ASSET MANAGEMENT PLAN 2005-2015

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OTAGONET JOINT VENTURE ASSET MANAGEMENT PLAN

(A) SUMMARY OF ASSET MANAGEMENT PLAN

(i) PURPOSE OF THE PLAN

The Asset Management Plan is intended to demonstrate responsible stewardship of assets by PowerNet Limited on behalf of OtagoNet Joint Venture (OtagoNet), its customers and stakeholders. The purpose of the plan is to provide a systematic approach to asset management which is intended to ensure that the condition and performance of the shareholder's network assets are being maintained, utilised and extended to meet all safety, legislative, customer and stakeholder requirements in the most cost effective manner.

The present owners and PowerNet as the Asset Manager have operated the network for a relatively short period and are continuing to review all assets on an ongoing basis to identify where further improvements can be made to improve reliability and customer service. As further information becomes available this Asset Management Plan will be subject to change.

(ii) DATE AND PERIOD OF PLAN

This Asset Management Plan is dated 28 June 2005 and is for the period 1 April 2005 to 31 March 2015. It is intended that this document is reviewed annually as a precursor to the preparation of the Annual Business Plan. The plan will be published on the web site and as part of the consultation procedure, submissions will be invited from all stakeholders prior to the next review process commencing at the end of 2005.

Submissions were requested from the public via an advertisement in the Otago Daily Times newspapers and via the PowerNet web page. At the date of this review no submissions were received.

(iii) ASSET MANAGEMENT SYSTEMS, PROCESSES AND INFORMATION

Asset management systems are owned by the asset manager, PowerNet and include the Geographic Information System (GIS) databases, reliability databases, maintenance records, load flow analysis software, SCADA, Finance 1 accounting package, WASP Asset and Maintenance Management System and UMS spend optimisation tool.

(iv) NETWORK AND ASSET DESCRIPTION

The OtagoNet network supplies a large mainly rural area throughout North and South Otago, but includes the townships of Balclutha, Palmerston, Milton, Middlemarch, Ranfurly and Owaka.

There is approximately 75km of 66kV, 550km of 33kV, 250km of 22kV and 2,970km of 11kV and 350km of 400v network.

The network is supplied through three Transpower Grid Exit Points (GXPs) and there are 31 zone substations and approximately 4,150 distribution transformers. There are a total of 14,540 connected Installation Control Points (ICPs), which gives a density of 3.5 ICPs per kilometre of line.

There is little interconnection at the subtransmission level between zone substations or at distribution level. Larger zone substations have duplicated equipment or limited distribution system backup.

There are three ripple injection plants, one at each of the Transpower GXPs injecting at 33kV.

(v) SERVICE LEVEL OBJECTIVES

During previous years OtagoNet has consulted with local dairy farmers, commercial businesses, domestic customers and the major users at a number of venues in Otago. Generally users were satisfied with the current overall levels of service, some wanted improved reliability levels of service and in all cases they were concerned not to see a deterioration in those levels.

One area of concern raised was the regulatory importance of reducing customer minutes by restoring urban areas before restoring rural areas, one particular case was restoring of Owaka Township before the rural Clydevale dairy farmers. While hundreds of customers were restored during the day some 10 dairy farms went without power for over a day. The concern raised was that while the statistics showed only 10 customers were without power compared with 100 being restored, this did not reflect the extreme distress of literally thousands of dairy cattle that could not be milked or given fresh water.

The result of this consultation was that extra effort and capital expense will be spent on alternative feeds into important dairying areas, perhaps initially at the expense of reduced levels of improvement to other areas.

Although reliability statistics vary each year, the 10-year objective for the OtagoNet network is to establish a decreasing trend to consistently achieve an overall five year average figure of less than five faults per 100 circuit kilometres. For the 2004-05 year the five year average is 5.5 faults per 100km.

The 10-year objective for OtagoNet is to establish a decreasing trend to consistently achieve an overall five year average CAIDI figure of less than 83.1 minutes. For the 2004-05 year the five year average CAIDI for network faults was 91.7 minutes.

The 10-year objective for OtagoNet is to establish a decreasing trend to consistently achieve an overall five year average SAIFI figure of less than 1.71. For the 2004-05 year the five year average SAIFI for network faults was 1.97.

The above targets will result in a five year average SAIDI figure of less than 142.3 minutes for network faults. For the 2004-05 year the five year average SAIDI was 179 minutes.

Taking into account the increased use of live line working and increased renewal of lines and reconductoring, the CAIDI for planned interruptions is expected to remain at about 180 minutes, with SAIFI increasing to 0.51 and the resulting SAIDI increasing to about 92 minutes. These five year averages are likely to be worse due to the increased line rebuilding.

The above targets will only be met through the planned renewal of obsolete equipment and overhead lines and, where appropriate, investment in modern technology.

As increasing revenue will be required to fund the planned asset renewal expenditure, it is thus acknowledged that the ability of the Company to achieve the above targets will be contingent on any price constraint through the Commerce Commission regulatory regime.

(vi) LIFE CYCLE ASSET MANAGEMENT

Asset maintenance management is condition-driven determined from diagnostic testing, visual inspections, faults incidents and technological, safety and operational obsolescence.

OtagoNet diagnostic testing includes dissolved gas analysis of power transformers, ultrasonic and partial discharge testing of high voltage equipment and infrared surveys.

Maintenance budgets average approximately 1.1% of replacement value of the assets or 2.3% of the Depreciated Replacement Value.

Data for the maintenance programmes originates from surveys carried out by both PowerNet staff and contractors. These resulting projects are then considered by a powerful spend optimisation tool, which compares all the projects against a number of criteria set by the Company management committee. This tool will help to ensure the best outcome for the dollars spent.

Localised load growth, customer requirements, risk management, asset economic lives and regulatory and PowerNet Network Standard compliance are all inputs into the spend optimisation tool to determine the future works programmes.

(vii) RISK ASSESSMENT

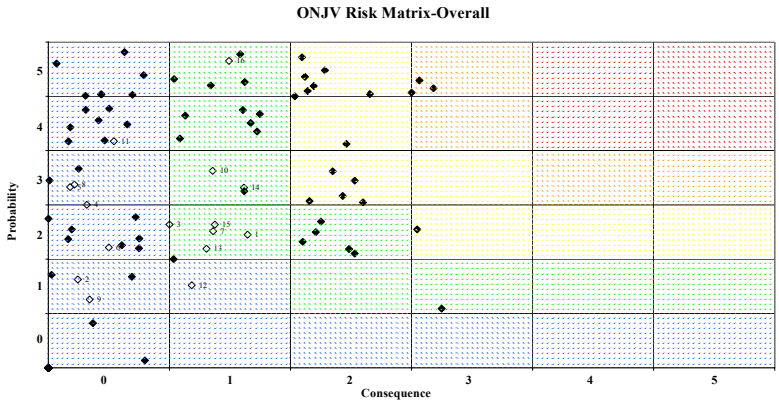
The reticulation network covers a large area of the south-eastern part of the South Island of New Zealand. Floods and severe storms tend to be localised and so the risk of catastrophic devastation is small.

The main risks to reliability are associated with the 11kV switchboards and transformers in zone substations, particularly those with only one transformer and little interconnection. The Transpower Palmerston 33kV supply is also only fed by a single transformer and 33kV bus. Other risks are a large local earthquake and weather events affecting the long radial 11kV lines.

Further risks to the business include technology changes, significant load pattern changes either by customer group or throughout the network, regulatory changes and finally economic changes.

No distributed generation has been installed on the network to date and whilst every endeavour would be made to accommodate such, depending on the location and capacity of any proposed generation, significant upgrade to the network may be required.

All projections have also been based on no significant changes with respect to the local economy or load pattern changes of a general nature.



The vertical axis is "probability" and the horizontal axis is "consequence". There are no considered high risk scenarios to be addressed on the OtagoNet network. Projects being considered are in the medium to low overall risk areas.

(viii) PERFORMANCE AND IMPROVEMENT PLANS

Plans to improve performance are not only based on increased capital investment in network security and reliability, but also include optimising existing asset utilisation, targeted maintenance, vegetation control and increased live line working.

Network performance incentives are included in maintenance and faults contracts that reflect the Customer Charter guarantees in the Use of System Agreements.

(b) BACKGROUND AND OBJECTIVES

(i) INTERACTION WITH OTHER CORPORATE GOALS, BUSINESS PLANNING PROCESSES AND OTHER PLANS AND DRIVERS

The Asset Management Plan is used as a basis for the preparation of the Annual Business Plan, which extends over a period of five years.

The Annual Business Plan details the Core Business, Goals, Vision Statement and Critical Success Factors, Nature and Scope of the Commercial Activity, Customer Service Objectives and Commercial Objectives for OtagoNet. The Asset Management Plan details systems and projects designed to meet these goals, factors and objectives for OtagoNet.

Requirements of the Asset Management Plan and its interaction with the Annual Business Plan are detailed within the PowerNet Quality Systems (ISO 9001:2000) procedures.

The drivers for the Asset Management Plan are as follows:

(a) Regulations – includes changes to ODV practice, prices and performance.

(b) Improvements in reliability and supply security to meet compliance with stated objectives and customer requirements.

(c) Variations in demand on the network.

(d) The quality of supply – ensuring voltage and harmonic levels are within prescribed limits.

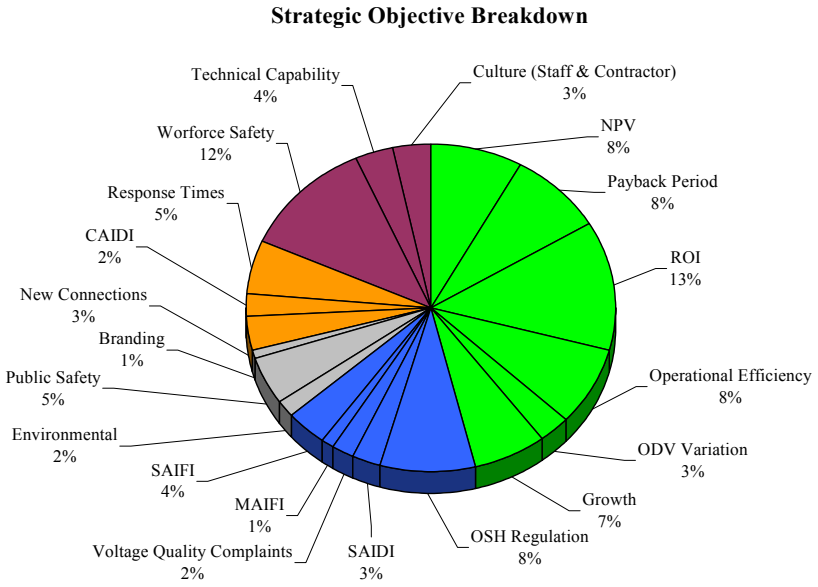
(e) Economic efficiency – ensuring there is a correct balance between asset maintenance and renewal; network losses and capital investment, and network capacity and utilisation.

(f) Public and staff safety – design and maintenance will maintain or enhance public and staff safety.

(g) Environmental responsibility – maintenance and capital development projects will be subject to cognisance of environmental considerations.

(h) Rate of return.

The strategic objectives weightings for OtagoNet as determined by the Management Committee are shown below:



(ii) PLANNING PERIODS

This Asset Management Plan records detail of the work required and budgets for a 10-year period. The plan draws on historical performance data and predicted life time requirements for all classes of network equipment with time periods beyond the 10 years recorded. Further the plan incorporates periodic and life cycle maintenance requirements which can vary from repetitive six monthly checks through to major equipment refurbishment after 40 to 50 years service life.

(iii) STAKEHOLDER INTERESTS

The principal stakeholders in the performance of the network assets are the end-use customers, the shareholders of the company, the electricity retailers and PowerNet as the asset manager.

The customer's interests are mainly centred on the reliability, with a preference to minimise cost. Consultation with the customers did not rate quality as the highest priority, indicating a level of satisfaction or acceptance of present service levels. The shareholders of OtagoNet require a return on their investment and want to maintain the worth of their investment while improving the value of the service provided to the end use customers. PowerNet is employed by OtagoNet to provide the appropriate solutions to improve service levels to customers, provide adequate investor returns and security whilst maintaining a longer term perspective for the assets and customer interests.

