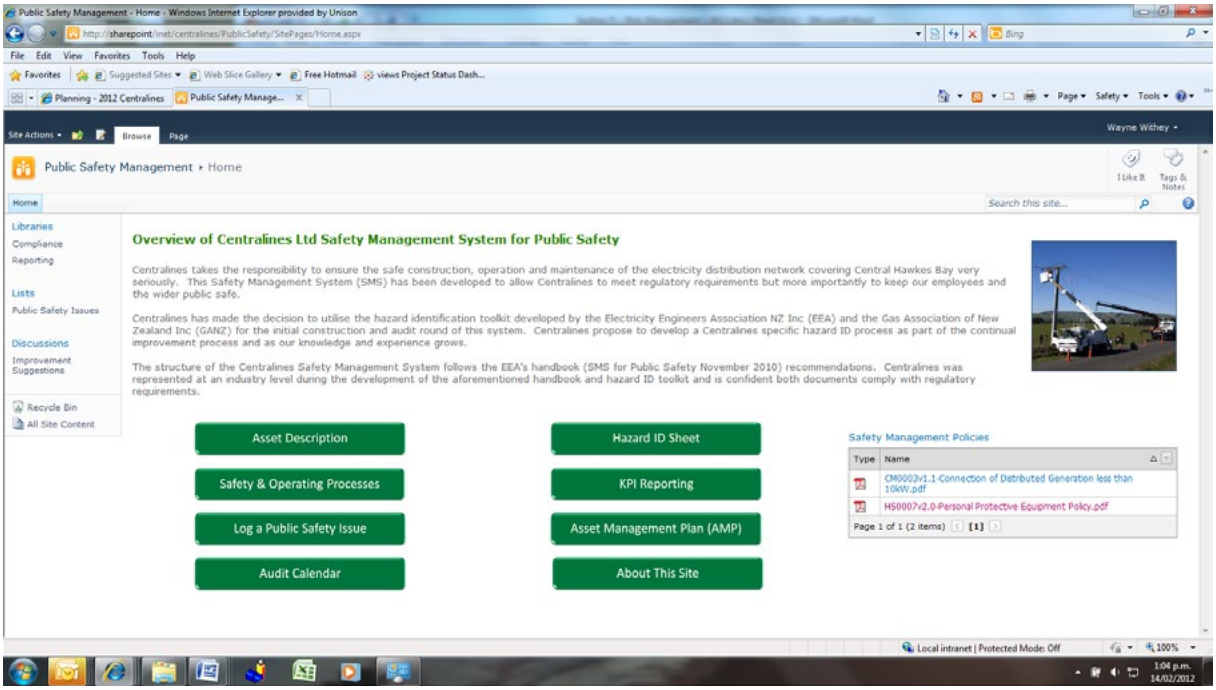


Figure 8-2: Public Safety Management System



The Area Manager (Unison) is the position named in the PSMS as being responsible for the management and maintenance of the system. The HSE Co-ordinator is the administrator of the system ensuring continual improvement and internal auditing is progressed.

Centralines has also adopted the EEA and GANZ-developed hazard management toolkit to monitor and report on identified hazards to the public and their property.

Centralines has ensured that the risk management process adopted in scrutinising asset risk includes public safety and property damage. Refer 7.4.2.2 above.

8.9.6 Non-Electrical Workers' Safety

A strategy to limit the risk of live-line contact incidents by third party contractors, agricultural workers and others has been implemented by Centralines, including an education programme targeted at companies with employees working in the vicinity of power lines and poles or in close proximity to underground cables.

The focus of the programme which is on-going and called 'Be Aware – Electricity Kills' is to raise awareness of the apparently benign presence of electricity throughout a range of work environments and the deadly consequences of making contact with live assets. Centralines continues to monitor and assess the effectiveness of its programmes and if necessary will modify the type and delivery of its safety messages.

SECTION 9 Evaluation of Performance

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9 Evaluation of Performance

Centralines' performance against objectives and planned activities published in the 2012 Asset Management Plan are discussed in this section, along with a gap analysis and corrective actions where targeted performance has not been attained.

Centralines believes in continuous improvement of its asset management practices and will continue to review performance measures to ensure that an objective understanding of the effectiveness and efficiency of asset planning outcomes, and the achievement of Centralines' strategic objectives. This in turn may drive changes to the metrics being used.

9.1 Financial and Physical Progress

9.1.1 Capital Expenditure 2012/13

Financial performance for capital expenditure is presented for 2012/13 in Table 9-1. Variances greater than 10% or $10,000 are explained below.

Capital Expenditure Category	12/13 Budget	12/13 Forecast	Variation
Customer Connection	300,000	300,000	0%
System Growth	135,000	147,504	9%
Asset Renewal and Replacement	1,656,000	1,425,949	-14%
Reliability, Safety and Environment	2,137,912	1,639,080	-23%
Asset Relocations	0	0	0%
Total	**$4,228,912**	**$3,512,533**	**-17%**

Table 9-1: 2012/13 Capital expenditure versus budget

Significant variances between budget and forecasted expenditures are explained in turn:

a. Asset Renewal and Replacement

The underspent "Asset Renewal and Replacement" budget is attributed to:
In some instances estimated budgets proved to be higher than that required given the limited asset inspection data available at the time of budgeting.

Another contributing factor would be the number of defects that were identified after the feeder inspections that needed to be rectified urgently thus being removed from the planned MAPT projects and completed under "Reactive and Unplanned Renewals".

b. Reliability, Safety and Environment

The underspent "Reliability and Replacement" budget is attributed to:

Sectionaliser projects budgeted for external contractors were brought "in-house" due to resource availability. This resulted in a significant cost saving.

The two major substation protection upgrade projects was based on the design estimate which proved to be higher than the actual tendered budget.

9.1.2 Maintenance and Renewals Expenditure 2012/13

Financial performance for maintenance expenditure is presented for 2012/13 in Table 9-2. Variances greater than 10% or $10,000 are explained below.

Maintenance Category	12/13 Budget	12/13 Forecast	Variation
Overhead	870,000	1,221,626	40%
Underground	21,000	31,389	49%
Circuit Breakers	5,000	4,629	-7%
Other Substation	40,000	40,579	1%
Power Transformers	4,000	5,147	29%
Distribution Transformers	70,000	61,055	-13%
Distribution Switchgear	19,000	29,520	55%
Vegetation	630,000	656,894	4%
Scada/Comms	24,000	15,103	-37%
Total	**$1,683,000**	**$2,065,942**	**23%**

Table 9-2: 2012/13 Maintenance expenditure versus budget

Significant variances between budget and forecasted expenditures are explained in turn:

a. Overhead

Due to a large backlog of critical overhead defects and an extraordinary large number of MAPT defects, the allocated budget was found to be inadequate and additional funds would be required to complete the works programme.

9.1.3 Review of Progress of Maintenance Initiatives and Programmes

Overhead Network

33kV Feeders

Centralines' maintenance practice is to undertake annual visual inspections of all 33kV feeders. This asset inspection programme is being achieved by Centralines with target inspections required for 2012/13 achieved.

Asset Inspection

Centralines' maintenance practice is to undertake detailed inspections of all assets on a 5 year cycle. This asset inspection programme is being achieved by Centralines.

SECTION 9 Evaluation of Performance

Defect Remediation

The remediation of priority 2 defects within regulatory timeframes has not been achieved during 2011/12, and has been the focus of a targeted works programme and process improvement initiative for 2012/13.

Replacement of Wooden Poles

The wooden pole replacements are being progressively undertaken in conjunction with renewal projects. This approach enables wooden pole replacements to be carried out in conjunction with deteriorated sections of feeders identified via the asset inspection programme. This will result in wooden pole replacements being progressively undertaken for at least the next few years, which is considered acceptable risk given very few unassisted in-service failures have been experienced to date.

Underground Network

Asset Inspection

Asset condition inspections of all cable terminations and risers have been undertaken in conjunction with 5 year asset inspections.

Older style cast iron “pot head” cable terminations on PILC cabling are not displaying the level of failure rates reported by other utilities. Notwithstanding this, Centralines continues to monitor these terminations.

The monitoring has revealed no immediate requirement to renew the remaining terminations, as all such terminations are assessed as serviceable. A further two terminations were replaced with the “11kV feeder structures” at Waipawa substation during 2011/12. This structure has subsequently been removed. The remaining terminations are planned to be replaced in conjunction with the “11kV feeder structure” at Takapau, planned for replacement.

Power Transformers

Centralines power transformers are maintained via an annual routine maintenance programme, supplemented with weekly inspections and 3 monthly major inspections. This programme is being achieved through 2012/13, via internal resources.

Dissolved gas analysis (DGA) tests are performed on all zone substation transformers on an annual basis to monitor internal conditions and project remaining life expectancy with consideration for refurbishment.

Thermo-vision photography is also used as another means of non-invasive condition monitoring. This activity is being undertaken on an annual basis and continues to enable identification of defects prior to in-service failure.

Circuit Breakers

Circuit breakers are maintained via a 2 or 3 year routine maintenance programme, based on insulation type, previous history and experience. This also includes partial discharge testing for all indoor switchgear on an annual basis, which has been integrated into maintenance schedules. This programme will be achieved through 2012/13, via external resources.

Similar to Power Transformers, thermo-vision photography is also used as another means of non-invasive condition monitoring. This activity is being undertaken on an annual basis and continues to enable identification of defects prior to in-service failure.

Other Substation Equipment and Buildings

All zone substations are inspected on a regular basis, with weekly readings and 3 monthly major inspections. This programme is being achieved through 2012/13, via internal resources.

Cyclic routine maintenance is undertaken according to programme for other substation equipment, such as CTs, VTs, busbars, supports and switches, cabling, relays and AC and DC local supplies. This programme is being achieved in accordance with the maintenance programme through 2012/13, via internal and external resources.

Similar to Power Transformers, Thermo-vision photography is also used as another means of non-invasive condition monitoring. This activity is being undertaken on an annual basis and continues to enable identification of defects prior to in-service failure.

Distribution Transformers and Voltage Regulators

Asset Inspection

Transformers are being inspected and condition assessed on a time based cycle completed on a feeder by feeder basis. Ground mounted transformers are inspected annually, and pole mounted transformers are inspected on a 5 year cycle. This asset inspection programme is being achieved by Centralines with target inspections for 2012/13 on track to be achieved.

Earth Testing

Distribution Earths are tested on a 5 yearly cycle, as part of the asset inspection programme. This asset inspection programme is being achieved by Centralines with earths being inspected in conjunction with overhead inspections, on a feeder by feeder basis.

Voltage Regulator Inspections

Voltage regulators are inspected on a 6 monthly cycle. This inspection programme is being achieved by Centralines via internal resources.