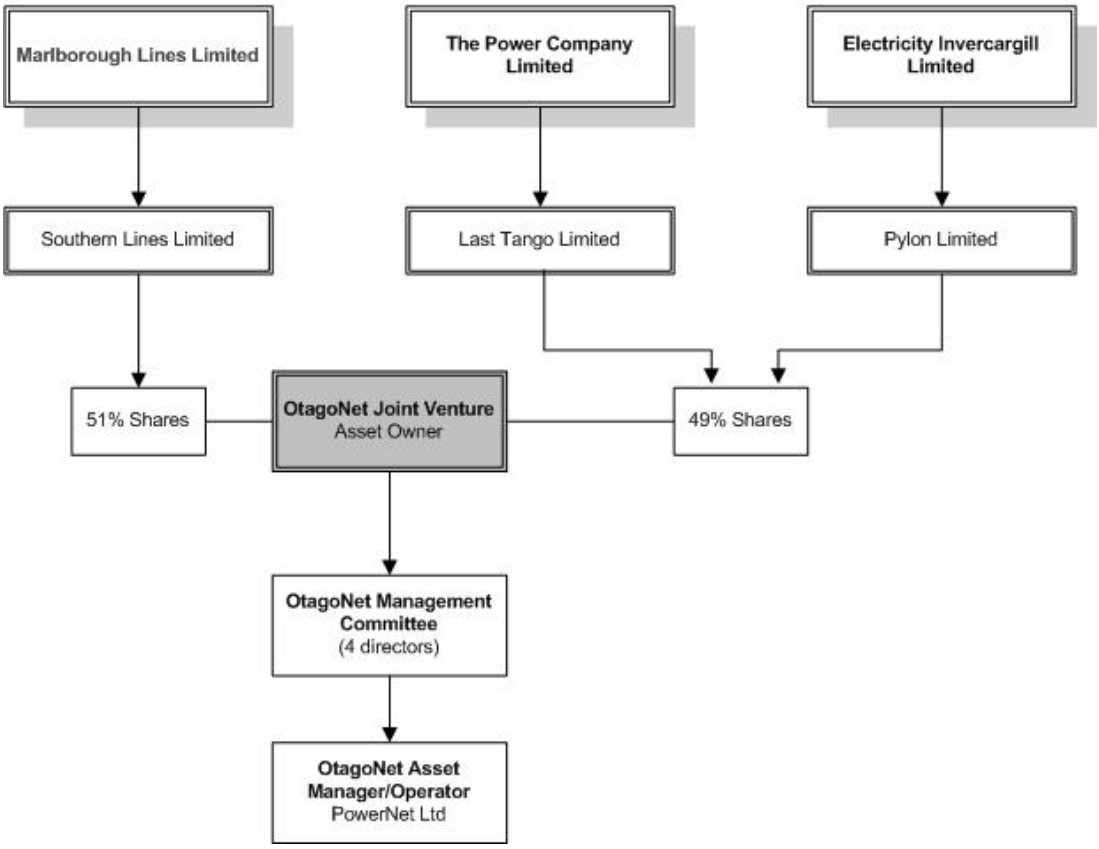
Other stakeholders indirectly involved with the management of the assets are the suppliers such as Transpower, Otago Power Services Ltd, other contractors and equipment and service providers. All have an interest in the amount of work proposed, the materials supplied and energy conveyed. They are also interested in the longevity of the business and the provision of services or products that meet the end use customer requirements for price and quality.

(iv) ACCOUNTABILITIES AND RESPONSIBILITIES FOR ASSET MANAGEMENT

The ultimate responsibility for the management of the Company's assets lies with the Shareholder Directors on the OtagoNet Management Committee who are appointed by the Shareholders.

The day-to-day management of the network is contracted to the asset manager which is currently PowerNet Limited.

OtagoNet Joint Venture Ownership Structure



(v) ASSET MANAGEMENT SYSTEMS AND PROCESSES

The principal systems used for the management of the assets are:

1. GIS system which records the location, construction details, condition of and any changes to the network assets.

   The databases associated with this system include attributes of all distribution components (poles, lines transformers and switchgear etc.) including their condition.

   Load flow and losses analyses use GIS data.

2. The SCADA system which improves the operations efficiency on the network and provides information on loads, faults and other operations to the System Control staff and expedites supply restoration through remote switching capability.

3. The Faults and Outage databases which are linked to a network model and provide reliability analyses.

4. The WASP Maintenance Management System that holds maintenance records and databases pertaining to individual pieces of equipment. A link to the GIS is about to be implemented.

5. Diagnostic testing, such as infrared and partial discharge, and records of visual inspections of equipment.

6. Vegetation database linked to the GIS, which provides information on the proximity of vegetation to lines.

7. Condition driven maintenance surveys, with information being fed back into GIS or the WASP system

8. ODRC analysis used for the preparation of the ODV.

9. The UMS Spend Optimisation Tool that will ensure expenditure is targeted at work that will support the strategic objectives of OtagoNet.

The processes to evaluate all the data available from these systems and produce the Asset Management Plan and Business Plan are varied and complex.

The basic premise is to determine the condition of the assets together with their remaining life, the importance of the asset to maintaining value and service levels and then to prioritise them given factors like risk and the consequences of failure.

Projects are developed around these assets or groups of assets and solutions are developed which will take into consideration the replacement or refurbishment costs together with life cycle costs. Finally all these projects with all relevant cost, performance and risk data are entered into the UMS Spend Optimisation Tool. This tool has been customised for OtagoNet to prioritise and select the projects according to business success criteria as laid down by OtagoNet's management committee. The selected projects are then included in the Annual Business Plan for the following years work.

(c) DETAILS OF ASSETS COVERED

(i) CURRENT NETWORK CONFIGURATION

Transpower Points of Supply

The points of supply for the OtagoNet Network are based at Balclutha, Naseby and Palmerston.

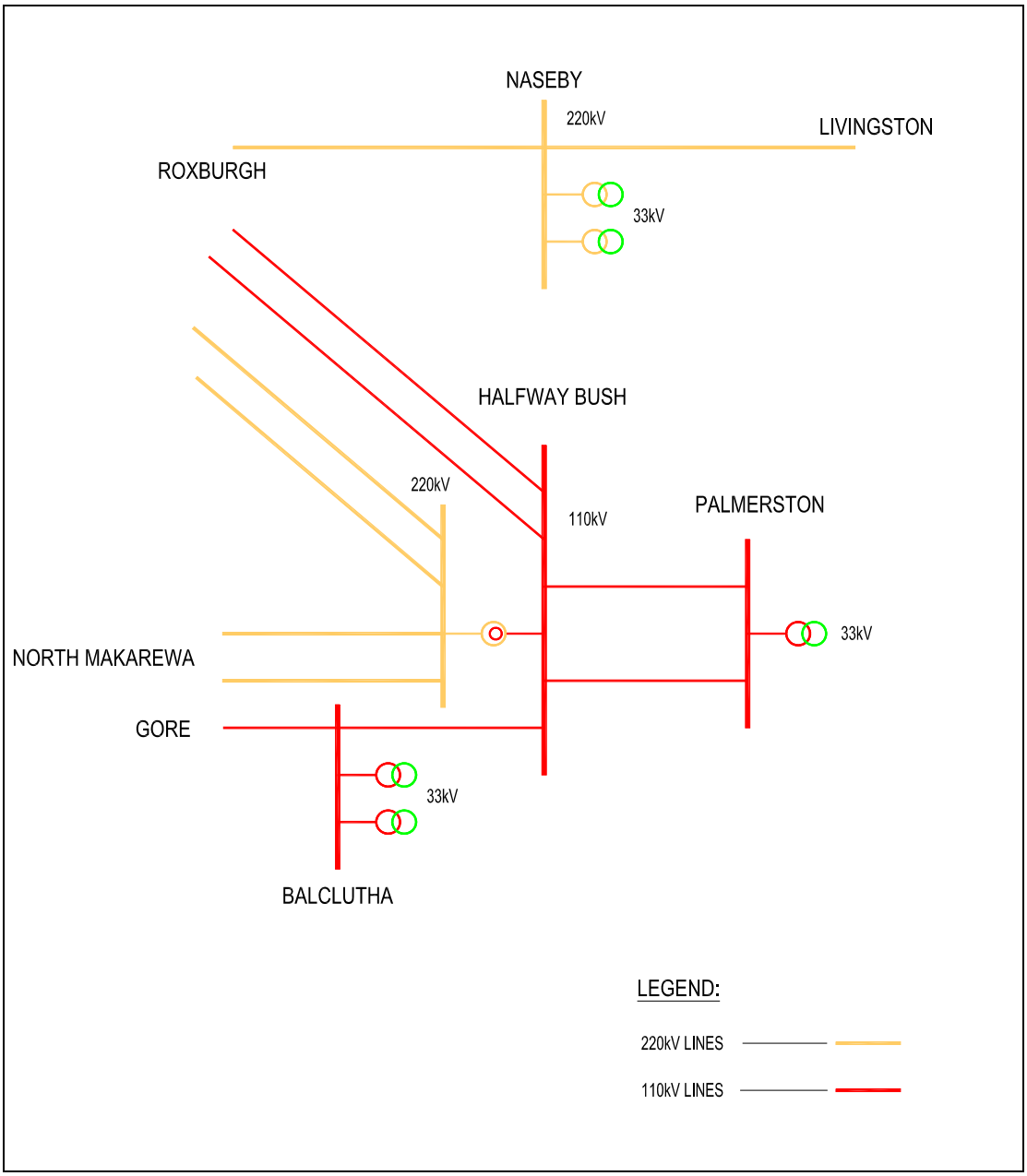
The Naseby point of supply is mid point on the Roxburgh Livingston single 220kV line with two 20 MVA supply transformers. Similarly, Balclutha is midway between Gore and Dunedin on a single 110kV line with two 20MVA transformer banks. The Transpower substations on either side of these points of supply have multiple lines or inter-connections.

The Palmerston point of supply is a single 10MVA transformer bank supplied from two 110kV lines from Halfway Bush. Only one line is in service at any one time and switching between the lines is carried out manually at Palmerston. A single 33kV bus and no bus section switch makes this point of supply inadequate insofar that Transpower faults and maintenance shutdowns are not satisfactory for most of the 3,000 customers. A limited 33kV back up is available from Ranfurly, but is severely limited and can only supply half of the present maximum demand. This backup supply capacity might be doubled if a proposal to build a new 110/66kV substation at Macraes Flat for Oceana Gold goes ahead (see further discussion later).

There are also two embedded generators in the Maniototo area, feeding into the Ranfurly substation. Paerau has three generators totalling 12.5MW and Falls Dam has one generator of 1.25MW. Both stations are operated as part of irrigation schemes with more consistent flows in the summer and run of the river characteristics during the winter months.

There have been concerns about the loads on both Balclutha and Naseby, as they are now greater than the N-1 rating, with loads of 25.7 and 24.3MVA respectively and therefore exceed the 20MVA rating of a single transformer. In Naseby this risk is reduced by the presence of the generators which mainly keep the Transpower offtake below 20MVA. At Balclutha, because there is no embedded generation and only limited ability to control the load, the risk was considered unacceptable and a contract has been signed with Transpower to replace the 20MVA transformers with two 30MVA units. These transformers will be modern three winding transformers with onload tap changers, which will provide 33kV voltage control with benefits for the largest 33kV customer in Balclutha and increase the capabilities of the existing 33kV subtransmission system. These transformers are due to be installed late in 2005.

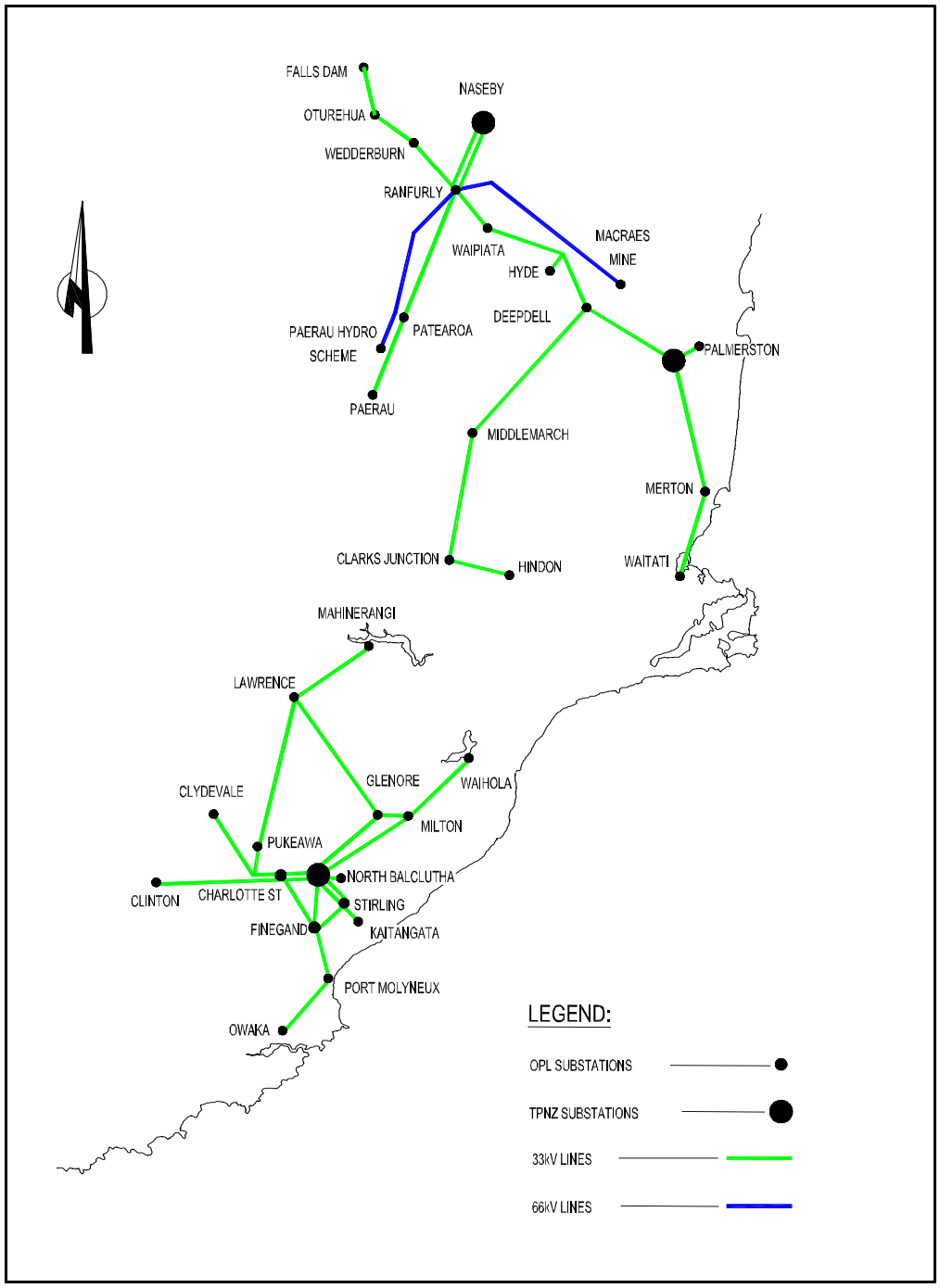
The drawing shows the Transpower grid in and around the Otago region.



Subtransmission

The OtagoNet subtransmission network is supplied by the Transpower points of supply at Naseby, Balclutha and Palmerston.

The drawings show the OtagoNet Subtransmission system on a geographical and schematic basis.



Naseby

The area supplied through the Naseby point of supply is the Maniototo region of North Otago. Naseby supplies Ranfurly through a double circuit 33kV line and at Ranfurly there are step-up transformers to 66kV, the lines from which link Macraes Mine and the Paerau Hydro Scheme. From Ranfurly there are 33kV radial lines to Wedderburn and Oturehua to the northwest and Waipiata, Hyde, Deepdell to the southeast. At Deepdell there is a tie to a 33kV line from Palmerston and then the 33kV line supplies Middlemarch, Clarks Junction and Hindon. There is also a 33kV line going southwest through Patearoa to Paerau.

The whole network is basically radial so that faults on one leg of each branch will cause a loss of supply to all customers along the branch with a supply security based on repair time. There is no adequate 11kV backup to any of the zone substations supplied from Naseby and the only 33kV backup is from Palmerston through Deepdell to Hyde, Waipiata and on to Ranfurly. There is inadequate capacity in this line to pick up any more than half the maximum loads supplied from Ranfurly.

One vulnerability in this area is the major customer, Oceana Gold, who is supplied through one long 66kV radial line. The 66kV line however is supplied through dual 33/66kV transformers at Ranfurly which in turn are supplied by the two 33 kV lines from Naseby. Oceana Gold is the only customer at the end of the 66kV line and it is its choice to remain as a single circuit supply.

Oceana Gold is expanding its mining operations and has requested additional power for its mining and processing operations. Options are presently being finalised, and the preferred option is to build a 110kV line from the Transpower Palmerston point of supply to a new 110/66kV substation at Macraes. While this will provide adequate supply to Oceana Gold and some additional 33kV back up to Palmerston, it will disadvantage the generation in the Maniototo as they will now have an excess of generation compared to the network load. Further options are being considered to connect the largest generator to the new Macraes substation, Oceana Gold and the Palmerston point of supply thus avoiding having to export power through the Transpower network.

All the zone substations supplied from Naseby comply with the OtagoNet security policy.

Palmerston

The area supplied from the Palmerston Transpower point of supply is the northern coastal Otago.

From the Palmerston grid supply point a 33kV line extends to Deepdell where it ties into the 33kV line from Ranfurly. To the south east there is a single circuit line through to Waikouaiti and Waitati. At Palmerston there is a single circuit line to the Palmerston zone substation, which is approximately 2.5 kilometres from the grid supply point.

Palmerston, Merton and Waitati zone substations do not fully comply with the Company's security policy in that there is only one 33kV circuit and inadequate alternative 11kV supply into Waikouaiti.

The lesser concern is the Palmerston zone substation, which is only 2.5 kilometres from the Palmerston grid supply point. Both Palmerston and Merton zone substations have dual transformers.

If the 110/66kV substation at Macraes does go ahead, this will improve the 33kV alternatives into Palmerston, and allow the development of a more permanent switching arrangement at Transpower Palmerston to provide a 33kV supply that will provide an alternative supply for most loads.

Balclutha

The area supplied from the Balclutha point of supply is mainly South Otago including the Balclutha and Milton areas.

The supplies to the two major customers, PPCS Finegand Freezing Works and the Fonterra Stirling Cheese Factory, both have alternative 33kV supplies or sufficient backup through the 11kV system to comply with the Company's security policy.

The zone substations at Balclutha, Charlotte Street, Pukeawa, Lawrence, Glenore and Elderlee Street are on 33kV rings and the zone substations comply with the security policy.

The two radial lines from Lawrence to Mahinerangi and from Elderlee Street to Waihola comply with the security policy, likewise the Clydevale and Clinton lines, however the increase in dairy farming in these last two areas will necessitate the need to provide further ties between and around the Clinton and Clydevale zone substations to satisfy the dairy customers. One 11kV enhancement between these substations is due for completion by the end of March 2006.

Owaka does not currently meet the Company's security policy, but it is a difficult and remote area to establish a backup line.

Two new customers are being established in the Milburn area in the next year. One is the Corrections Department facility for 300-500 inmates with its particular security and reliability requirements, the other customer is a timber mill with a large future load increase predicted if the timber market allows. The addition of these new customers and the existing customers mean that the 11kV supply from Elderlee Street in Milton, 6 km to the south, is inadequate. A new zone substation is to be built in Milburn by the end of 2006. This will initially be a single 5 MVA transformer substation with provision for dual transformers if the predicted load growth eventuates.

With the additional load in Milburn area, the 33kV lines from Transpower Balclutha will no longer provide N-1 supply for a fault on the heavy line. It is planned to build a new heavy 33kV line from Transpower Balclutha to Milton, this together with the existing lines will provide true N-1 availability into the foreseeable future.

Distribution

The 11kV distribution network has only a low degree of interconnection between some zone substations.

The lines are mostly radial, reducing in size towards the feeder ends, often ending up in light two-wire circuits or single wire earth return systems. The Clarks and Hindon area exclusively uses 22kV single wire earth return from the two zone substations.

Many of the single wire earth systems are approaching or exceeding the regulation limit of 8 amps, there are also a number of quality of supply, reliability and maintenance issues on these lines. Some of these lines will be replaced with two or three wire systems, some will have the voltage increased from 6.6kV to the standard 11kV and in one case from 11kV up to 22kV.

Current Supply Security

A summary of the supply security for the various zone substations and customers supplied from them is shown on the table below.

The table shows that the supply security for five zone substations does not meet the network design standard.

OtagoNet - Zone Substation Security

Zone Substation	Present Maximum Demand (MVA)	Required Security Rating	Present Circuit Configuration	Alternative Supply Security Satisfactory	Required Circuit Configuration	Circuit Work Required
Charlotte Street	6.6	AA	Alternative	Yes	OK	
Clarks Junction	0.3	A(ii)	Single	Yes	OK	
Clinton	1.9	A(i)	MV Alternative	Yes	OK	
Clydevale	1.7	A(i)	MV Alternative	Yes	OK	
Deepdell	0.4	A(ii)	Alternative	Yes	OK	
Elderlee Street	5.5	AA	Dual Circuit	Yes	OK	
Finegand	1.4	A(i)	Alternative	Yes	OK	
Glenore	0.6	A(ii)	Alternative	Yes	OK	
Hindon	0.3	A(ii)	Single	Yes	OK	
Hyde	1.3	A(ii)	Alternative	Yes	OK	
Kaitangata	1.4	A(i)	MV Alternative	Yes	OK	
Lawrence	1.6	A(i)	Alternative	Yes	OK	
Macraes Mine	19.5	AA	Single	No	OK	Single customer choice
Mahinerangi	0.04	A(ii)	Single	Yes	OK	
Merton	2.7	A(i)	Single	No	HV Alternative	Complete 2nd 33kV line
Middlemarch	0.7	A(ii)	Single	Yes	OK	
North Balclutha	3.1	A(i)	MV Alternative	Yes	OK	
Oturehua	0.2	A(ii)	Single	Yes	OK	
Owaka	1.6	A(i)	Single	No	MV Alternative	Remote, no easy solution
Paerau	0.3	A(ii)	Single	Yes	OK	
Paerau Hydro	12.0	AA	Single	No	OK	Single customer choice
Palmerston	2.1	A(i)	Short Single	No	HV Alternative	Short length of 33kV
Patearoa	1.3	A(ii)	Single	Yes	OK	
Port Molyneux	0.9	A(ii)	Single	Yes	OK	
Pukeawa	0.2	A(ii)	Alternative	Yes	OK	
Ranfurly	1.9	A(i)	Dual Circuit	Yes	OK	
Ranfurly 66/33	19.7	AA	Dual Circuit	Yes	OK	
Stirling	3.1	A(i)	Alternative	Yes	OK	
Waihola	0.9	A(ii)	MV Alternative	Yes	OK	
Waipiata	0.8	A(ii)	Alternative	Yes	OK	
Waitati	1.5	A(i)	Single	Yes	OK	
Wedderburn	0.2	A(ii)	Single	Yes	OK	

(ii) ASSETS BY CATEGORY

Assets have been classified as:

- Overhead Lines
- Substation Buildings
- Power Transformers
- Zone Substation Structures
- Circuit Breakers
- Distribution Transformers

(iii) JUSTIFICATION FOR ASSETS

In general the assets are the minimum required to provide adequate reliability to the end use customers and comply with the statutory requirements for voltage drop etc.

The network configuration has evolved over the years as loads have increased or moved. The Transpower points of supply have been moved over times and new ones established. The new Balclutha 33kV point of supply in 1962 was the direct result of increased agricultural loads in the area with the establishment of a freezing works and dairy factory in the local area. The Naseby point of supply was required in 1974 to service the increased Maniototo load and later in 1983 for the 12.5MW Paerau hydro generation. The gold mine at Macraes came after Naseby and the hydro and was able to take advantage of the established 66kV supply from Ranfurly. Apart from these major customers the establishment of zone substations and distribution lines has only been to satisfy general growth and quality of supply.