Distribution Switchgear

Ring Main Switches

Ring Main Switches are inspected and condition assessed on an annual inspection cycle. This asset inspection programme is being achieved by Centralines with target inspections required for 2012/13 achieved.

Air Break Switches

Centralines' maintenance practice is to undertake detailed inspections of all assets on a five year cycle, as part of feeder asset inspections. This asset inspection programme is being achieved by Centralines with target inspections for 2012/13 on track to be achieved.

SECTION 9 Evaluation of Performance

Reclosers/Sectionalisers/Remote Controlled Switches
Reclosers, sectionalises and remote controlled switches are maintained via a 3 monthly battery check and minor maintenance, along with annual detailed inspections and function tests. This asset inspection programme is being achieved by Centralines with target inspections required for 2012/13 achieved.

Earth Testing
Distribution Switchgear Earths are tested on a 5 yearly cycle, as part of the asset inspection programme. This asset inspection programme is being achieved by Centralines with earths being inspected in conjunction with overhead inspections, on a feeder by feeder basis.

Vegetation

Vegetation assessments
Vegetation assessments are planned to be undertaken on an annual basis for all vegetation in close proximity to the Centralines Network. The assessment of the 11kV feeders (22 in total) was completed during the 2012/13 financial year.

Clearing and Trimming
Centralines' lines require minimum clearances to be maintained, with works planned based on proximity to the network. For the 2012/13 year, Centralines has achieved the delivery of programmed cut and trim projects, effectively managing the higher risk sites.

SCADA Control and Communications

Centralines SCADA equipment is subject to routine maintenance and inspection which varies depending upon the component. These are discussed in turn:

VHF Radio Infrastructure
VHF radio infrastructure is supplied and maintained under contract by Rangitoto Radio.

SCADA Software - Abbey
Abbey systems software is supported and updated by a 24 hour response contract through Abbey systems.

SCADA Software - Realflex
Realflex software is supported and updated by Unison, in accordance with the Management Services Agreement with Centralines.

RTUs
RTUs and Line Fault Indicators associated with sectionalises are being maintained via a 3 monthly battery check and minor maintenance, along with annual detailed inspections. These are being conducted in conjunction with Recloser/Sectionaliser/Remote Control Switch inspection programme and undertaken by internal resources.

9.1.4 Review of Progress of Projects/Programmes 2012/13

Asset Category	Project Name	Status
Augmentation – Substation Equipment and Buildings	33kV Sub-transmission and protection upgrade at Waipukurau substation.	In progress
Augmentation – Substation Equipment and Buildings	33kV feeder current differential protection upgrade at Waipawa GXP.	In progress
Renewal - Asset Replacement	Ripple Injection Plant Replacement.	In progress
Renewal - Asset Replacement	Two Pole Structure Victoria Street Waipawa.	Complete
Renewal - Asset Replacement	Two Pole Structure Sydney Street Takapau.	Complete
Renewal - Overhead	Feeder 3 – 11kV Pole Feeder Maintenance.	Complete
Renewal - Overhead	Feeder 18 – 11kV Pole Feeder Maintenance.	Due for completion by 31 March 2013
Renewal - Overhead	Feeder 46 – 11kV Pole Feeder Maintenance.	In progress
Renewal - Overhead	Feeder 45 – 11kV Pole Feeder Maintenance.	In progress
Renewal - Overhead	Feeder 83 – 11kV Pole Feeder Maintenance.	In progress
Renewal - Overhead	Feeder 88 – 11kV Pole Feeder Maintenance.	Due for completion by 31 March 2013
Renewal - Overhead	Feeder 1 – 33kV Pole Feeder Maintenance.	Due for completion by 31 March 2013
Renewal - Overhead	Feeder 2 – 33kV Pole Feeder Maintenance.	Due for completion by 31 March 2013
Renewal - Overhead	Takapau – 33kV Pole Feeder Maintenance.	Complete
Renewal - Overhead	Wilder Road 33kV Stage 1 of 5 Feeder Upgrade.	Due for completion by 31 March 2013
Reliability – Distribution Switchgear	Upgrade Wanstead Regulator.	In progress
Reliability – Distribution Switchgear	Upgrade Pourere Voltage Regulator Site.	Complete
Reliability – Distribution Switchgear	Install 11kV Sectionalises Feeder 1.	Complete
Reliability – Distribution Switchgear	Install 11kV Sectionalises Feeder 2.	Complete

Table 9-3: Projects/Programmes 2012/13

SECTION 9 Evaluation of Performance

9.2 Performance against Service Levels for 2012/13

9.2.1 Review of Service Level Performance

This section assesses Unison's performance against its Service Levels as provided in the 2012 AMP. (Note that 2012/13 actual figures are projected to year end).

Supply Reliability: Service Interruptions 2012/13

Measure	Target	2012/13 Year End Forecast
Network SAIDI	≤ 197.5	126.4
Network SAIDI (planned)	≤ 67.1	72.5
Network SAIDI (unplanned)	≤ 130.4	53.9
Network SAIFI	< 4.22	2.9
Number of 33kV faults per 100km of line	≤ 6.7	1.1
Number of 11kV faults per 100km of line	≤ 8.5	8.2

Table 9-4: Supply Reliability: Service interruptions 2012/13

Significant variances are discussed in turn:

Planned SAIDI

2012/13 planned SAIDI target was based on historical trends. Centralines has placed emphasis on reducing the maintenance backlog in order to improve network reliability and performance. With the increased pole and feeder maintenance work, more planned shutdowns has been required potentially exceeding the planned SAIDI target of ≤ 67.1.

Measure	Target
Supply of compliant voltage levels to consumers	**>99.95% compliance**

Compliance against this measure is undertaken reactively, in response to customer or electrical contractors initiated requests for investigation. Centralines typically receives two to three requests for investigations per month. From these investigations, only a small number was found to be outside the regulatory requirement of 230V ± 6%. The remainder of the investigations required customer upgrades, or no problem was found. In situations where the Centralines voltage supply is not compliant, it is usually corrected through conductor upgrades or network reconfiguration.

As such Centralines performance is assessed as compliant.

Stakeholder Service

Measure	Target
Customer Satisfaction with delivery of customer services	**95% compliance**

Performance against this measure for 2012/13 is a forecast average of 98.5%, and as such Centralines Performance is expected to be compliant.

9.2.2 Asset Performance and Efficiency Indicators

Measure	Target
Maintain physical system losses at an acceptable level	**< 8 %**[(1)]

Network Loss Ratio to the end 2012/13 was 7.7%.

(1) Centralines believes this is a reasonable measure for a lines business to consider when operating using best practice, but notes that there is no incentive for ELB's to actively manage losses on the network in the current regulatory environment.

Maintain effective distribution capacity utilisation **≥ 24.7%**

Distribution capacity utilisation for 2012/13 was 21, 5%. The reduction in performance seen during 2008/09 results from historical omission of customer owned distribution transformers, which have now been included since changes to disclosure requirements were introduced in 2007/08. As a result, the target for this measure has been lowered further going forward, to provide a realistic goal, improving over time.

Manage network Load Factor **≥ 65%**

Network Load Factor for 2012/13 was 62%. This result was driven by the failure of load control equipment, which is in the process of being replaced.

SECTION 9 Evaluation of Performance

9.3 An evaluation and comparison of the results of the asset management maturity assessment

For the 2012 Information Disclosure requirements, the Unison Asset Management team was required to complete a self-assessment of the maturity of Centralines' asset management practices.

To assist the Asset Management team, individuals from across Unison's various departments with diverse professions and backgrounds formed a working group to review and assess each of the categories. As this group had a wide spectrum of knowledge this enabled a healthy discussion about rating Centralines against the Maturity criteria. The goal from this working group was to provide a fair and honest assessment against each question.

The conclusion from this evaluation is that Centralines has a strong Asset Management foundation and is pleased with the overall assessment. However, through its continuous improvement ethos Unison Management will continue to focus on areas that can be improved and ultimately seek the highest maturity levels possible for Centralines.

Overall the assessment highlighted that the Asset Management Plan is established, documented, implemented and maintained for asset systems and critical assets to achieve the asset management strategy and asset management objectives across all life cycle phases. There are robust linkages between the long-term asset management strategy and other organisational policies, strategies and stakeholder requirements.

It was also pleasing to note the working group assessed that Asset Management Plans consistently document responsibilities for the delivery actions and there is adequate detail to enable delivery of those actions. Designated responsibility and authority for achievement of asset plan actions is appropriate. Those appointed person or persons also have full responsibility for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s).

It was assessed that the AMP is widely distributed to stakeholders but further effort to communicate to all internal resources could be achieved and ensuring an effective process exists for determining the resources needed for asset management and sufficient resources are available.

Centralines will continue to review risks, costs, systems, data quality and other components of the assessment to ensure focus and advancement against the assessment criteria is achieved over its lifecycle asset management practises.

9.4 Gap Analysis

9.4.1 Review of Quality of Asset Management and Planning

Since 2007/08, Centralines has invested more heavily in Capital and Operating funds compared to recent history, driven by a requirement to improve the reliability of supply from levels that were considered unacceptable in 2003 and 2004. The asset planning that has been undertaken has led to the identification of works that have significant improvement in network reliability and security, such that Centralines' network reliability now offers Centralines' customers strong performance, given the density of the network.

This has all been achieved with relatively modest levels of investment, and significantly, without placing Centralines Limited under undue financial pressure. This Asset Management Plan continues to be refined, with the aim at maintaining, and improving network performance and security over the period of this plan. This is aimed to be achieved with modest levels of investment.

While it is expected that further continual improvement will be necessary as asset behaviour becomes better understood, it is suggested that overall the quality of the asset management planning for Centralines is sound. This claim is made in consideration of the contractual relationship Centralines has with Unison, which has been expanded such that Unison is now contractually responsible for all asset management practices associated with Centralines' assets. This arrangement has given Centralines access to contemporary asset management tools and resources, which is anticipated to lead to optimal outcomes in terms of asset management.

9.4.2 Initiatives for Improvement

There are a number of issues identified for improvement or further consideration in this asset management plan. The most significant issues are discussed following.

Asset Management System Upgrade
Centralines intends to upgrade to a new asset management system in 2012/13, in conjunction with Unison. This upgrade is expected to enable significantly expanded functionality that will lead to further improvements in the understanding of the condition, performance and status of Centralines assets.

Defect Management Process
Previously the management of defects were managed via a number of information sources, with defects stored in more than one system. This led to continual difficulty in the management of such defects.

Centralines has now consolidated all defects into a single system that enables a single reporting suite, with one process to manage all defects.

Data Cleanse
Significant progress has been made in the last year in cleansing the asset management data set, however a reasonable amount of effort is still required to complete the cleansing the Centralines' asset data set. Some of this will be completed via the asset inspection process, with the remainder being addressed with the migration and integration of the Centralines asset management systems.