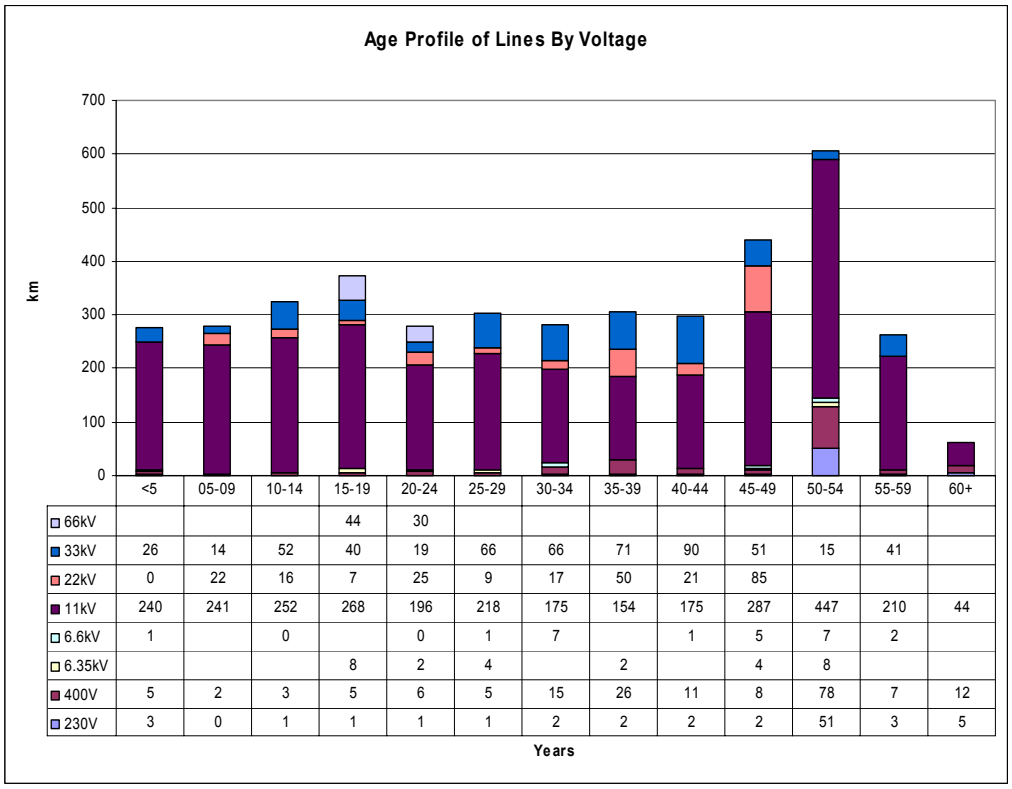
The geographic area and features of Otago originally required a light 33kV backbone with many zone substations and relatively short radial 11kV lines. These were the most economical solutions of their day and continue to shape and influence the network configuration today.

Other assets include communications systems, SCADA control and ripple injection systems. Again the geographical area has required an extensive radio system of nine radio repeater sites for both VHF voice radio and UHF data telemetry. Ripple injection was provided to allow flexible control of various retail tariffs and switching for night store heaters and street lights. While these services are still provided to the retailers, the ripple injection's main benefit to OtagoNet is in reduction of peak demands through the network and the cost of the Transpower interconnection charges. The SCADA system is the most recent addition and was justified by more efficient automated load control and enhanced service levels provided by remote control and alarms from all the zone substations.

(iv) LOCATION, AGE AND CONDITION

While condition has not been specifically quantified in this document, the information is regularly captured and used to drive condition based maintenance and as a factor in preparing these plans for both capital replacement and maintenance. However there is a good correlation between age and condition for the bulk of the assets that tend to have relatively consistent lives, for example the lines and distribution transformers.

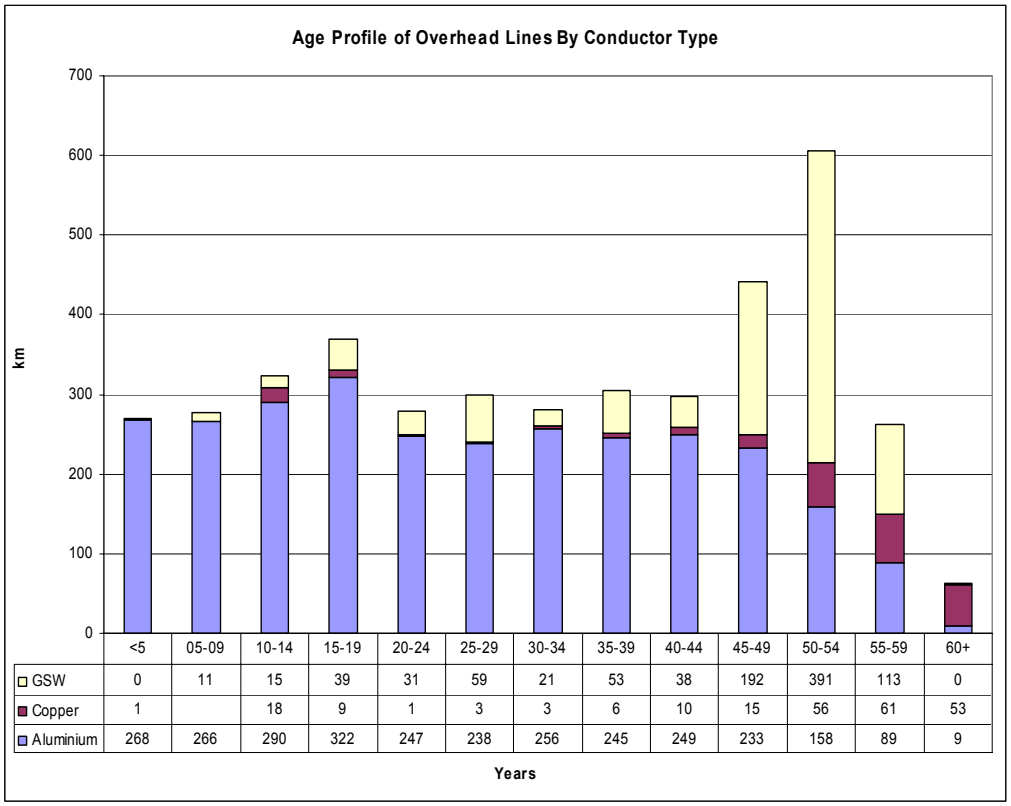
Overhead Lines



	<5	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
66kV				44	30								
33kV	26	14	52	40	19	66	66	71	90	51	15	41	
22kV	0	22	16	7	25	9	17	50	21	85			
11kV	240	241	252	268	196	218	175	154	175	287	447	210	44
6.6kV	1		0		0	1	7		1	5	7	2	
6.35kV				8	2	4		2		4	8		
400V	5	2	3	5	6	5	15	26	11	8	78	7	12
230V	3	0	1	1	1	1	2	2	2	2	51	3	5

The chart above shows the length of line constructed on the OtagoNet network over the last 60+ years. It can be seen that 1,371 km, or one third of lines, were built more than 45 years ago, this will require a significant replacement program to maintain or preferably reduce the average line age.

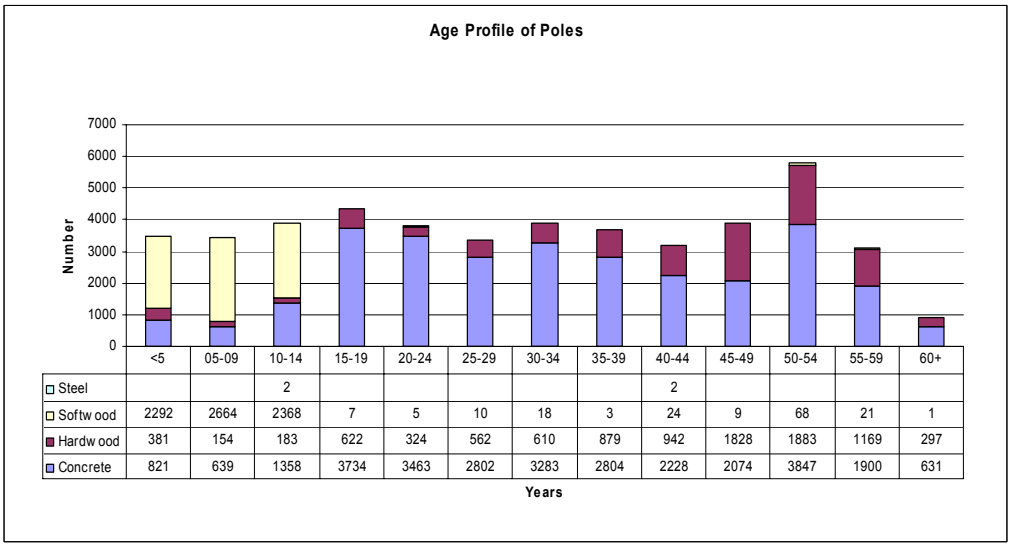
Many of the older lines will have been maintained with new cross arms and insulators, however many poles and the conductors now need total replacement or upgrading during this planning period.



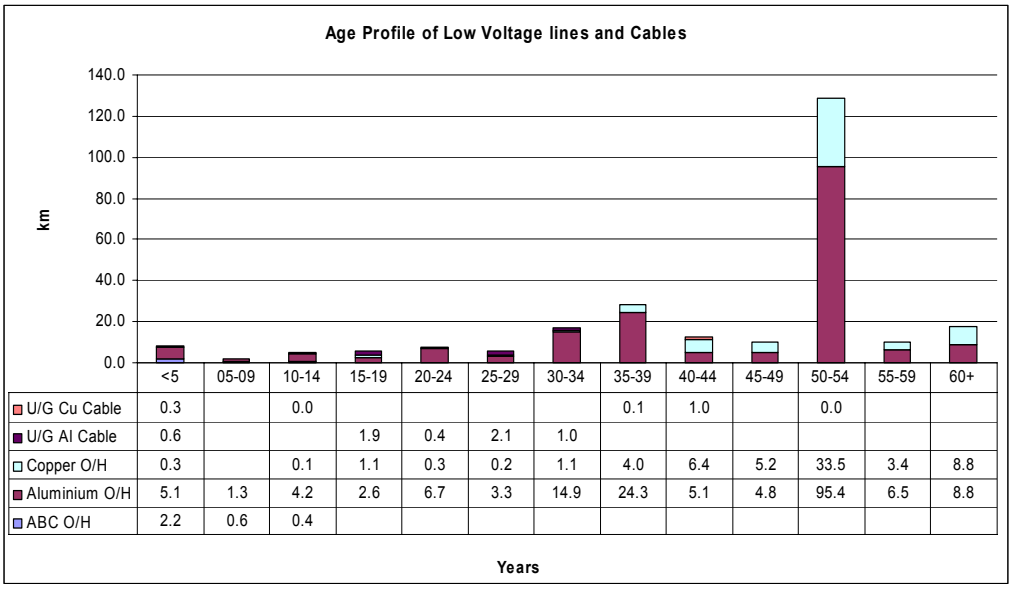
	<5	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
GSW	0	11	15	39	31	59	21	53	38	192	391	113	0
Copper	1		18	9	1	3	3	6	10	15	56	61	53
Aluminium	268	266	290	322	247	238	256	245	249	233	158	89	9

These graphs show the extent of the more urgent replacements required with 700km of galvanised steel wire conductors greater than 45 years old and 5,200 hardwood poles older than 45 years.

Fortunately the majority of the older poles are concrete which have a far greater life expectancy than hardwood and are showing little sign of any degradation. However, maintenance of the cross arms, conductor and fittings should still be expected.



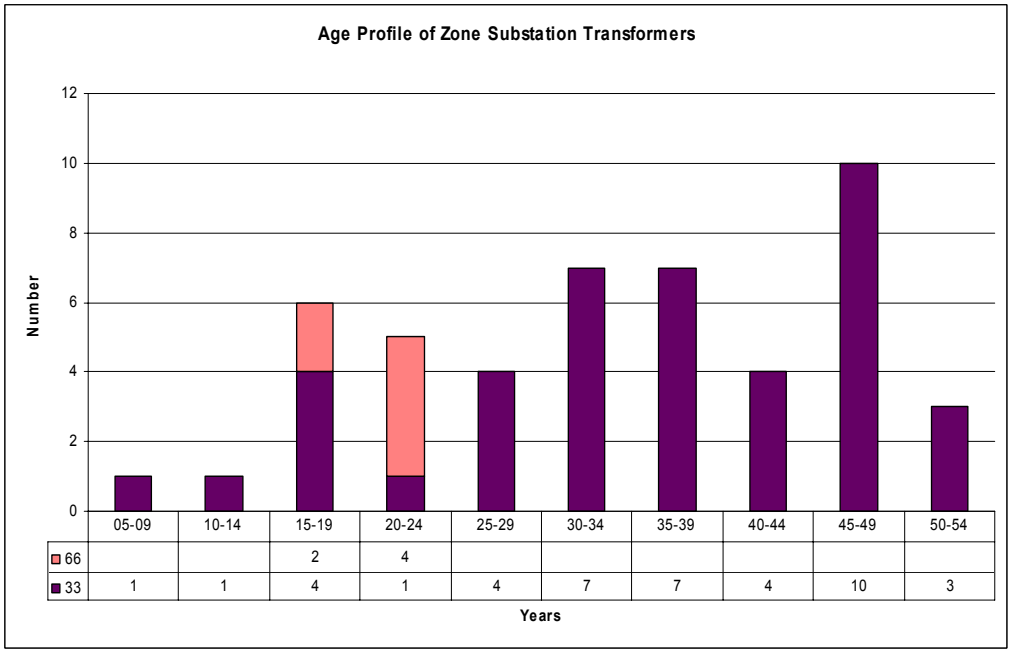
	<5	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
Steel			2						2				
Softwood	2292	2664	2368	7	5	10	18	3	24	9	68	21	1
Hardwood	381	154	183	622	324	562	610	879	942	1828	1883	1169	297
Concrete	821	639	1358	3734	3463	2802	3283	2804	2228	2074	3847	1900	631



	<5	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
U/G Cu Cable	0.3		0.0					0.1	1.0		0.0		
U/G Al Cable	0.6			1.9	0.4	2.1	1.0						
Copper O/H	0.3		0.1	1.1	0.3	0.2	1.1	4.0	6.4	5.2	33.5	3.4	8.8
Aluminium O/H	5.1	1.3	4.2	2.6	6.7	3.3	14.9	24.3	5.1	4.8	95.4	6.5	8.8
ABC O/H	2.2	0.6	0.4										

The age of the low voltage lines and underground cables shows that the majority of lines were built early to supply the towns and that there has been little new town reticulation or replacement since then. While there has been a regular amount of new connections, 11kV extensions and line renewals throughout the network, much of this has involved individual customers with privately owned low voltage lines. There have been a number of justified voltage complaints resulting from inadequate low voltage lines for present loads, again a product of the older low voltage line.

Power Transformers

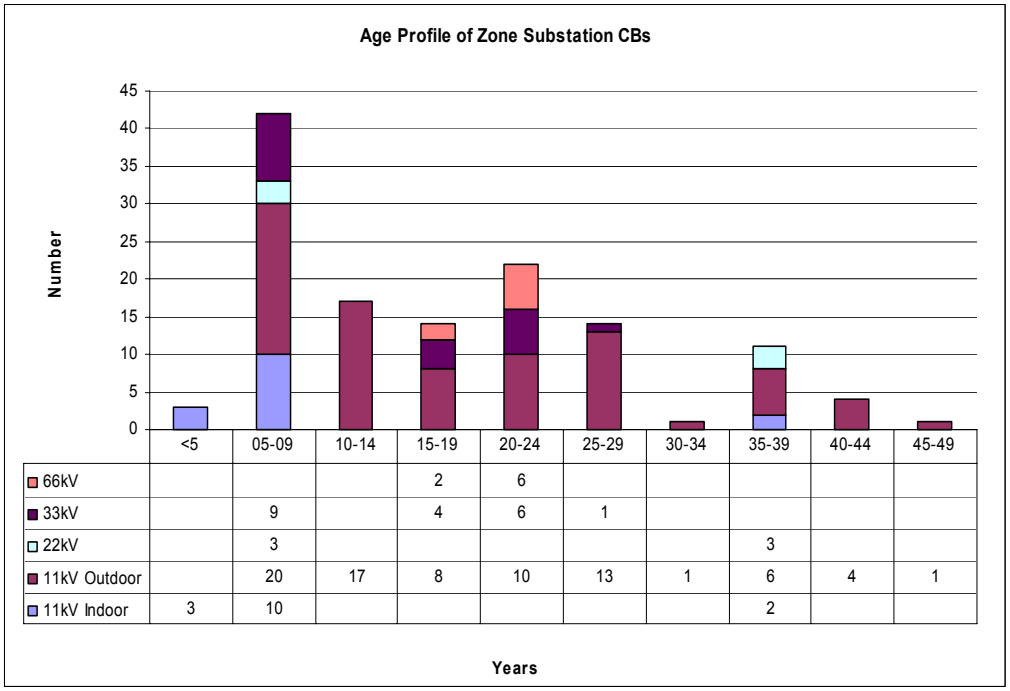


	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
66			2	4						
33	1	1	4	1	4	7	7	4	10	3

At present OtagoNet has only one spare 1,000kVA 33/11kV transformer and one spare 33/22kV earth return transformer. Emergency replacement plans consist of moving one of a pair of transformers from one of five zone substations to cover a failure elsewhere, but this would be time consuming and may require further load distribution to keep loads under the remaining single

transformer rating. The 13 transformers over 45 years are all smaller units up to 2.5MVA and are planned for replacement during this planning period. Some of the medium age transformers will also be refurbished where it is economically and technically viable.

Circuit Breakers

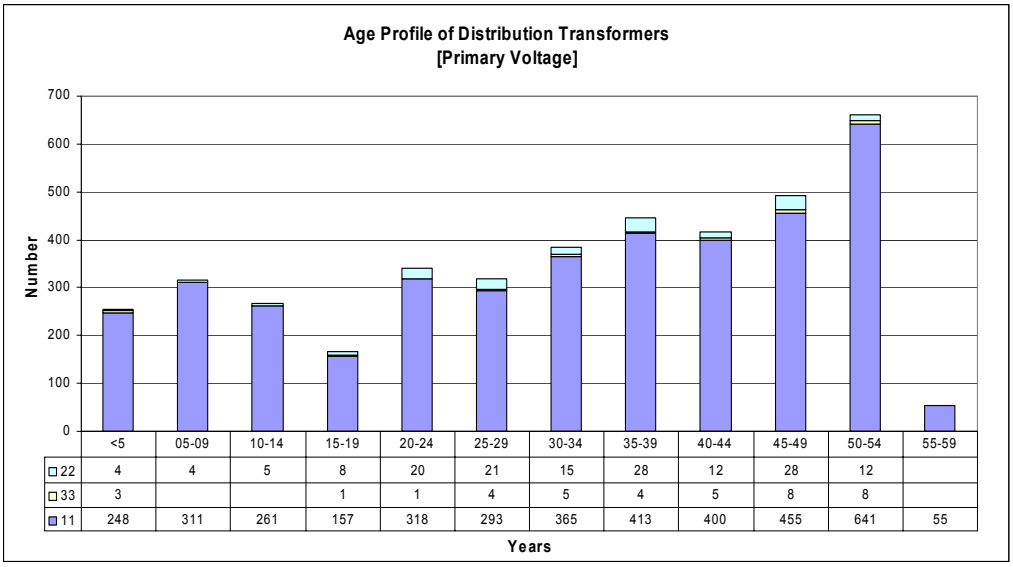


	<5	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49
66kV				2	6					
33kV		9		4	6	1				
22kV		3						3		
11kV Outdoor		20	17	8	10	13	1	6	4	1
11kV Indoor	3	10						2		

Many zone substations have been upgraded in the last ten years with the replacement of the circuit breakers and other equipment. Some hardwood poles in outdoor structures remain but isolators, fuses and cross arms have been replaced or are in acceptable condition. The five circuit breakers over 40 years old will be replaced in the near future as part of the SCADA actuator program.

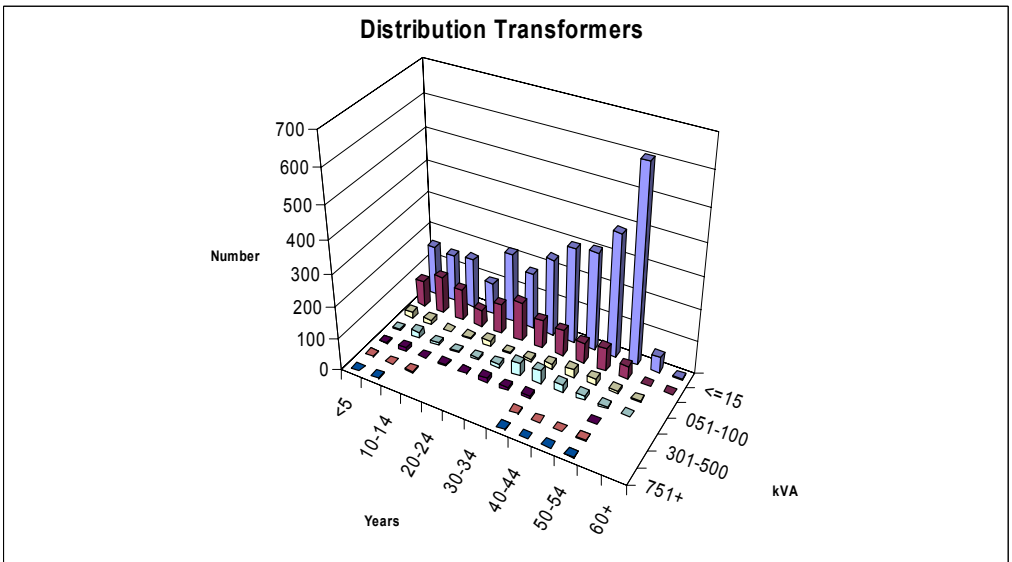
OtagoNet has a total of only ten field circuit breakers (reclosers) on the 11kV distribution lines. These are on the outskirts of towns to maintain the reliability in urban areas where the feeder continues deep into rural areas. These circuit breakers are all under 20 years with the majority being vacuum and installed in the 1990s.

Distribution Transformers



	<5	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59
22	4	4	5	8	20	21	15	28	12	28	12	
33	3			1	1	4	5	4	5	8	8	
11	248	311	261	157	318	293	365	413	400	455	641	55

While there are a large number of transformers over 45 years old, they are mainly less than 15kVA, quite often 3 and 5kVA units. These units are replaced as they deteriorate, are over-loaded or more rarely fail. Younger transformers, 10kVA and over, are considered for refurbishment if economically viable. The average age of transformers is still growing and the programmed replacement of transformers will be accelerated during this planning period to at least maintain the average age.



	60+	55-59	50-54	45-49	40-44	35-39	30-34	25-29	20-24	15-19	10-14	05-09	<5
<=15	5	49	605	384	306	297	241	176	217	101	157	150	157
016-050	1	2	39	71	64	81	89	123	95	53	97	117	82
051-100		2	9	20	24	16	8	4	19	5	1	16	20
101-300		2	6	14	23	41	39	12	6	3	7	18	4
301-500			1			9	8	13	3	5	1	10	2
501-750			1	1	1	1					3	1	3
751+			1	1	1	1						3	1

(d) DETAILS OF PROPOSED LEVELS OF SERVICE

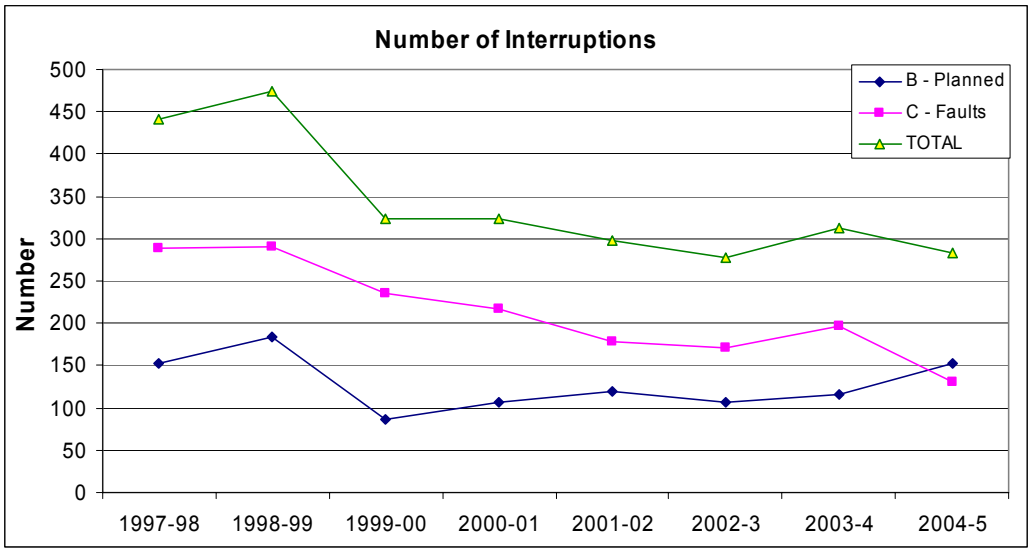
(i) CUSTOMER ORIENTED RELIABILITY, SECURITY AND AVAILABILITY PERFORMANCE TARGETS

Reliability of Supply

The historical reliability performance figures for 1997 to 2005, the 2005-06 target, the five year average target and the Commerce Commission five year Threshold target for outages originating within the OtagoNet network are shown in the tables and graphs below.