SECTION 9 Evaluation of Performance

Resource planning

Centralines capital expenditure for the past few years has exceeded internal resource capability, necessitating outsourcing of a number of capital projects.

The requirement for external resources to enable the delivery of the capital works programme will continue for 2013/14 for Centralines. To assist external contractors with resource planning for the coming year, Centralines completes its capital planning earlier, and communicates the capital plan to contractors.

SECTION 10 Capability to Deliver

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SECTION 10 Capability to Deliver

Capability to Deliver 10-2

SECTION 10 Capability to Deliver

10 Capability to Deliver

10.1 Achieving the objectives of the Plan

The requirements for Asset Management Plans now require that it:[1]

- must describe the processes used by the EDB to ensure that
  - The AMP is realistic and the objectives set out in the plan can be achieved;
  - The organisation structure and the processes for authorisation and business capabilities will support the implementation of the AMP plans.

This is a new requirement, which Centralines interprets as requiring an explanation of how we ensure that the Plan is reasonable (i.e. is efficient and effective at building, maintaining and operating networks that are neither gold-plated, nor inadequate to sustainably deliver reliable services to consumers) and that Centralines has business processes and capabilities to actually deliver the Plan.

As noted in section 2 of this Plan, Centralines operates a mixed model of retaining some capability in-house (field-staff), but outsources Management Services and some capital works to third parties through competitive tenders.

10.1.1 Ensuring the Plan is realistic

The factors that contribute to ensuring the Plan is realistic are as follows:

- The quality of the needs assessments (e.g. demand growth forecasts, which give rise to network reinforcement requirements);
- Quality of tools used to establish optimal life cycle asset management activities;
- Business processes and systems to support achievement of the plan;
- Resource availability;
- Need for specialist equipment or materials, requiring long-lead times (e.g., larger-sized transformers); and
- Commercial or legal arrangements (e.g. easements) required to facilitate work being carried out.

[1] Requirement 16.

10.1.2 Needs assessments

Section 6 of the Plan details Centralines' approach to determining the long-term network planning requirements, in the context of load growth requirements, quality and reliability standards. Needs assessments are carried out by Unison under the MSA. Unison draws on external sources of information (e.g. growth forecasts, developer, Council information) to develop load projections. A detailed project list is developed for the coming year, with projects not meeting identified thresholds prioritised for future years and re-evaluated during the annual asset planning cycle, or if circumstances change during the year (e.g. where large new loads not previously known trigger investments or forecast loads not materialising).

Inevitably, there is uncertainty about future demands put on the network, which results in the Plan being developed under conditions of uncertainty. By utilising sound forecasting techniques, rigourous models to establish asset management responses (repair, refurbish, replace) and allowing for intra-year flexibility in projects under-taken, Centralines considers that a reasonable approach to establishing its maintenance and investment plans has been established.

The Centralines' network is characterised by low volume and demand growth, so much of the Centralines investment and maintenance programme is driven by compliance and age/condition-related considerations. Additionally, the network architecture is relatively straight-forward, reflecting the low density nature of the network.

10.1.3 Quality of tools

Section 6 describes the tools that are used to establish its asset investment priorities. Centralines considers these tools provides a consistent, rigorous framework for developing its investment plan.

10.1.4 Contracting arrangements

Centralines has an existing contracting arrangement with Unison Networks Limited to provide a broad suite of Management Services, including operational control of the network, commercial/financial functions (such as billing, preparation of accounts) and management of the development and maintenance of the network. Centralines retained in-house capability to carry out field-work, as well as ability to manage competitive tendering for any works not undertaken internally. The majority of work is carried out internally.

In the previous two years, all planned works have been met by internal and external providers, but in 2012/13, the planned work scheduled for completion in the 2012/13 disclosure year is not likely to be completed as a result of a contractor not completing the contracted works. The carry-over work will be completed early in the next financial year.

Centralines is satisfied that through the combination of in-house field staff capability and use of external contractors to undertake the balance of capital expenditure work, sufficient resources exist or are available to ensure planned works are completed.

In addition, under emergency conditions (such as the storms suffered in the 2011/12 year) provision exists with external contractors to complement in-house restoration efforts.

SECTION 10 Capability to Deliver

10.1.5 Arrangements for long lead-time items

When developing the Plan, arrangements are made to acquire any long lead-time equipment (e.g. larger transformers) or arrangements (e.g. Resource Consents, land purchases, easements) that are required to facilitate delivery of the the Plan.

10.2 Organisation structure, processes for authorisation and business capabilities

10.2.1 Organisation structure

The following organisation structure is employed by Centralines. The relatively simple structure reflects that a significant number of services are outsourced through the MSA to Unison:

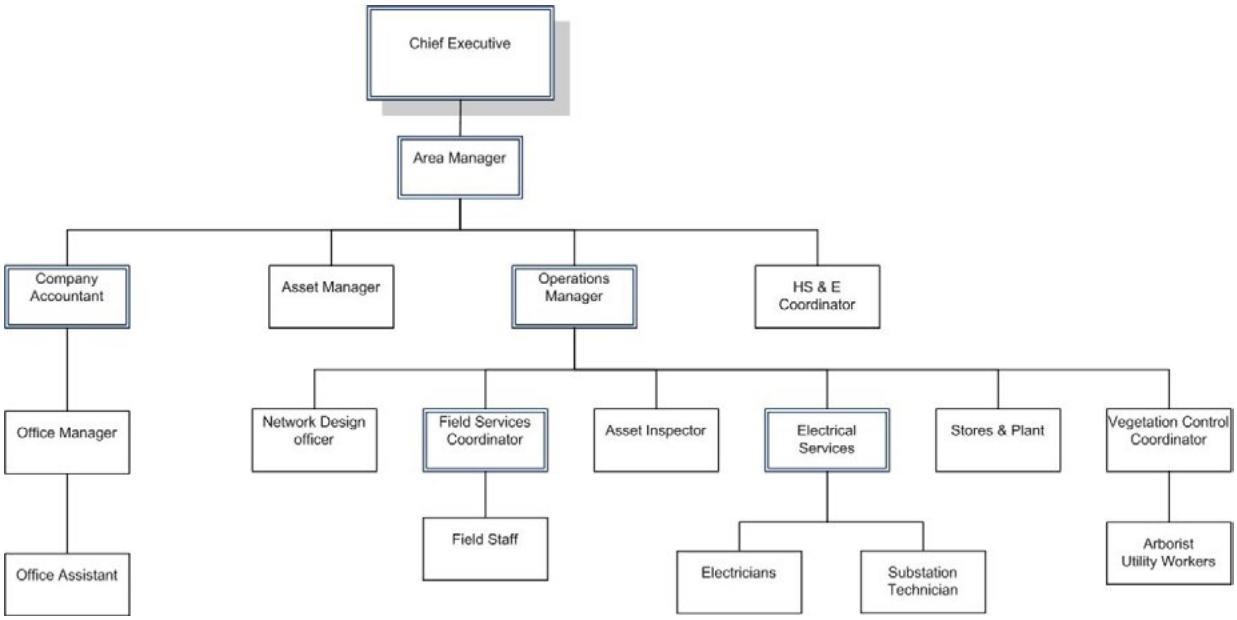

Figure 10-1: Centralines organisation structure

10.3 Processes for authorisation

Various levels of financial authorisation exist in Centralines and under the terms of the Management Services Agreement with Unison:

1. The Board approves the overall business plan, including the Asset Management Plan, which sets out the capital and operating expenditure forecasts;

2. Centralines' delegations policy sets specific limits for specific named roles to incur particular categories of expenditure (e.g. Network CAPEX, Network OPEX);

3. Detailed business cases must be prepared and approved by the Board;

4. Authorisations to approve variations to agreed contracts or works for unforeseen circumstances are provided by the Board.

Financial systems, controls and audits complement Centralines' authorisation policies to ensure compliance or detect non-compliance with financial delegations.

10.4 Business capabilities

As a small regional network, Centralines seeks to ensure that there is an efficient and effective business structure in place which ensures that community ownership of the network is not compromised by small scale. As such, as stated previously, Centralines seeks to strike a balance between out-sourcing specialised functions that would be otherwise unaffordable or provided inefficiently internally, with maintaining an internal capability to ensure resources remain in the region to provide field services. Out-sourcing risks are managed through the method of contracting and exit arrangements, which would provide for an orderly transition in the event that Centralines wished to change management service provider.

Centralines maintains field services (all maintenance activities and the majority of capital expenditure works) in-house.

The following keys services are out-sourced under the MSA:

- Finance (e.g. accounts, reporting) and commercial activity (e.g. billing, retailer negotiations);
- Network operations (e.g. control room);
- Asset management planning;
- General management; and
- Business continuity planning.

SECTION 11 Schedules

CENTRALINES
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SECTION 11 Schedules

11a: Report on Forecast Capital Expenditure

This schedule requires a breakdown of forecast expenditure on assets for the current disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. Also required is a forecast of the value of commissioned assets (i.e., the value of RAB additions)

EDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

11a(i): Expenditure on Assets Forecast

	for year ended	*Current Year* **31 Mar 13**	*CY+1* **31 Mar 14**	*CY+2* **31 Mar 15**
		$000 (in nominal dollars)		
	Consumer connection	360	255	260
	System growth	95	245	229
	Asset replacement and renewal	1,668	1,609	1,561
	Asset relocations	118	122	125
	Reliability, safety and environment:			
	Quality of supply	40	41	42
	Legislative and regulatory	-	-	-
	Other reliability, safety and environment	1,870	490	427
	Total reliability, safety and environment	1,910	530	468
	Expenditure on network assets	4,151	2,761	2,643
	Non-network assets	194	834	227
	Expenditure on assets	4,345	3,596	2,869
plus	Cost of financing			
less	Value of capital contributions	243	250	258
plus	Value of vested assets			
	Capital expenditure forecast	4,102	3,346	2,611
	Value of commissioned assets	4657	3596	2869

	for year ended	*Current Year* **31 Mar 13**	*CY+1* **31 Mar 14**	*CY+2* **31 Mar 15**
		$000 (in constant prices)		
	Consumer connection	360	250	250
	System growth	95	240	220
	Asset replacement and renewal	1,668	1,577	1,500
	Asset relocations	118	120	120
	Reliability, safety and environment:			
	Quality of supply	40	40	40
	Legislative and regulatory	-	-	-
	Other reliability, safety and environment	1,870	480	410
	Total reliability, safety and environment	1,910	520	450
	Expenditure on network assets	4,151	2,707	2,540
	Non-network assets	194	818	218
	Expenditure on assets	4,345	3,525	2,758