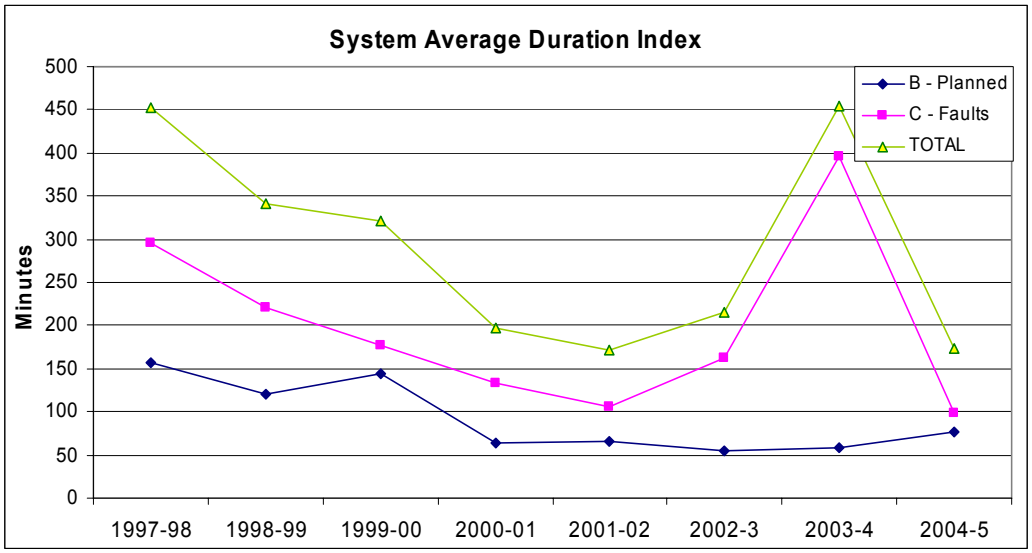
Interruptions

	Actual							Targets			
Class	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**5 Yr Av.**	**Threshold**
B - Planned	153	184	87	107	119	107	115	153	143	149	121
C - Faults	289	291	236	216	178	171	197	131	188	184	218
TOTAL	442	475	323	328	299	278	312	284	331	332	339



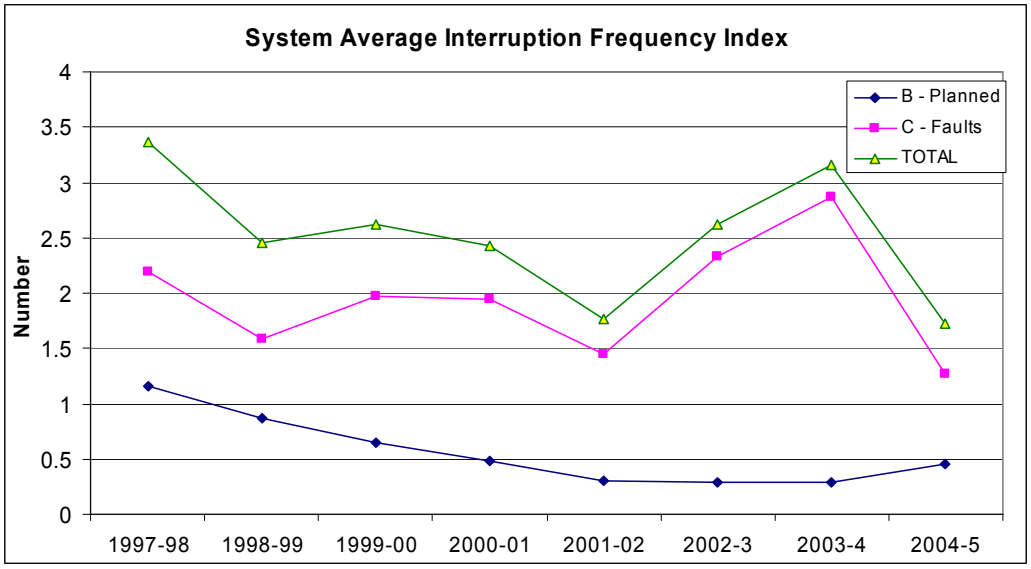
System Average Interruption Duration Index

	Actual									Targets	
Class	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**5 Yr Av.**	**Threshold**
B - Planned	157	120	144	64	66	54	59	76	80	83	89
C - Faults	296	221	177	133	106	162	395	98	164	157	160
TOTAL	453	341	321	197	172	216	454	174	244	240	249



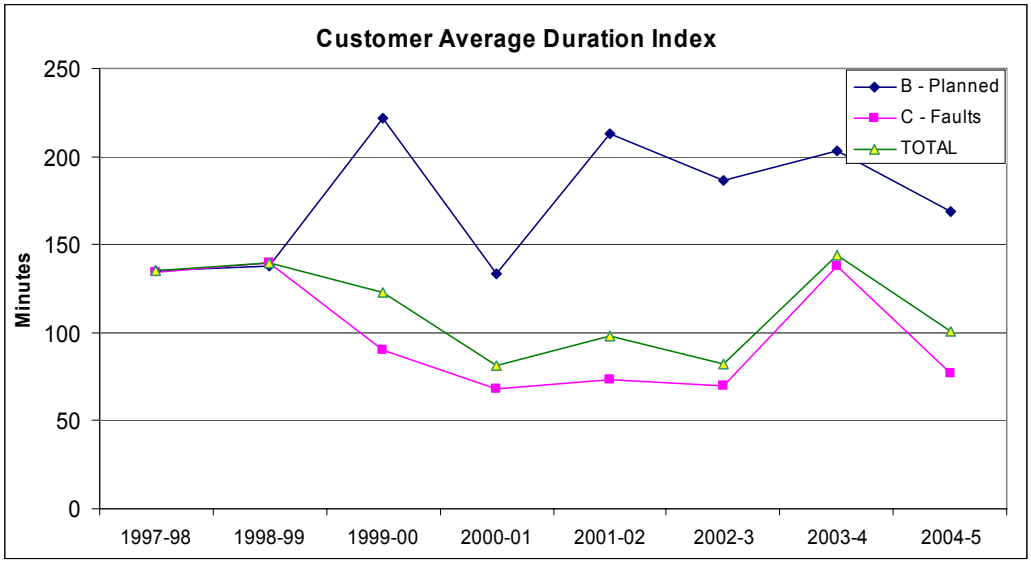
System Average Interruption Frequency Index

	Actual									Targets	
Class	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**5 Yr Av.**	**Threshold**
B - Planned	1.16	0.87	0.65	0.48	0.31	0.29	0.29	0.45	0.44	0.46	0.52
C - Faults	2.2	1.58	1.97	1.95	1.45	2.33	2.87	1.27	1.84	1.80	1.86
TOTAL	3.36	2.45	2.62	2.43	1.76	2.62	3.16	1.72	2.28	2.26	2.38



Customer Average Interruption Duration Index

	Actual								Targets		
Class	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	5 Yr Av.	Threshold
B - Planned	135	138	221	133	211	186	204	168	180	180	178
C - Faults	135	140	90	68	73	70	138	77	90	87	88
TOTAL	135	139	122	81	98	82	144	101	107	106	105



Notes:

- Class B are planned interruptions; Class C are unplanned interruptions due to faults.
- There were two severe weather events on 16-17 November 2003 and 24-25 February 2004 that resulted in extraordinary interruptions. The data above includes those faults, resulting in the large displacements above targets for the 2003-04 year.
- The levels for the 2004-05 year are overall below targets and the thresholds, reflecting a year of mild weather as well as fault reduction due to ongoing maintenance, renewals and tree clearance work.
- One exception is the number of planned interruptions and their durations, this reflects the increased amount of line renewal work and a limited use of live line working techniques, mainly due to the type of work (conductor replacement on radial lines requiring shutdowns).

Service Pledge

If as a result of a general network failure the power supply has not been restored within six hours of notification of the failure for urban customers then the Company will pay the customer $25 and in the case of rural customers, if the power supply has not been restored within 16 hours the Company will pay the customer $25.

There are exemptions to these payments in the event of major widespread severe snow storms, winds, lightning, floods, earthquakes etc or faults caused by a third party such as Transpower and vehicles.

To date there have been no significant payments against the service pledge, with all time breaches being exempted due to storms.

(ii) Other Targets for Asset Performance and Efficiency, Effectiveness and Efficiency of Line Company Activity

Network Efficiency (Losses)

Current system losses based on retailers' sale figures are 7.5% and will include fraud etc. Investigations are being carried out on certain parts of the network to enable a better assessment of loss levels and pragmatic targets to be established.

Reliability

Reliability is calculated monthly and reported to the Board against the targets shown in section (i) above.

Quality of Supply

The statutory requirements for voltage level and harmonic content will be met, although in both cases the end use customer shares some responsibility in these matters.

It is the Company's intention to respond to all voltage complaints within five business days; to investigate and report on these within a further 20 business days; and to rectify justified complaints within 60 business days unless resource consent is required for any remedial works.

The Company has a target of no more than 10 proven voltage complaints per 10,000 ICPs.

As at 31 March 2005 the Company had 9 justified voltage complaints in the previous 12 months and took an average of 49 days to remedy them.

(iii) Justification for Target Levels of Service

Following consultation with customer groups, the reliability target levels of service were set based on levels which the company believes satisfy consumer expectations and which will be obtained if appropriate investment is undertaken.

It is intended to continue customer consultation on the issue price and quality throughout the year. Customers are invited to submit comments on the target levels and state whether they would be interested in being a member of a focus group on this issue. Unfortunately while feedback has been requested including placing adverts in the daily papers, there has been little response. This reinforces the earlier consultation that there is a general satisfaction with the direction being taken by the company.

(e) DETAILS OF NETWORK DEVELOPMENT

(i) NETWORK PLANNING CRITERIA AND ASSUMPTIONS

The planning criteria for the OtagoNet network is dependent on the required supply security and reliability and meeting legislative requirements, such as voltage. The Design Standard specifies the supply security levels which any new investment should meet and it also triggers some investment on the network on a retrospective basis.

Supply reliability is subject to planned supply interruptions. With respect to the design of the network, the policy on planned interruptions is shown below. Investment in the network should permit the future use of live line techniques wherever possible and where this is not feasible, design should permit restricted interruptions as described below.

Reliability is also dependent on the network design and some general criteria for the design of the 11kV distribution part of the network is shown below.

Investment in the subtransmission network is based on the supply security criteria and to meet legislative requirements.

All discretionary investment, for example improved reliability as opposed to compliance with legislative voltage requirements, are prioritised according to the criteria set by the management committee and implemented in the UMS Spend Optimisation Tool. The strategic objective inputs to this tool are broken down into Finance, Regulatory & Service Quality, Corporate Citizenship, Customer Markets and Resources.

Security Standards

The design of the network is based on the following criteria:

OtagoNet Security Ratings		
Group Demand	**Security Rating**	**Arrangement**
>12 MW or 6,000 connections	AAA	(n-1) Uninterrupted
5-12 MW or 2,000 to 6,000 connections	AA	25 minutes restoration time
1-5 MW	A(i)	Isolate and Restore
<1 MW	A(ii)	Repair time

Notes:

1. Restoration time for 90% of load permits the prolonged loss of supply to individual customers following storm conditions.

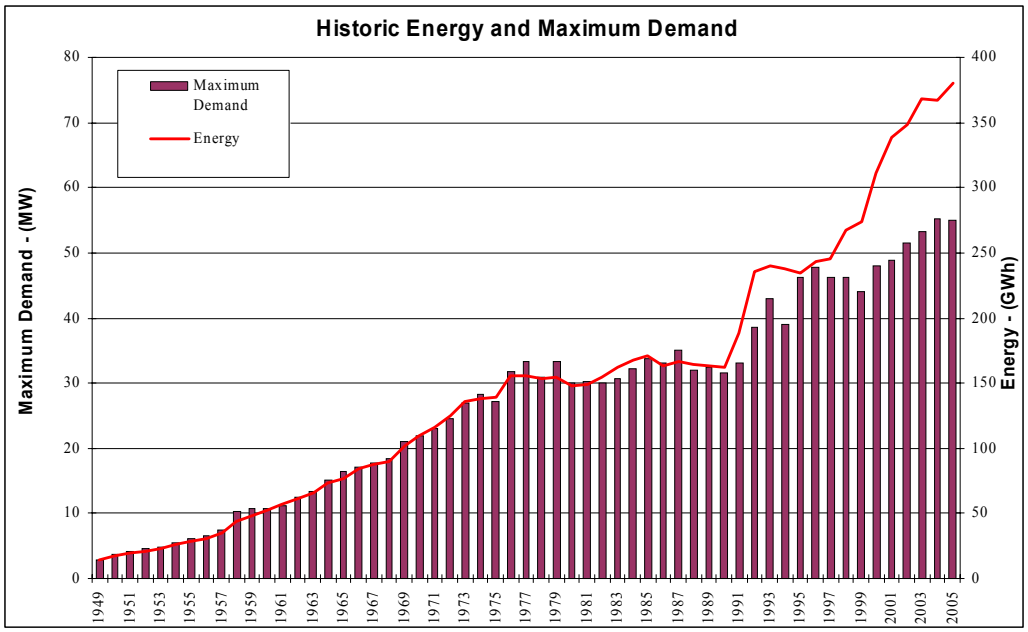
2. The above times are maximum and relate to network design parameters.

3. The above table also applies in general to the distribution network, but transformers or transformer groups supplied by an underground 11kV cable and with more than 75 network connections will have a security of A(i).

4. Certain parts of the network will demand enhanced supply security due to the type of load etc.

(ii) DEMAND FORECASTS

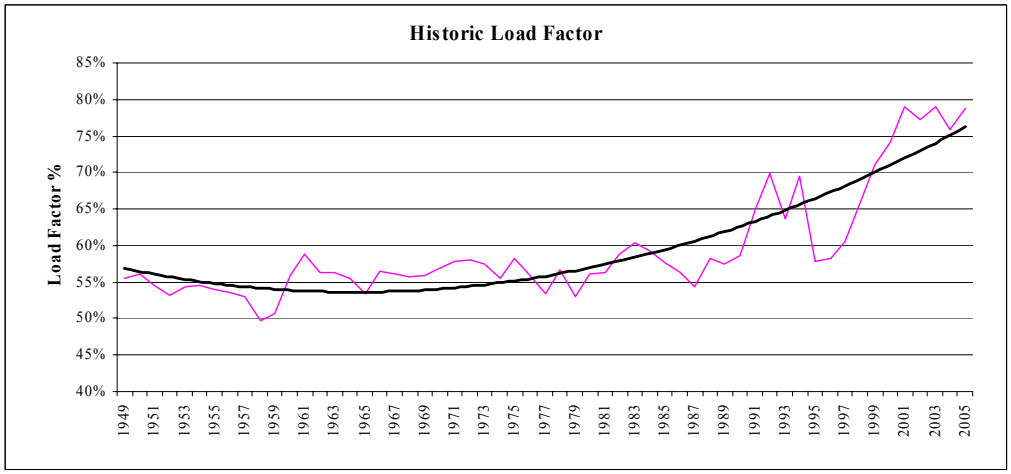
Continuing growth of between 1-1.5% for the next 10 years has been estimated. This is based on economic forecasts relating to continuing growth in agriculture, establishment of further timber mills and associated operations and some expansion in the popular coastal residential areas.



The above graph shows the growth on the network since 1949.

The main energy increase in 1992 and again in 2000 has been due to one large 24-hour industrial customer coming on line and then further increasing its load.

The reduction in maximum demand during the four years 1996-1999 was due to a policy of more stringent load control operations and milder winters, the demand increase since then more correctly reflect the system growth.



The graph above shows the load factor over the same period. Seasonal industrial use and latterly the increase of large industrial customers have greatly improved the load factor.

The demand forecasts for each zone substation are shown in the table below. Overall the growth rate is between 1% and 1.5% with limited growth over most zone substations reflecting ongoing dairy conversions, irrigation supplies and more wood processing facilities.

OtagoNet - Growth at Zone Substations

Zone substation	Present Design Capacity (MVA)	Maximum Demand 2005 (MVA)	Utilisation Factor 2005 %	Proposed Annual Growth %	Projected Demand 2015 (MVA)	Projected Utilisation 2015 %
Charlotte Street	10.0	6.6	66%	1.0%	7.3	73%
Clarks Junction	0.5	0.3	62%	0.5%	0.3	65%
Clinton	2.5	1.9	77%	2.0%	2.3	92%
Clydevale	2.5	1.7	69%	3.0%	2.2	89%
Deepdell	0.8	0.4	52%	0.5%	0.4	55%
Elderlee Street	10.0	5.5	55%	5.0%	8.3	83%
Finegand	2.5	1.4	58%	1.0%	1.6	64%
Glenore	1.5	0.6	38%	0.5%	0.6	40%
Hindon	0.5	0.3	64%	0.5%	0.3	67%
Hyde	2.5	1.3	53%	2.5%	1.7	67%
Kaitangata	2.5	1.4	57%	2.5%	1.8	71%
Lawrence	3.0	1.6	53%	0.5%	1.7	55%
Macraes Mine	30	19.5	65%	1.0%	21.4	71%
Mahinerangi	0.1	0.04	44%	0.5%	0.0	46%
Merton	5.0	2.7	53%	1.5%	3.1	61%
Middlemarch	1.5	0.7	46%	2.5%	0.9	57%
North Balclutha	5.0	3.1	61%	1.0%	3.4	67%
Oturehua	0.8	0.2	26%	0.5%	0.2	28%
Owaka	2.5	1.6	63%	1.0%	1.7	70%
Paerau	0.8	0.3	36%	0.5%	0.3	38%
Paerau Hydro	30	12.0	40%	0.0%	12.0	40%
Palmerston	5.0	2.1	42%	0.5%	2.2	44%
Patearoa	2.5	1.3	52%	5.0%	1.9	78%
Port Molyneux	1.5	0.9	62%	5.0%	1.4	93%
Pukeawa	0.8	0.2	31%	0.5%	0.3	33%
Ranfurly	5	1.9	38%	0.5%	2.0	40%
Ranfurly 66/33kV	50	19.7	39%	1.0%	21.7	43%
Stirling	5.0	3.1	63%	2.5%	3.9	79%
Waihola	1.5	0.9	57%	1.0%	0.9	63%
Waipiata	1.5	0.8	55%	2.5%	1.0	68%
Waitati	2.5	1.5	59%	2.0%	1.8	70%
Wedderburn	0.8	0.2	29%	2.5%	0.3	36%

The table shows the projected demands for each zone substation over the next 10 years based on anticipated load growths. The actual annual maximum demands for each 11kV feeder and the zone substation transformers are recorded each year. This historic trend is used together with local and industry knowledge to predict the future load growth shown above. This is performed each year and provides a check on the growth rate predicted and actually recorded.

(iii) Asset and Non Asset Policies

The aim of the Company is to utilise new technology; recently this has included control and protection schemes to improve reliability, the use of modern technology in switchgear to reduce maintenance and the provision of SCADA and GIS systems to improve information flows and operational performance.

Evaluations are carried out to determine whether assets should be disposed of rather than maintained for further use. These considerations take into account the cost of maintenance and replacement as well as life cycle cost and performance. This year two zone substation transformers will be replaced as they are at the end of their lives, but another transformer will be taken out of service and refurbished as it will gain an appreciable life extension for modest cost.

Improvements in the performance of the network do not always entail new investment. Operational considerations such as transfer of load between GXPs or zone substations, extended use of ripple control or interactive demand side management with large customers and incentives through line charges which encourage off peak usage of the network are part of the overall strategy.

Power factor and correction requirements are specified in the OtagoNet Installation Connection Standards. Power factor is also monitored for the larger half hour metered customers, who have an added incentive to maintain a high power factor by being charged on their maximum kVA demands.

OtagoNet is presently working with one large customer on the cost benefits of peak load reduction using on site generation. This is the first example of using embedded generation to reduce peak demands in OtagoNet, but it is hoped that others may follow. There are a couple of examples of remote area power schemes that have been established by customers, these have been simple economic decisions by the individuals in response to the high cost of extending network lines for their small capacity.

Through the use of databases and records of maximum demand readings, transformers are shifted from location to location to improve utilisation factors and reduce the degree of under-utilised capacity. Each year this relocation work is coordinated with any required transformer maintenance or other component replacements.

Consideration is also given to the retrofitting of modern technology into existing 11kV switchgear and upgrading of 400V boards to meet the modern safety standards. Last year the old manual bulk oil circuit breakers at one substation were replaced with new vacuum circuit breakers. Protection relays have also been replaced to take advantage of SCADA control and indication together with more precise protection coordination.

Capital assets can only be purchased in accordance with the approved Business Plan programme. Authorisations for expenditure of capital items not included in the Business Plan are required from either the Chief Executive or the management committee.

(iv) Options Available

Supply Reliability

To improve operational performance in the sphere of reliability, consideration is given to the following three factors:

1. Reduce the Number of Faults

This is achieved through improved maintenance and in particular focusing on vegetation, condition of assets and reliability history. The recent introduction of the Tree Regulations has resulted in a significant increase in vegetation control costs and this is set to increase for the next three years as the first free trim is provided to tree owners.

2. *Reduce the number of Planned Interruptions*

This is being pursued by increasing the use of live line working. Justification is based on the economics taking into account the cost of non-supply, advertising, control room operations and switching. Work programmes will coordinate all the work required on areas of the network and minimise the number of outages required. The faults contracts include incentives for contractors to improve performance in their respective areas also contribute to reducing planned interruptions on the network. However in the last year there was a 30% increase in the number of planned interruptions, but this was due to the even more significant increase in renewal and maintenance work on the radial distribution lines.

Given the significant amount of work to be undertaken to improve reliability the total time lost by planned interruptions can realistically be expected to increase. It is OtagoNet's policy that:

- All low voltage work shall be done live.
- All 11kV work shall, where appropriate, be done live.
- For most jobs only one supply interruption shall be approved.

Any supply interruptions which are found necessary shall meet the following conditions:

- It is technically unsafe to use live line techniques or is uneconomic using the cost of non-supply criteria.
- Supply interruptions should not be longer than three hours duration at any one time unless the proposed work makes it impossible to complete within 3 hours or when customers agree to the duration of the outage.
- Supply interruptions should not extend over the normal lunch time period, usually 12 Noon to 1.00pm.
- Morning and afternoon supply interruptions shall take place only if warranted. Time span shall be 9.00 am to 12 noon, and 1.00pm to 4.00pm. The total planned outage should not exceed six hours in a 24-hour period.
- If the maximum ambient temperature is forecasted to be below $5^{o}C$ supply interruption will only take place for urgent maintenance.
- In summer and on hot days there shall be no all day supply interruptions as farmers are not able to pump enough water for households and stock use. In these situations morning supply interruptions shall be preferred.
- Generally, farming areas supply interruption periods shall be:
- NOT off before 9.00 am or after 3.30pm – milking.
- ON between 12 noon and 1.00pm.
- It is general policy that supply interruptions affecting domestic customers shall take place from Monday to Friday and shall not take place over the weekend or on public holidays.
- Commercial and industrial areas shall be assessed on an individual basis.
- Night time supply interruptions shall be considered under some circumstances.
- Some areas with special conditions shall be treated on an individual basis.

3. *Reduce the Impact of Supply Interruptions*

This is being addressed through more sophisticated protection, ie distance or directional protection enabling closed-ring supplies on the subtransmission network to exist. Other methods include the installation of reclosers or field circuit breakers on urban/rural boundaries or in locations to reduce feeder lengths and the impact of remote faults affecting

customers close to the zone substation. This is also carried out with an optimisation of the lengths of 11kV feeders to reduce the number of customers affected by any one fault.

4. Reduce the Duration of Supply Interruptions

This is addressed by the use of SCADA which not only provides indication from all zone substations but also enables the remote control of the switchgear reducing the cost and improving the speed of restoration of supply in the event of faults.

11kV Distribution Design

All Distribution Design shall use sound engineering judgement and good industry practice in all aspects.

Urban Feeders

- Unless the existing reticulation is predominantly overhead new extensions will be installed underground.
- Maximum group demand 3 MW.
- Generally transformer group capacity 4.5MVA.
- Maximum transformer capacity between isolation points 800kVA.
- Earth Fault Indicators are required on predominantly underground system.
- All transformers will have suitable HV fault protection, ie fuses or circuit breakers and isolation.
- Transformer overload protection will generally be through the LV fuses or switchgear or physical load constraints.

Rural Feeders

- Overhead reticulation is predominantly used in all rural areas.
- Maximum accumulated length - 40 km coastal feeder.
- Maximum accumulated length - 100 km inland feeder.
- Maximum length between isolation points - 10 km.
- Maximum transformer capacity between isolation points - 800kVA.
- All transformers shall have individual isolation capability.
- Feeders shall be protected by circuit breakers with auto-reclosing facility.
- Combined urban/rural feeders shall include line circuit breakers to separate the urban and rural segments. The line breakers shall have auto-reclosing facility.
- Group fusing is permitted, but shall not involve more than 5 individual transformers or 600kVA transformer capacity. Installation of permanent fault indicators should also be included.

(v) MAINTENANCE

OtagoNet has a range of maintenance strategies for each asset group as detailed below. These strategies are based on customer service, economic efficiency, safety and environmental considerations. Maintenance strategies include condition assessment and performance monitoring to ensure that any defects or potential problems are identified so appropriate maintenance can be carried out. The actual maintenance required may involve servicing, minor replacements through to large scale refurbishment and ultimately replacement. The actual range of work or priority will be determined by the cost benefits to stakeholders as previously discussed.

OtagoNet is presently updating maintenance procedures and implementing those procedures in the WASP maintenance management system. These procedures are based on manufacturers' recommendations, best industry practices, history of any problems and OtagoNet's experience with the equipment involved. The procedures cover performance monitoring, testing frequency as well as specifying the required maintenance. Basic details for each asset group are discussed below:

1. Overhead Lines/Underground Cables

Visual drive by inspections are carried out on all lines each year with detailed condition assessment and recording being performed over a rolling five year period. This detailed inspection will involve at least 1,000 wooden poles being tested annually using ultrasonic test equipment. The maintenance will be based on condition and will generally involve the older lines as there is a definite correlation between age and condition. Cross arms will be replaced partway through the line life and ultimately poles and conductor replaced towards the end of the line life.