Subcomponents of expenditure on assets (where known)

Energy efficiency and demand side management, reduction of energy losses			
Overhead to underground conversion			
Research and development			

CY+3	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
31 Mar 16	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**	**31 Mar 23**
265	271	276	282	287	293	299	305
207	227	287	293	299	305	311	317
2,038	1,353	1,435	1,464	1,493	1,523	1,554	1,585
127	130	132	135	138	141	143	146
42	43	44	45	46	47	48	49
-	-	-	-	-	-	-	-
223	769	453	462	471	480	490	500
265	812	497	507	517	527	538	549
2,902	2,793	2,628	2,680	2,734	2,789	2,844	2,901
231	236	241	246	250	255	261	266
3,134	3,029	2,868	2,926	2,984	3,044	3,105	3,167
265	273	281	290	299	207	317	326
2,869	2,756	2,587	2,636	2,685	2,837	2,788	2,841
3134	3029	2868	2926	2984	3044	3105	3,167

CY+3	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
31 Mar 16	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**	**31 Mar 23**
250	250	250	250	250	250	250	250
195	210	260	260	260	260	260	260
1,920	1,250	1,300	1,300	1,300	1,300	1,300	1,300
120	120	120	120	120	120	120	120
40	40	40	40	40	40	40	40
-	-	-					
210	710	410	410	410	410	410	410
250	750	450	450	450	450	450	450
2,735	2,580	2,380	2,380	2,380	2,380	2,380	2,380
218	218	218	218	218	218	218	218
2,953	2,798	2,598	2,598	2,598	2,598	2,598	2,598

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	Current Year	CY+1	CY+2
for year ended	31 Mar 13	31 Mar 14	31 Mar 15
Difference between nominal and constant price forecasts	$000		
Consumer connection	-	5	10
System growth	-	5	9
Asset replacement and renewal	-	32	61
Asset relocations	-	2	5
Reliability, safety and environment:			
Quality of supply	-	1	2
Legislative and regulatory	-	-	-
Other reliability, safety and environment	-	10	17
Total reliability, safety and environment	-	10	18
Expenditure on network assets	-	54	103
Non-network assets	-	16	9
Expenditure on assets	-	71	111

11a(ii): Consumer Connection

	Current Year	CY+1	CY+2
for year ended	31 Mar 13	31 Mar 14	31 Mar 15
*Consumer types defined by EDB**	$000 (in constant prices)		
Yet to be determined projects	360	250	250
Consumer connection expenditure	360	250	250
less Capital contributions funding consumer connection			
Consumer connection less capital contributions	360	250	250

11a(iii): System Growth

Sub-transmission			
Zone substations			220
Distribution and LV lines			
Distribution and LV cables			
Distribution substations and transformers			
Distribution switchgear	95	240	
Other network assets			
System growth expenditure	95	240	220
less Capital contributions funding system growth			
System growth less capital contributions	95	240	220

CY+3 **31 Mar 16**	*CY+4* **31 Mar 17**	*CY+5* **31 Mar 18**	*CY+6* **31 Mar 19**	*CY+7* **31 Mar 20**	*CY+8* **31 Mar 21**	*CY+9* **31 Mar 22**	*CY+10* **31 Mar 23**
15	21	26	32	37	43	49	55
12	17	27	33	39	45	51	57
118	103	135	164	193	223	254	285
7	10	12	15	18	21	23	26
2	3	4	5	6	7	8	9
-	-	-	-	-	-	-	-
13	59	43	52	61	70	80	90
15	62	47	57	67	77	88	99
167	213	248	300	354	409	464	521
13	18	23	28	32	37	43	48
181	231	270	328	386	446	507	569

CY+3 **31 Mar 16**	*CY+4* **31 Mar 17**	*CY+5* **31 Mar 18**
250	250	250

250	250	250
250	250	250

195	210	260
195	210	260
195	210	260

SECTION 11 Schedules

11a(iv): Asset Replacement and Renewal

for year ended	Current Year 31 Mar 13	CY+1 31 Mar 14	CY+2 31 Mar 15
	$000 (in constant prices)		
Sub-transmission	150	150	150
Zone substations	100		
Distribution and LV lines	978	577	565
Distribution and LV cables		150	150
Distribution substations and transformers			200
Distribution switchgear	160	400	85
Other network assets	280	300	350
Asset replacement and renewal expenditure	1,668	1,577	1,500
less Capital contributions funding asset replacement and renewal			
Asset replacement and renewal less capital contributions	1,668	1,577	1,500

11a(v):Asset Relocations

*Project or programme**			
Yet to be determined	118	120	120
All other asset relocations projects or programmes			
Asset relocations expenditure	118	120	120
less Capital contributions funding asset relocations			
Asset relocations less capital contributions	118	120	120

11a(vi):Quality of Supply

*Project or programme**			
Yet to be determined	40	40	40
All other quality of supply projects or programmes			
Quality of supply expenditure	40	40	40
less Capital contributions funding quality of supply			
Quality of supply less capital contributions	40	40	40

CY+3 **31 Mar 16**	*CY+4* **31 Mar 17**	*CY+5* **31 Mar 18**
150	150	
715	310	510
150	150	150
200	200	200
355	90	90
350	350	350
1,920	1,250	1,300
1,920	1,250	1,300

120	120	120

120	120	120
120	120	120

40	40	40

40	40	40
40	40	40

SECTION 11 Schedules

11a(vii): Legislative and Regulatory

	for year ended	Current Year 31 Mar 13	CY+1 31 Mar 14	CY+2 31 Mar 15
	*Project or programme**	$000 (in constant prices)		
	All other legislative and regulatory projects or programmes			
	Legislative and regulatory expenditure	-	-	-
less	Capital contributions funding legislative and regulatory			
	Legislative and regulatory less capital contributions	-	-	-

11a(viii): Other Reliability, Safety and Environment

	*Project or programme**			
	Zone Substation Protection Upgrades	1,560		
	Distribution Network Automation	310	480	220
	Improve Back Feeding Capability			190
	All other reliability, safety and environment projects or programmes			
	Other reliability, safety and environment expenditure	1,870	480	410
less	Capital contributions funding other reliability, safety and environment			
	Other reliability, safety and environment less capital contributions	1,870	480	410

11a(ix): Non-Network Assets

Routine expenditure

	*Project or programme**			
	Office Equipment	3	3	3
	Vehicles	105	592	100
	Buildings	12	52	15
	Plant and equipment	74	171	100
	All other routine expenditure projects or programmes			
	Routine expenditure	194	818	218

Atypical expenditure

	*Project or programme**			
	All other atypical projects or programmes			
	Atypical expenditure			
	Non-network assets expenditure	194	818	218

CY+3 **31 Mar 16**	*CY+4* **31 Mar 17**	*CY+5* **31 Mar 18**
-	-	-
-	-	-
	600	
90		180
120	110	230
210	710	410
210	710	410
3	3	3
100	100	100
15	15	15
100	100	100
218	218	218
218	218	218

SECTION 11 Schedules

11b: Report on Forecast Operational Expenditure

This schedule requires a breakdown of forecast operational expenditure for the disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms.

EDBs must provide explanatory comment on the difference between constant price and nominal dollar operational expenditure forecasts in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

	Current Year	*CY+1*	*CY+2*
for year ended	**31 Mar 13**	**31 Mar 14**	**31 Mar 15**
Operational Expenditure Forecast	**$000 (in nominal dollars)**		
Service interruptions and emergencies	285	270	276
Vegetation management	659	775	791
Routine and corrective maintenance and inspection	190	202	206
Asset replacement and renewal	894	1,175	503
Network Opex	2,028	2,422	1,775
System operations and network support	140	157	168
Business support	1,031	1,157	1,239
Non-network Opex	1,171	1,314	1,407
Operational expenditure	3,199	3,736	3,183

	Current Year	*CY+1*	*CY+2*
for year ended	**31 Mar 13**	**31 Mar 14**	**31 Mar 15**
	$000 (in constant prices)		
Service interruptions and emergencies	285	265	265
Vegetation management	659	760	760
Routine and corrective maintenance and inspection	190	198	198
Asset replacement and renewal	894	1,152	484
Network Opex	2,028	2,375	1,707
System operations and network support	140	154	162
Business support	1,031	1,134	1,191
Non-network Opex	1,171	1,288	1,353
Operational expenditure	3,199	3,663	3,059

Subcomponents of operational expenditure (where known)			
Energy efficiency and demand side anagement, reduction of energy losses			
Direct billing*			
Research and Development			
Insurance			

** Direct billing expenditure by suppliers that direct bill the majority of their consumers*

	Current Year	*CY+1*	*CY+2*
for year ended	**31 Mar 13**	**31 Mar 14**	**31 Mar 15**
Difference between nominal and real forecasts	**$000**		
Service interruptions and emergencies	-	5	11
Vegetation management	-	15	31
Routine and corrective maintenance and inspection	-	4	8
Asset replacement and renewal	-	23	20
Network Opex	-	47	69
System operations and network support	-	3	7
Business support	-	23	48
Non-network Opex	-	26	55
Operational expenditure	-	73	124

CY+3 **31 Mar 16**	*CY+4* **31 Mar 17**	*CY+5* **31 Mar 18**	*CY+6* **31 Mar 19**	*CY+7* **31 Mar 20**	*CY+8* **31 Mar 21**	*CY+9* **31 Mar 22**	*CY+10* **31 Mar 23**
281	287	293	298	304	310	317	323
488	498	508	518	528	539	550	561
210	214	219	223	227	232	237	241
513	523	534	544	555	566	578	589
1,493	1,522	1,553	1,584	1,616	1,648	1,681	1,715
172	175	179	182	186	189	193	197
1,264	1,289	1,315	1,341	1,368	1,395	1,423	1,452
1,435	1,464	1,493	1,523	1,554	1,585	1,616	1,649
2,928	2,986	3,046	3,107	3,169	3,233	3,297	3,363

CY+3 **31 Mar 16**	*CY+4* **31 Mar 17**	*CY+5* **31 Mar 18**	*CY+6* **31 Mar 19**	*CY+7* **31 Mar 20**	*CY+8* **31 Mar 21**	*CY+9* **31 Mar 22**	*CY+10* **31 Mar 23**
265	265	265	265	265	265	265	265
460	460	460	460	460	460	460	460
198	198	198	198	198	198	198	198
484	484	484	484	484	484	484	484
1,407	1,407	1,407	1,407	1,407	1,407	1,407	1,407
162	162	162	162	162	162	162	162
1,191	1,191	1,191	1,191	1,191	1,191	1,191	1,191
1,353	1,353	1,353	1,353	1,353	1,353	1,353	1,353
2,759	2,759	2,759	2,759	2,759	2,759	2,759	2,759

CY+3 **31 Mar 16**	*CY+4* **31 Mar 17**	*CY+5* **31 Mar 18**	*CY+6* **31 Mar 19**	*CY+7* **31 Mar 20**	*CY+8* **31 Mar 21**	*CY+9* **31 Mar 22**	*CY+10* **31 Mar 23**
16	22	28	33	39	45	52	58
28	38	48	58	68	79	90	101
12	16	21	25	29	34	39	43
30	40	50	61	72	83	94	106
86	116	146	177	209	241	274	308
10	13	17	20	24	28	32	35
73	98	124	150	177	204	232	261
83	111	141	171	201	232	264	296
169	227	287	348	410	474	538	604

SECTION 11 Schedules

12a: Report on Asset Condition

This schedule requires a breakdown of asset condition by asset class as at the start of the forecast year. The data accuracy assessment relates to the percentage values disclosed in the asset condition columns. Also required is a forecast of the percentage of units to be replaced in the next 5 years. All information should be consistent with the information provided in the AMP and the expenditure on assets forecast in Schedule 11a. All units relating to cable and line assets, that are expressed in km, refer to circuit lengths.

Voltage	Asset category	Asset class	Units
All	Overhead Line	Concrete poles / steel structure	No.
All	Overhead Line	Wood poles	No.
All	Overhead Line	Other pole types	No.
HV	Sub-transmission Line	Sub-transmission OH up to 66kV conductor	km
HV	Sub-transmission Line	Sub-transmission OH 110kV+ conductor	km
HV	Sub-transmission Cable	Sub-transmission UG up to 66kV (XLPE)	km
HV	Sub-transmission Cable	Sub-transmission UG up to 66kV (Oil pressurised)	km
HV	Sub-transmission Cable	Sub-transmission UG up to 66kV (Gas pressurised)	km
HV	Sub-transmission Cable	Sub-transmission UG up to 66kV (PILC)	km
HV	Sub-transmission Cable	Sub-transmission UG 110kV+ (XLPE)	km
HV	Sub-transmission Cable	Sub-transmission UG 110kV+ (Oil pressurised)	km
HV	Sub-transmission Cable	Sub-transmission UG 110kV+ (Gas Pressurised)	km
HV	Sub-transmission Cable	Sub-transmission UG 110kV+ (PILC)	km
HV	Sub-transmission Cable	Sub-transmission submarine cable	km
HV	Zone substation Buildings	Zone substations up to 66kV	No.
HV	Zone substation Buildings	Zone substations 110kV+	No.
HV	Zone substation switchgear	22/33kV CB (Indoor)	No.
HV	Zone substation switchgear	22/33kV CB (Outdoor)	No.
HV	Zone substation switchgear	33kV Switch (Ground Mounted)	No.
HV	Zone substation switchgear	33kV Switch (Pole Mounted)	No.
HV	Zone substation switchgear	33kV RMU	No.
HV	Zone substation switchgear	50/66/110kV CB (Indoor)	No.
HV	Zone substation switchgear	50/66/110kV CB (Outdoor)	No.
HV	Zone substation switchgear	3.3/6.6/11/22kV CB (ground mounted)	No.
HV	Zone substation switchgear	3.3/6.6/11/22kV CB (pole mounted)	No.
HV	Zone Substation Transformer	Zone Substation Transformers	No.
HV	Distribution Line	Distribution OH Open Wire Conductor	km
HV	Distribution Line	Distribution OH Aerial Cable Conductor	km
HV	Distribution Line	SWER conductor	km
HV	Distribution Cable	Distribution UG XLPE or PVC	km
HV	Distribution Cable	Distribution UG PILC	km
HV	Distribution Cable	Distribution Submarine Cable	km
HV	Distribution switchgear	3.3/6.6/11/22kV CB (pole mounted) - reclosers and sectionalisers	No.
HV	Distribution switchgear	3.3/6.6/11/22kV CB (Indoor)	No.
HV	Distribution switchgear	3.3/6.6/11/22kV Switches and fuses (pole mounted)	No.
HV	Distribution switchgear	3.3/6.6/11/22kV Switch (ground mounted) - except RMU	No.
HV	Distribution switchgear	3.3/6.6/11/22kV RMU	No.
HV	Distribution Transformer	Pole Mounted Transformer	No.
HV	Distribution Transformer	Ground Mounted Transformer	No.
HV	Distribution Transformer	Voltage regulators	No.
HV	Distribution Substations	Ground Mounted Substation Housing	No.
LV	LV Line	LV OH Conductor	km
LV	LV Cable	LV UG Cable	km
LV	LV Streetlighting	LV OH/UG Streetlight circuit	km
LV	Connections	OH/UG consumer service connections	No.
All	Protection	Protection relays (electromechanical, solid state and numeric)	No.
All	SCADA and communications	SCADA and communications equipment operating as a single system	Lot
All	Capacitor Banks	Capacitors including controls	No.
All	Load Control	Centralised plant	Lot
All	Load Control	Relays	No.
All	Civils	Cable Tunnels	km

Asset condition at start of planning period (percentage of units by grade)							
	Grade 1	Grade 2	Grade 3	Grade 4	Grade unknown	Data accuracy (1–4)	% of asset forecast to be replaced in next 5 years
	3.62%	2.17%	88.96%	5.25%		2	4.00%
	28.38%	0.54%	69.19%	1.89%		2	
	-	2.13%	93.62%	4.25%		1	1.00%
	-	-	42.50%	57.50%		1	-
	-	-	10.00%	90.00%		2	-
	-	26.32%	42.10%	31.58%		2	10.00%
	-	-	66.67%	33.33%		2	33.00%
	-	-	83.33%	16.67%		2	-

-	-	42.86%	57.14%		2	-
20.85%	9.05%	64.88%	5.22%		1	4.00%
-	-	82.45%	17.55%		1	1.00%
-	-	96.00%	4.00%		1	5.00%
-	-	42.86%	57.14%		2	1.00%
0.66%	14.69%	31.55%	53.10%		1	1.00%
-	-	40.00%	60.00%		2	-
3.30%	2.77%	87.77%	6.16%		2	3.00%
-	1.94%	80.64%	17.42%		2	2.00%
-	25.00%	50.00%	25.00%		2	25.00%
7.05%	8.33%	78.85%	5.77%		1	4.00%
0.87%	0.23%	87.08%	11.82%		1	1.00%
0.73%	0.40%	95.11%	3.76%		1	1.00%
-	-	92.46%	7.54%		1	1.00%
-	-	33.33%	66.67%		2	-
1.33%	1.33%	60.00%	37.34%		2	3.00%
-	-	-	100.00%		3	-
100.00%	-	-	-		2	100.00%

SECTION 11 Schedules

12b: Report on Forecast Capacity

This schedule requires a breakdown of current and forecast capacity and utilisation for each zone substation and current distribution transformer capacity. The data provided should be consistent with the information provided in the AMP. Information provided in this table should relate to the operation of the network in its normal steady state configuration.

12b(i): System Growth - Zone Substations

Existing Zone Substations	Current Peak Load (MVA)	Installed Firm Capacity (MVA)	Security of Supply Classification (type)	Transfer Capacity (MVA)	Utilisation of Installed Firm Capacity %
Waipukurau	8	18	CBD/Industrial/Residential/Rural	-	43%
Waipawa	4	18	CBD/Industrial/Residential/Rural	-	24%
Takapau	6	18	CBD/Industrial/Residential/Rural	-	34%
Ongaonga	5	12	Rural/Remote Rural	-	44%
Wilder Road	1	2.4	Rural/Remote Rural	-	43%

[1] *Extend forecast capacity table as necessary to disclose all capacity by each zone substation*

12b(ii): Transformer Capacity

	(MVA)
Distribution transformer capacity (EDB owned)	85
Distribution transformer capacity (Non-EDB owned)	9
Total distribution transformer capacity	94
Zone substation transformer capacity	47

	Installed Firm Capacity +5 years (MVA)	Utilisation of Installed Firm Capacity + 5yrs %	Installed Firm Capacity Constraint +5 years (cause)	Explanation
	22.5	35%	No constraint within +5 years	
	22.5	28%	No constraint within +5 years	
	22.5	27%	No constraint within +5 years	
	15.0	34%	No constraint within +5 years	
	3.0	45%	No constraint within +5 years	

12c: Report on Forecast Network Demand

This schedule requires a forecast of new connections (by consumer type), peak demand and energy volumes for the disclosure year and a 5 year planning period. The forecasts should be consistent with the supporting information set out in the AMP as well as the assumptions used in developing the expenditure forecasts in Schedule 11a and Schedule 11b and the capacity and utilisation forecasts in Schedule 12b.

12c(i): Consumer Connections

Number of ICPs connected in year by consumer type

		Current Year	CY+1
	for year ended	31 Mar 13	31 Mar 14
*Consumer types defined by EDB**		Number of connections	
Small Customers		8,169	8,234
Medium Customers		115	116
Large Customers		2	2
Connections total		8,286	8,352

**include additional rows if needed*

Distributed generation

	Number of connections		
	Installed connection capacity of distributed generation (MVA)		

12c(ii) System Demand

		Current Year	CY+1
		31 Mar 13	31 Mar 14
Maximum coincident system demand (MW)	for year ended	Number of connections	
	GXP demand	20	20
plus	Distributed generation output at HV and above		
	Maximum coincident system demand	20	20
less	Net transfers to (from) other EDBs at HV and above		
	Demand on system for supply to consumers' connection points	20	20
Electricity volumes carried (GWh)			
	Electricity supplied from GXPs	112	113
less	Electricity exports to GXPs		
plus	Electricity supplied from distributed generation		
less	Net electricity supplied to (from) other EDBs		
	Electricity entering system for supply to ICPs	112	113
less	Total energy delivered to ICPs	102	103
	Losses	10	10
	Load factor	64%	64%
	Loss ratio	8.9%	8.8%

CY+2 **31 Mar 15**	*CY+3* **31 Mar 16**	*CY+4* **31 Mar 17**	*CY+5* **31 Mar 18**
Number of connections			
8,300	8,367	8,433	8,500
117	118	119	120
2	2	2	2
8,419	8,487	8,554	8,622

CY+2 **31 Mar 15**	*CY+3* **31 Mar 16**	*CY+4* **31 Mar 17**	*CY+5* **31 Mar 18**
Number of connections			
20	20	21	21
20	20	21	21
20	20	21	21
114	115	116	117
114	115	116	117
104	104	105	106
10	11	11	11
65%	66%	63%	64%
8.8%	9.6%	9.5%	9.4%

12d: Report Forecast Interruptions and Duration

This schedule requires a forecast of SAIFI and SAIDI for disclosure and a 5 year planning period. The forecasts should be consistent with the supporting information set out in the AMP as well as the assumed impact of planned and unplanned SAIFI and SAIDI on the expenditures forecast provided in Schedule 11a and Schedule 11b.

	Current Year	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
for year ended	**31 Mar 13**	**31 Mar 14**	**31 Mar 15**	**31 Mar 16**	**31 Mar 17**	**31 Mar 18**
SAIDI						
Class B (planned interruptions on the network)	72.5	67.1	67.1	67.1	67.1	67.1
Class C (unplanned interruptions on the network)	53.9	130.4	130.4	130.4	130.4	130.4
SAIFI						
Class B (planned interruptions on the network)	0.33	1.21	1.21	1.21	1.21	1.21
Class C (unplanned interruptions on the network)	2.46	3.01	3.01	3.01	3.01	3.01

SECTION 11 Schedules

13: Report on Asset Management Maturity

This schedule requires information on the EDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Score	Evidence—Summary	Maturity Level 0	
3	Asset management policy	To what extent has an asset management policy been documented, authorised and communicated?	2	Centralines, under the management of Unison has adopted its Asset Management Policy. The policy has been approved by Unison's top management but has limited circulation within Centralines.	The organisation does not have a documented asset management policy.	
10	Asset management strategy	What has the organisation done to ensure that its asset management strategy is consistent with other appropriate organisational policies and strategies, and the needs of stakeholders?	2	Centralines is in the process of implementing the strategies developed at Unison. Unison has developed a comprehensive Asset Management System (the System). The System is a framework that provides structure to guide the behaviours necessary to foster high quality asset management for the benefit of stakeholders. A Line of Sight runs through the System linking people, accountabilities and policies/documentation. The System is published and reviewed and has the effect of ensuring consistency and compatibility between various components.	The organisation has not considered the need to ensure that its asset management strategy is appropriately aligned with the organisation's other organisational policies and strategies or with stakeholder requirements. OR The organisation does not have an asset management strategy.	
11	Asset management strategy	In what way does the organisation's asset management strategy take account of the lifecycle of the assets, asset types and asset systems over which the organisation has stewardship?	2	As part of the Management Services Agreement with Unison, Centralines will be implementing the strategies introduced at Unison at a level appropriate to Centralines.	The organisation has not considered the need to ensure that its asset management strategy is produced with due regard to the lifecycle of the assets, asset types or asset systems that it manages. OR The organisation does not have an asset management strategy.	
26	Asset management plan(s)	How does the organisation establish and document its asset management plan(s) across the life cycle activities of its assets and asset systems?	2	A strategic driver roadmap (Lifecycle Framework) is in place to establish and document asset management plan(s) across the life cycle activities of assets and asset systems at Centralines. This strategy commences at Unison and will include the documentation of plans for assets and asset systems at Centralines.	The organisation does not have an identifiable asset management plan(s) covering asset systems and critical assets.	

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	The organisation has an asset management policy, but it has not been authorised by top management, or it is not influencing the management of the assets.	The organisation has an asset management policy, which has been authorised by top management, but it has had limited circulation. It may be in use to influence development of strategy and planning but its effect is limited.	The asset management policy is authorised by top management, is widely and effectively communicated to all relevant employees and stakeholders, and used to make these persons aware of their asset related obligations.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The need to align the asset management strategy with other organisational policies and strategies as well as stakeholder requirements is understood and work has started to identify the linkages or to incorporate them in the drafting of asset management strategy.	Some of the linkages between the long-term asset management strategy and other organisational policies, strategies and stakeholder requirements are defined but the work is fairly well advanced but still incomplete.	All linkages are in place and evidence is available to demonstrate that, where appropriate, the organisation's asset management strategy is consistent with its other organisational policies and strategies. The organisation has also identified and considered the requirements of relevant stakeholders.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The need is understood, and the organisation is drafting its asset management strategy to address the lifecycle of its assets, asset types and asset systems.	The long-term asset management strategy takes account of the lifecycle of some, but not all, of its assets, asset types and asset systems.	The asset management strategy takes account of the lifecycle of all of its assets, asset types and asset systems.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation has asset management plan(s) but they are not aligned with the asset management strategy and objectives and do not take into consideration the full asset life cycle (including asset creation, acquisition, enhancement, utilisation and maintenance.	The organisation is in the process of putting in place comprehensive, documented asset management plan(s) that cover all life cycle activities, clearly aligned to asset management objectives and the asset management strategy.	Asset management plan(s) are established, documented, implemented and maintained for asset systems and critical assets to achieve the asset management strategy and asset management objectives across all life cycle phases.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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Question No.	Function	Question	Score	Evidence—Summary	Maturity Level 0	
27	Asset management plan(s)	How has the organisation communicated its plan(s) to all relevant parties to a level of detail appropriate to the receiver's role in their delivery?	2	The asset management plans at Centralines are communicated to its internal contractor responsible for the delivery of the plans through its Enterprise Asset Management System and other supporting software systems.	The organisation does not have plan(s) or their distribution is limited to the authors.	
29	Asset management plan(s)	How are designated responsibilities for delivery of asset plan actions documented?	3	Centralines has appropriate documentation in place defining the responsibility for delivery of Capital and Maintenance Plans.	The organisation has not documented responsibilities for delivery of asset plan actions.	
31	Asset management plan(s)	What has the organisation done to ensure that appropriate arrangements are made available for the efficient and cost effective implementation of the plan(s)? (Note this is about resources and enabling support.)	2	A number of tools have been developed to prioritise and schedule works, which then leads to resource requirement assessments, including gaps to be filled to meet the planned programme of works.	The organisation has not considered the arrangements needed for the effective implementation of plan(s).	
33	Contingency planning	What plan(s) and procedure(s) does the organisation have for identifying and responding to incidents and emergency situations and ensuring continuity of critical asset management activities?	2	Unison Management has in place a number of documented processes and procedures in its controlled documents system, which detail roles and responsibilities in emergencies and crises, including escalation points. Unison is undertaking a review and redevelopment of its business continuity management capability (including Centralines), including assessments of DR capability requirements for critical business processes (e.g., information availability, applications, disaster recovery sites).	The organisation has not considered the need to establish plan(s) and procedure(s) to identify and respond to incidents and emergency situations.	

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	The plan(s) are communicated to some of those responsible for delivery of the plan(s). OR Communicated to those responsible for delivery is either irregular or ad-hoc.	The plan(s) are communicated to most of those responsible for delivery but there are weaknesses in identifying relevant parties resulting in incomplete or inappropriate communication. The organisation recognises improvement is needed as is working towards resolution.	The plan(s) are communicated to all relevant employees, stakeholders and contracted service providers to a level of detail appropriate to their participation or business interests in the delivery of the plan(s) and there is confirmation that they are being used effectively.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	Asset management plan(s) inconsistently document responsibilities for delivery of plan actions and activities and/or responsibilities and authorities for implementation inadequate and/or delegation level inadequate to ensure effective delivery and/or contain misalignments with organisational accountability.	Asset management plan(s) consistently document responsibilities for the delivery of actions but responsibility/ authority levels are inappropriate/ inadequate, and/ or there are misalignments within the organisation.	Asset management plan(s) consistently document responsibilities for the delivery actions and there is adequate detail to enable delivery of actions. Designated responsibility and authority for achievement of asset plan actions is appropriate.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation recognises the need to ensure appropriate arrangements are in place for implementation of asset management plan(s) and is in the process of determining an appropriate approach for achieving this.	The organisation has arrangements in place for the implementation of asset management plan(s) but the arrangements are not yet adequately efficient and/or effective. The organisation is working to resolve existing weaknesses.	The organisation's arrangements fully cover all the requirements for the efficient and cost effective implementation of asset management plan(s) and realistically address the resources and timescales required, and any changes needed to functional policies, standards, processes and the asset management information system.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation has some ad-hoc arrangements to deal with incidents and emergency situations, but these have been developed on a reactive basis in response to specific events that have occurred in the past.	Most credible incidents and emergency situations are identified. Either appropriate plan(s) and procedure(s) are incomplete for critical activities or they are inadequate. Training/ external alignment may be incomplete.	Appropriate emergency plan(s) and procedure(s) are in place to respond to credible incidents and manage continuity of critical asset management activities consistent with policies and asset management objectives. Training and external agency alignment is in place.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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Question No.	Function	Question	Score	Evidence—Summary	Maturity Level 0	
37	Structure, authority and responsibilities	What has the organisation done to appoint member(s) of its management team to be responsible for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s)?	3	Centralines has a Management Services Agreement with Unison. The Area Manager Centralines, Operations Manager and Network Manager Centralines are responsible to ensure that assets deliver the requirements of the asset management strategy, objectives and plans. Further support is provided through Unison's Networks and Operations Team lead by the General Manager who is a member of the Executive Management Team.	Top management has not considered the need to appoint a person or persons to ensure that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s).	
40	Structure, authority and responsibilities	What evidence can the organisation's top management provide to demonstrate that sufficient resources are available for asset management?	2	Centralines uses a basic scheduling tool to evaluate and plan works over time, which links to resource availability and requirements. When work is outsourced to Unison Contracting an IT-based scheduling tool is used to evaluate and plan works over time, which links to resource availability and requirements. The tool enables an evaluation of resource gaps, so that priorities can be re-evaluated or additional resources sought.	The organisation's top management has not considered the resources required to deliver asset management.	
42	Structure, authority and responsibilities	To what degree does the organisation's top management communicate the importance of meeting its asset management requirements?	2	The importance of meeting asset management requirements is communicated to select parts of the organisation, and there has been significant cross-team collaboration on a service delivery optimisation project in 2012/13 to improve the effectiveness of service delivery, across a wide variety of processes, this has been driven by top management.	The organisation's top management has not considered the need to communicate the importance of meeting asset management requirements.	
45	Outsourcing of asset management activities	Where the organisation has outsourced some of its asset management activities, how has it ensured that appropriate controls are in place to ensure the compliant delivery of its organisational strategic plan, and its asset management policy and strategy?	2	Centralines "outsources" to Unison Contracting and some subcontractors. Regular auditing of work takes place, and there is close collaboration over scheduling of works in order to deliver the planned programme.	The organisation has not considered the need to put controls in place.	

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	Top management understands the need to appoint a person or persons to ensure that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s).	Top management has appointed an appropriate people to ensure the assets deliver the requirements of the asset management strategy, objectives and plan(s) but their areas of responsibility are not fully defined and/or they have insufficient delegated authority to fully execute their responsibilities.	The appointed person or persons have full responsibility for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s). They have been given the necessary authority to achieve this.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisations top management understands the need for sufficient resources but there are no effective mechanisms in place to ensure this is the case.	A process exists for determining what resources are required for its asset management activities and in most cases these are available but in some instances resources remain insufficient.	An effective process exists for determining the resources needed for asset management and sufficient resources are available. It can be demonstrated that resources are matched to asset management requirements.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisations top management understands the need to communicate the importance of meeting its asset management requirements but does not do so.	Top management communicates the importance of meeting its asset management requirements but only to parts of the organisation.	Top management communicates the importance of meeting its asset management requirements to all relevant parts of the organisation.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation controls its outsourced activities on an ad-hoc basis, with little regard for ensuring for the compliant delivery of the organisational strategic plan and/or its asset management policy and strategy.	Controls systematically considered but currently only provide for the compliant delivery of some, but not all, aspects of the organisational strategic plan and/or its asset management policy and strategy. Gaps exist.	Evidence exists to demonstrate that outsourced activities are appropriately controlled to provide for the compliant delivery of the organisational strategic plan, asset management policy and strategy, and that these controls are integrated into the asset management system.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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Question No.	Function	Question	Score	Evidence—Summary	Maturity Level 0	
48	Training, awareness and competence	How does the organisation develop plan(s) for the human resources required to undertake asset management activities - including the development and delivery of asset management strategy, process(es), objectives and plan(s)?	2	Centralines has access to Unison's resource scheduling tool, which identifies by type of resource the requirements to meet the planned programme of works. As a result of the use of this tool, skill gaps are identified, including over the longer term, which enables Cemtralines to address through recruitment or sub-contracting.	The organisation has not recognised the need for assessing human resources requirements to develop and implement its asset management system.	
49	Training, awareness and competence	How does the organisation identify competency requirements and then plan, provide and record the training necessary to achieve the competencies?	2	Centralines uses a "Network Competency Standard" (SD0001) to identify competencies required for task specific functions carried out by staff and contractors engaged to work on the assets. The standard is reviewed regularly with inputs from the SM-EI's and information from other NZ EDB's. The employer is to submit a declaration that the individual staff member has received full training and is fully competent in the tasks they will be required to undertake.	The organisation does not have any means in place to identify competency requirements.	
50	Training, awareness and competence	How does the organisation ensure that persons under its direct control undertaking asset management related activities have an appropriate level of competence in terms of education, training or experience?	3	Centralines uses a software package called "Vault" to track competencies and training/re-training requirements.	The organization has not recognised the need to assess the competence of person(s) undertaking asset management related activities.	
53	Communication, participation and consultation	How does the organisation ensure that pertinent asset management information is effectively communicated to and from employees and other stakeholders, including contracted service providers?	2	Given the small size of the business, communication at Centralines is effective at all levels of the organisation.	The organisation has not recognised the need to formally communicate any asset management information.	

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	The organisation has recognised the need to assess its human resources requirements and to develop a plan(s). There is limited recognition of the need to align these with the development and implementation of its asset management system.	The organisation has developed a strategic approach to aligning competencies and human resources to the asset management system including the asset management plan but the work is incomplete or has not been consistently implemented.	The organisation can demonstrate that plan(s) are in place and effective in matching competencies and capabilities to the asset management system including the plan for both internal and contracted activities. Plans are reviewed integral to asset management system process(es).	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation has recognised the need to identify competency requirements and then plan, provide and record the training necessary to achieve the competencies.	The organisation is the process of identifying competency requirements aligned to the asset management plan(s) and then plan, provide and record appropriate training. It is incomplete or inconsistently applied.	Competency requirements are in place and aligned with asset management plan(s). Plans are in place and effective in providing the training necessary to achieve the competencies. A structured means of recording the competencies achieved is in place.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	Competency of staff undertaking asset management related activities is not managed or assessed in a structured way, other than formal requirements for legal compliance and safety management.	The organization is in the process of putting in place a means for assessing the competence of person(s) involved in asset management activities including contractors. There are gaps and inconsistencies.	Competency requirements are identified and assessed for all persons carrying out asset management related activities - internal and contracted. Requirements are reviewed and staff reassessed at appropriate intervals aligned to asset management requirements.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	There is evidence that the pertinent asset management information to be shared along with those to share it with is being determined.	The organisation has determined pertinent information and relevant parties. Some effective two way communication is in place but as yet not all relevant parties are clear on their roles and responsibilities with respect to asset management information.	Two way communication is in place between all relevant parties, ensuring that information is effectively communicated to match the requirements of asset management strategy, plan(s) and process(es). Pertinent asset information requirements are regularly reviewed.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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Question No.	Function	Question	Score	Evidence—Summary	Maturity Level 0	
59	Asset Management System documentation	What documentation has the organisation established to describe the main elements of its asset management system and interactions between them?	3	The main elements of the Asset Management System are documented in the Asset Management Policy, the regulatory Asset Management Plan, Standards and reviewed at prescribed intervals.	The organisation has not established documentation that describes the main elements of the asset management system.	
62	Information management	What has the organisation done to determine what its asset management information system(s) should contain in order to support its asset management system?	2	There is ongoing analysis based on requirements from key users that lead to projects for significant or minor change. In each case a change request is created to initiate the change. Currently this is as a result of identified requirement rather than a holistic approach to Asset Management requirements.	The organisation has not considered what asset management information is required.	
63	Information management	How does the organisation maintain its asset management information system(s) and ensure that the data held within it (them) is of the requisite quality and accuracy and is consistent?	2	Controls are in place to ensure that complete and consistent data is maintained in systems such as the GIS. These are applied and regularly maintained.	There are no formal controls in place or controls are extremely limited in scope and/or effectiveness.	
64	Information management	How has the organisation's ensured its asset management information system is relevant to its needs?	2	A study has been undertaken by the business to identify the needs of an asset management system to support the Lifecycle Asset Management process, however this has yet to be progressed to an analysis of a holistic system requirement to meet this business requirement. This is scheduled for this next financial year.	The organisation has not considered the need to determine the relevance of its management information system. At present there are major gaps between what the information system provides and the organisations needs.	
69	Risk management process(es)	How has the organisation documented process(es) and/ or procedure(s) for the identification and assessment of asset and asset management related risks throughout the asset life cycle?	2	Unison has in place a comprehensive risk policy and risk framework, which sets out the requirements for how risks are identified and managed to appropriate risk tolerances.	The organisation has not considered the need to document process(es) and/or procedure(s) for the identification and assessment of asset and asset management related risks throughout the asset life cycle.	

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	The organisation is aware of the need to put documentation in place and is in the process of determining how to document the main elements of its asset management system.	The organisation in the process of documenting its asset management system and has documentation in place that describes some, but not all, of the main elements of its asset management system and their interaction.	The organisation has established documentation that comprehensively describes all the main elements of its asset management system and the interactions between them. The documentation is kept up to date.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation is aware of the need to determine in a structured manner what its asset information system should contain in order to support its asset management system and is in the process of deciding how to do this.	The organisation has developed a structured process to determine what its asset information system should contain in order to support its asset management system and has commenced implementation of the process.	The organisation has determined what its asset information system should contain in order to support its asset management system. The requirements relate to the whole life cycle and cover information originating from both internal and external sources.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation is aware of the need for effective controls and is in the process of developing an appropriate control process(es).	The organisation has developed a controls that will ensure the data held is of the requisite quality and accuracy and is consistent and is in the process of implementing them.	The organisation has effective controls in place that ensure the data held is of the requisite quality and accuracy and is consistent. The controls are regularly reviewed and improved where necessary.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation understands the need to ensure its asset management information system is relevant to its needs and is determining an appropriate means by which it will achieve this. At present there are significant gaps between what the information system provides and the organisation's needs.	The organisation has developed and is implementing a process to ensure its asset management information system is relevant to its needs. Gaps between what the information system provides and the organisations needs have been identified and action is being taken to close them.	The organisation's asset management information system aligns with its asset management requirements. Users can confirm that it is relevant to their needs.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation is aware of the need to document the management of asset related risk across the asset lifecycle. The organisation has plan(s) to formally document all relevant process(es) and procedure(s) or has already commenced this activity.	The organisation is in the process of documenting the identification and assessment of asset related risk across the asset lifecycle but it is incomplete or there are inconsistencies between approaches and a lack of integration.	Identification and assessment of asset related risk across the asset lifecycle is fully documented. The organisation can demonstrate that appropriate documented mechanisms are integrated across life cycle phases and are being consistently applied.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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Question No.	Function	Question	Score	Evidence—Summary	Maturity Level 0	
79	Use and maintenance of asset risk information	How does the organisation ensure that the results of risk assessments provide input into the identification of adequate resources and training and competency needs?	2	The organisation addresses risk management at Strategic, Tactical and Operational levels. Centralines maintains a risk register where risks, appropriate actions to eliminate or mitigate risks, and follow up dates are logged. Inconsistencies do exist and will be addressed through the Lifecycle Asset Management Framework project initiated at Unison.	The organisation has not considered the need to conduct risk assessments.	
82	Legal and other requirements	What procedure does the organisation have to identify and provide access to its legal, regulatory, statutory and other asset management requirements, and how is requirements incorporated into the asset management system?	3	Centralines has in place a comprehensive legal compliance programme that uses a questionnaire that is filled out twelve-monthly to establish compliance with all applicable legislation and regulations. The content is reviewed at each twelve-monthly review or updated when we are aware of changes in applicable regulations/legislations.	The organisation has not considered the need to identify its legal, regulatory, statutory and other asset management requirements.	
88	Life Cycle Activities	How does the organisation establish implement and maintain process(es) for the implementation of its asset management plan(s) and control of activities across the creation, acquisition or enhancement of assets. This includes design, modification, procurement, construction and commissioning activities?	2	These processes and procedures are addressed through the work being undertaken in the Lifecycle asset management framework project initiated at Unison.	The organisation does not have process(es) in place to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning.	

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	The organisation is aware of the need to consider the results of risk assessments and effects of risk control measures to provide input into reviews of resources, training and competency needs. Current input is typically ad-hoc and reactive.	The organisation is in the process ensuring that outputs of risk assessment are included in developing requirements for resources and training. The implementation is incomplete and there are gaps and inconsistencies.	Outputs from risk assessments are consistently and systematically used as inputs to develop resources, training and competency requirements. Examples and evidence is available.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation identifies some its legal, regulatory, statutory and other asset management requirements, but this is done in an ad-hoc manner in the absence of a procedure.	The organisation has procedure(s) to identify its legal, regulatory, statutory and other asset management requirements, but the information is not kept up to date, inadequate or inconsistently managed.	Evidence exists to demonstrate that the organisation's legal, regulatory, statutory and other asset management requirements are identified and kept up to date. Systematic mechanisms for identifying relevant legal and statutory requirements.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation is aware of the need to have process(es) and procedure(s) in place to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning but currently do not have these in place (note: procedure(s) may exist but they are inconsistent/incomplete).	The organisation is in the process of putting in place process(es) and procedure(s) to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning. Gaps and inconsistencies are being addressed.	Effective process(es) and procedure(s) are in place to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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Question No.	Function	Question	Score	Evidence—Summary	Maturity Level 0	
91	Life Cycle Activities	How does the organisation ensure that process(es) and/ or procedure(s) for the implementation of asset management plan(s) and control of activities during maintenance (and inspection) of assets are sufficient to ensure activities are carried out under specified conditions, are consistent with asset management strategy and control cost, risk and performance?	2	Through the Service Delivery Optimisation project, Unison is in the process of improving its existing processes and procedures to manage the implementation of asset management plans and control of activities during maintenance and inspection of its assets. These improvements will be implemented at Centralines on completion of the project.	The organisation does not have process(es)/ procedure(s) in place to control or manage the implementation of asset management plan(s) during this life cycle phase.	
95	Performance and condition monitoring	How does the organisation measure the performance and condition of its assets?	2	A number of initiatives are underway at Unison in the areas of development of dynamic rating capability, advanced data processing algorithms, condition monitoring and diagnosis, failure forecasting and remaining life assessment. The outputs of this work will also be implemented on the Centralines Network.	The organisation has not considered how to monitor the performance and condition of its assets.	
99	Investigation of asset-related failures, incidents and nonconformities	How does the organisation ensure responsibility and the authority for the handling, investigation and mitigation of asset-related failures, incidents and emergency situations and non conformances is clear, unambiguous, understood and communicated?	3	Centralines has managers which routinely conduct inspections and investigations following any significant asset failures. Non-conformances are documented and reworks actioned and reaudited. Centralines has policies and procedures in place which assign responsibilities for managing emergency or crisis situations.	The organisation has not considered the need to define the appropriate responsibilities and the authorities.	
105	Audit	What has the organisation done to establish procedure(s) for the audit of its asset management system (process(es))?	2	The Asset Management Team has been collaborating with Asset Management Consultants to review and ultimately improve its asset management system and practices.	The organisation has not recognised the need to establish procedure(s) for the audit of its asset management system.	

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	The organisation is aware of the need to have process(es) and procedure(s) in place to manage and control the implementation of asset management plan(s) during this life cycle phase but currently do not have these in place and/ or there is no mechanism for confirming they are effective and where needed modifying them.	The organisation is in the process of putting in place process(es) and procedure(s) to manage and control the implementation of asset management plan(s) during this life cycle phase. They include a process for confirming the process(es)/procedure(s) are effective and if necessary carrying out modifications.	The organisation has in place process(es) and procedure(s) to manage and control the implementation of asset management plan(s) during this life cycle phase. They include a process, which is itself regularly reviewed to ensure it is effective, for confirming the process(es)/procedure(s) are effective and, if necessary, carrying out modifications.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation recognises the need for monitoring asset performance but has not developed a coherent approach. Measures are incomplete, predominantly reactive and lagging. There is no linkage to asset management objectives.	The organisation is developing coherent asset performance monitoring linked to asset management objectives. Reactive and proactive measures are in place. Use is being made of leading indicators and analysis. Gaps and inconsistencies remain.	Consistent asset performance monitoring linked to asset management objectives is in place and universally used including reactive and proactive measures. Data quality management and review process are appropriate. Evidence of leading indicators and analysis.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation understands the requirements and is in the process of determining how to define them.	The organisation are in the process of defining the responsibilities and authorities with evidence. Alternatively there are some gaps or inconsistencies in the identified responsibilities/authorities.	The organisation have defined the appropriate responsibilities and authorities and evidence is available to show that these are applied across the business and kept up to date.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation understands the need for audit procedure(s) and is determining the appropriate scope, frequency and methodology(s).	The organisation is establishing its audit procedure(s) but they do not yet cover all the appropriate asset-related activities.	The organisation can demonstrate that its audit procedure(s) cover all the appropriate asset-related activities and the associated reporting of audit results. Audits are to an appropriate level of detail and consistently managed.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

SECTION 11 Schedules

Question No.	Function	Question	Score	Evidence—Summary	Maturity Level 0	
109	Corrective & Preventative action	How does the organisation instigate appropriate corrective and/or preventive actions to eliminate or prevent the causes of identified poor performance and non conformance?	2	Managers inspect works and work-sites for both quality and health and safety-related requirements. Audit reports are produced, with non-conformances identified, with reworks required. Where required alerts are communicated widely to address any trends or reinforce required procedures.	The organisation does not recognise the need to have systematic approaches to instigating corrective or preventive actions.	
113	Continual Improvement	How does the organisation achieve continual improvement in the optimal combination of costs, asset related risks and the performance and condition of assets and asset systems across the whole life cycle?	1	Centralines recognises three competing drivers as the cornerstones of asset management. These are Long-Term Value, Asset Performance and Risk Management. Continual Improvement initiatives will be implemented in conjunction with the work done by Unison in this area.	The organisation does not consider continual improvement of these factors to be a requirement, or has not considered the issue.	
115	Continual Improvement	How does the organisation seek and acquire knowledge about new asset management related technology and practices, and evaluate their potential benefit to the organisation?	3	Under the management of Unison, Centralines has access to a Technology Information Portal which is a suppository for capturing information on new technologies, products and best industry practices. If it is deemed worth progressing it is then subjected to a detailed new technology and product evaluation process. Unison has also formed strong relationships with other EDBs both nationally and internationally some of which have been formalised to allow the sharing of IP around technologies.	The organisation makes no attempt to seek knowledge about new asset management related technology or practices.	

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	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
	The organisation recognises the need to have systematic approaches to instigating corrective or preventive actions. There is ad-hoc implementation for corrective actions to address failures of assets but not the asset management system.	The need is recognised for systematic instigation of preventive and corrective actions to address root causes of non compliance or incidents identified by investigations, compliance evaluation or audit. It is only partially or inconsistently in place.	Mechanisms are consistently in place and effective for the systematic instigation of preventive and corrective actions to address root causes of non compliance or incidents identified by investigations, compliance evaluation or audit.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	A Continual Improvement ethos is recognised as beneficial, however it has just been started, and or covers partially the asset drivers.	Continuous improvement process(es) are set out and include consideration of cost risk, performance and condition for assets managed across the whole life cycle but it is not yet being systematically applied.	There is evidence to show that continuous improvement process(es) which include consideration of cost risk, performance and condition for assets managed across the whole life cycle are being systematically applied.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
	The organisation is inward looking, however it recognises that asset management is not sector specific and other sectors have developed good practice and new ideas that could apply. Ad-hoc approach.	The organisation has initiated asset management communication within sector to share and, or identify 'new' to sector asset management practices and seeks to evaluate them.	The organisation actively engages internally and externally with other asset management practitioners, professional bodies and relevant conferences. Actively investigates and evaluates new practices and evolves its asset management activities using appropriate developments.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

APPENDIX Glossary of Terms

CENTRALINES
LIMITED

Appendix

ABS	Air Break Switch
AC	Alternating Current
ACSR	Aluminium Conductor Steel Reinforced
AMP	Asset Management Plan
CAD	Computer Aided Drafting
CAIDI	Customer Average Interruption Duration Index
CAPEX	Capital Expenditure
CB	Circuit Breaker
CBD	Central Business District
CDEM	Civil Defence Emergency Management
CEO	Chief Executive Officer
CHBPCT	Central Hawkes Bay Power Consumers' Trust
CT	Current Transformer
DC	Direct Current
DG	Distributed Generation
DGA	Dissolved Gas Analysis
DR	Disaster Recovery
DRC	Depreciated Replacement Cost
ECANZ	Electrical Contractors Association of New Zealand
EDRMS	Electronic Document and Records Management System
EDB	Electricity Distribution Business (same as below)
ELB	Electricity Lines Business
GDP	Gross Domestic Product
GIS	Geo-spatial Information System
GM	General Manager
GMI	Ground Mount Inspection
GPS	Global Positioning System
GWh	Giga Watt-hours
GXP	Grid Exit Point
HDPE	High Density Polyethylene
HB	Hawke's Bay
HR	Human Resources
HV	High Voltage
ICP	Installation Control Point
IS	Information System/s
kV	Kilo Volts
kVA	Kilo Volt Amps
LCP	Legislative Compliance Programme
LV	Low Voltage
MD	Maximum Demand
MDPE	Medium Density Polyethylene
MEUG	Major Electricity Users Group
MIND	Mineral Insulated Non Draining
MVA	Mega Volt-Amps
NIF	Network Investment Framework
NRIM	Network Renewal Investment Model
ODRC	Optimised Deprival Replacement Cost
ODV	Optimised Deprival Value
OH	Overhead
OHUG	Overhead to Underground Conversion
OPEX	Operational Expenditure
PC	Personal Computer
PDA	Personal Digital Assistant
PI	Plant Information
PILC	Paper Insulated, Lead Covered
PLC	Programmable Logic Controller
POS	Point of Supply
PR	Public Relations
PVC	Polyvinyl Chloride
RC	Replacement Cost
RCS	Remote Controlled Switch
RLE	Residual Life Expectancy
RMA	Resource Management Act
RMS	Ring Main Switch
RMU	Ring Main Unit (same as Ring Main Switch)
RTU	Remote Terminal Unit
SAIFI	System Average Interruption Frequency Index
SAIDI	System Average Interruption Duration Index
SAN	Storage Area Network
SCADA	Supervisory Control and Data Acquisition
SCI	Statement of Corporate Intent
SF_6	Sulphur Hexaflouride (gas)
SLT	Service Level Target
Sys Op	System Operator
SWER	Single Wire Earth Return
UG	Underground
UHF	Ultra High Frequency
V	Volts
VAr	Volt Amps Reactive
VHF	Very High Frequency
VT	Voltage Transformer
WASP	Works, Assets, Sceduling and People (Software package)
XLPE	Cross Linked Polyethylene
ZS	Zone Substation

CENTRALINES
LIMITED

CERTIFICATION FOR YEAR-BEGINNING DISCLOSURES

Pursuant to Schedule 17

We, Samuel Robinson and James Aitken, being directors of Centralines Networks Limited certify that, having made all reasonable enquiry, to the best of our knowledge-

a) the attached Asset Management Plan of Centralines Networks Limited prepared for the purposes of clause 2.4.1, clause2.6.1 and subclauses 2.6.3(4) and 2.6.5(3) of the Commerce Commission's Electricity Distribution Information Disclosure Determination 2012 complies with those determination.

b) The prospective financial or non-financial information included in the attached information has been measured on a basis consistent with regulatory requirements or recognised industry standards.

Director Date: 27th March 2013

Director Date: 27th March 2013

CENTRALINES LIMITED
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