On an annual basis expenditure for the next ten years is estimated as follows:

33kV and 66kV Overhead Lines	$170,000
11kV Overhead Lines	$575,000
400V Overhead Lines	$75,000

2. Substation Buildings and Structures

Substations and all structures are inspected each month with condition and any defects recorded and reported back. The maintenance is condition based and involves the usual building maintenance, repairs, painting and upgrading as required.

Annual estimated expenditure is $60,000.

3. Power Transformers

Transformer inspection and monitoring includes the following:

- Monthly – visual check of transformer condition including silica gel breathers, oil levels and temperatures etc.
- Annually – DGA, dielectric strength, acidity and moisture content testing of transformer oil.

Transformers are then maintained or overhauled based on their condition. Maintenance can range from minor repairs, paint touch ups or fixing oil leaks through onsite oil refurbishment to full offsite refurbishment by specialist contractors.

Tap changer overhauls are based on the number of operations and may be undertaken on a contract basis.

Annual estimated expenditure is $150,000.

4. *Circuit Breakers*

The number of circuit breaker operations and their duty are recorded by SCADA and protection relay log files. They are also visually inspected each month. Oil levels, gas pressures, battery condition and protection devices are checked routinely based on equipment type. Primary or secondary injection tests are carried out every five years.

Maintenance is device specific and based on the results of the above inspections and tests, the number and type of operations and specific time intervals.

Annual estimated expenditure is $100,000.

5. *Distribution Transformers*

The larger ground mounted transformers are inspected every six months and their condition and maximum demands recorded. Maintenance of these transformers is condition based and would involve up to 20 larger transformers being overhauled annually.

All transformers will be inspected on a five year cycle as part of earth testing and line inspection. The larger overhead transformers of 50kVA or more will be maintained or removed from service and refurbished based on their condition. The smaller transformers will have a combination of minor maintenance or replacement at the end of their life.

Approximately 70 new replacement transformers are purchased annually.

Annual estimated expenditure is $100,000.

6. *Vegetation Control*

With the new requirements in the tree regulations for line owners to provide the first free trim, OtagoNet is increasing expenditure to $450,000 for this year with further increases in subsequent years as contractors build their expertise and equipment levels. A tree management package is incorporated into the WASP system and allows field staff to record details and prepare work packages on the job site and provide the required notices.

7. *Faults Service*

A faults response contract is in place with Otago Power Services with the agreed staff based in depots at Balclutha, Palmerston and Ranfurly. The contract guarantees maximum fault response times with minimum resources being available at each depot at all times. The faults contract covers all labour and plant costs for the first 24 hours.

With the addition of materials and other uncovered fault repair costs the annual expenditure is estimated to be $420,000.

The above costs are direct costs of materials and contractor time and equipment. In addition there are the PowerNet asset management and System Control costs, which include all operations and maintenance related personnel and overheads.

(vi) PROPOSED NETWORK CONFIGURATION

The following alterations to the network are proposed in order to increase the level of security to meet the proposed security guidelines, as detailed in both this plan and in the industry guidelines[1].

Palmerston – Transpower Point of Supply

The three zone substations in the Palmerston area are fed from single 33kV circuits from the Transpower point of supply, which has only a single transformer and 33kV bus arrangement, all without regulation. These single components do not allow for any failures, do not meet the guidelines and are difficult to maintain without considerable customer interruptions.

This point of supply is the most expensive for OtagoNet as well as being the least reliable. A strengthened alternative 33kV supply from Macraes is being studied in conjunction with proposed load increase to Oceana Gold and 110kV supply from Palmerston. This would allow flexibility for Transpower shutdowns and provide some 5MW backup capacity for a Transpower interruption. However there is still a need for reconfiguring the 33kV supply from and beyond Palmerston as set out below.

The proposed reconfiguration will be staged in over a number of years and will include the following phases:

- Complete the second 33kV circuit into Merton from Palmerston point of supply, this line is partially built requiring the last 7.5 km to be completed from Tumai alongside the railway line and around Waikouaiti to the Merton Substation.
- Provide additional circuit breakers and directional protection for the two Merton transformers to provide an N-1 supply.
- A new 33kV switching structure to replace all the Transpower feeder circuit breakers to allow bus and circuit breaker maintenance without loss of supply. The additional circuit breaker will be required in time for the commissioning of the second Merton circuit.
- The dual 33kV to Merton could then be extended into Palmerston to fully meet the alternative 33kV supply requirement there. This would involve a short length of 33kV line through Palmerston but would also require the reconfiguring the substation, transformers, regulators and the 33kV ripple injection. Further studies will be required to quantify and consider the cost benefits of such a supply compared with the risk of a 33kV fault on the 2.5 km of line and the time required to repair it.
- Lastly to provide backup to the growing Waitati area an 11kV solution is proposed to complement the newly rebuilt Warrington - Seacliff line and as the most cost effective solution compared with dual 33kV lines and a second 33/11kV transformer. The 11kV Kilmog feeder from Merton will be rebuilt to a larger capacity and the short break down the Kilmog hill to Evansdale will be connected to allow adequate 11kV backup into the Waitati area. The line upgrade and 2.5 km extension should be completed after the above projects.

Clydevale and Clinton

These two substations do not fully meet the proposed security standard because of only one 33kV line, single 33/11kV transformers and only partial 11kV backup from the recently completed 11kV tie line. There are a number of possible options and the final solution may be influenced by the dairy conversions in the area and a proposed rural water-pumping scheme out of the Pomahaka River at Popotunoa or the Clutha River north of Clydevale.

[1] Electricity Engineers Association of New Zealand – Guidelines for Security of Supply in New Zealand Electricity Networks, June 2000

The preferred solution is detailed below:

- Continue to upgrade the initial parts of the new tie line at the Clydevale end by replacing the existing squirrel conductor with a heavy AAAC conductor.
- Complete the maintenance and upgrade the spare Clifton to Clydevale 33kV circuit and switches, keeping it alive up to Clydevale.
- Install actuators on the existing 33kV incoming ABSs at Clydevale and program the RTU to perform an automatic change over on loss of one supply. These two lines are fed from the two 33kV circuits from Balclutha, normally one to each of Clydevale and Clinton.
- Provide greater security to the dairy customers by linking the 11kV feeders from Clydevale across the Clutha River at Tuapeka, also eliminating an overloaded single wire earth return line.
- Consider further tie lines between Clydevale and Clinton depending on dairy conversions in the area of the Pomohaka River north of Taumata.

Owaka

This substation has only an existing weak link to Finegand and a possible line route to Port Molyneux. However these substations are some 25 and 15 km away and it will therefore require a large investment in maintenance and upgrading of the existing line plus building of 5 km of new line over difficult terrain. These two feeders into Owaka would provide adequate emergency back up to cover 33kV line or transformer failures and allow access to the transformer for tapchanger maintenance. An 11kV route from Port Molyneux has been secured and the line designed, but the project will be held until at least 2010 due to the low customer numbers and expense of the solution.

Oceana Gold Increased supply to Macraes

This major customer has requested a proposal to take additional load at Macraes for additional underground mining and processing developments. Various options were considered with the preferred option being a 110kV supply from Transpower Palmerston. A 33kV supply would also be available at Macraes to provide greater backup into Palmerston, Middlemarch and Ranfurly on the existing 33kV lines. The proposed work would involve the following phases:

- Transpower to build a new 110kV bay and make protection changes at Palmerston.
- Build a new 110kV line from Palmerston to Macraes.
- Build a new substation at Macraes with a 110/66/33kV three winding interconnecting transformer to feed Oceana Gold at 66kV, connect with Ranfurly at 66kV and provide backup to the local area at 33kV.
- Build a new 33kV line from Macraes to the Deepdell substation to provide the backup into the OtagoNet system.
- Configure the network so the generator exports power down the Ranfurly – Macraes 66kV line and remains an embedded generator.
- Release one 220/33kV transformer at Transpower Naseby to minimise charges as a suitable 33kV backup will be available through the Ranfurly – Macraes 66kV line.

Milburn Zone Substation

This new supply is now required as the Corrections Department prison and the Dunedin City Forest timber mills are presently being built. Initially a single 5MVA transformer substation will be built on Lime Works Road with 11kV lines to the north and south of State Highway 1 and a further feed towards the west and Bruce Road.

If there is the predicted timber mill expansion the single transformer would have to be duplicated, as there would not be adequate security or back feed capacity from the Elderlee Street substation.

Initially the 33kV supply would come from a single T off the Waihola line less than 2 km to the west on Jensen Road and ultimately the new Balclutha to Milton 33kV line would extended up Back Road and enter the Milburn substation from the east.

Milton Area 33kV supply

As the above projects in Milburn are proceeding, the 33kV supply into the Milton area will become inadequate in the event of a 33kV line failure. A 66kV solution was considered, but a new heavy 33kV line will provide adequate security into the foreseeable future. The following work will be required:

- Secure a new route and build a 33kV line to the east of the existing 33kV line from Transpower Balclutha through to Tokoiti.
- Lay a 33kV underground cable through Milton and across SH1 from the Tokoiti side of town.
- Install another circuit breaker and suitable directional or distance protection at Elderlee Street to close the heavy 33kV ring.
- Create a lighter second ring from Milton to Milburn with a new 33kV line along Back Road and the existing Waihola 33kV line along Jensen Road.

General Load Growth

Apart from the above proposed changes around Milton and Macraes for specific customers, no increase in the existing subtransmission capacity is required in the next 10 years based on the projected general growth. There are only small lengths of 11kV lines that will require upgrading for load growth. Most of the general load growth is from agriculture and is seen as the requirement for new three phase supplies in the rural areas that are only serviced at present with limited single phase or single wire earth return systems.

Most of the effect from general load growth will be seen as inadequate voltage and security on the LV lines in towns. An allowance has been made for an increasing amount of LV line rebuilding in this 10 year planning period.

Renewals

Equipment to be renewed because of age, condition or safety includes a number of zone substation transformers, switchgear and overhead lines. Nine zone substation transformers are identified for possible replacement in this 10 year planning period. These transformers will be closely monitored in the initial period and a cost benefit analysis performed to determine the merits of replacement or refurbishment closer to the time.

There are 16 circuit breakers that are presently over 30 years old and should be replaced progressively during the 10 year period. Three of these circuit breakers are single-phase 22kV units and others are 11kV reclosers. There are three 33kV circuit breakers at Ranfurly which will need careful monitoring and possible replacement at the end of the 10 year period.

Lines and poles will continue to be replaced as a result of the ongoing condition surveys in order to increase reliability and safety.

Environmental

The main environmental concern is the possibility of zone substation transformer oil leaks contaminating the ground or waterways. Presently 14 zone substations have oil bunding installed with 16 left to complete. The first 14 were the most at risk sites and the ongoing plan allows for a further one to two substations per year to have oil bunding installed at the same time as upgrading the seismic restraint of transformers and equipment and general substation maintenance.

New Connections

The number of new connections allowed for each year is dependent on the economy and other factors such as industry expansion. The influx of new dairy farm conversions has slowed over recent years in South Otago. However irrigation in the Maniototo continues to be the main source of load growth with conversions from boarder dyke flood irrigation to more water efficient rotary or 'K' line irrigation. The range of 11kV line extensions required is dependent on the position of these new loads, and in many recent cases has involved a 1 to 2 km line extension with some upstream distribution reinforcement. The new developments in Milburn are also expected to produce an increased demand on new housing in the area.

Ripple Injection

The 492 Hz signal strength is expected to remain adequate in Ranfurly and Palmerston areas within the 10 year planning period. A new 317 Hz plant has been established in the Balclutha area as the 492 Hz was marginal and below reliable signal levels in some areas. The two plants will be run in parallel for a number of years while the retailers progressively replace old 492 Hz receivers with the new 317 Hz. The network owned street light receivers have been replaced.

Protection Policy

Up to this time the 33kV side to the zone substation transformers has only been protected by overhead dropout fuses. These fuses provide only coarse protection and present a possible safety risk and definite equipment risk in the event of a transformer or 11kV bus failure. Any single transformer or bus failure at a dual substation would result in a total loss of supply and possible damage to the other components.

It is proposed to install suitable protection and 33kV circuit breakers on the largest transformers starting at Charlotte Street, which has the greatest risk in terms of customers served and equipment value. This will be followed by similar work at the remaining five dual transformer substations and possibly the more strategic 5 MVA single transformer sites depending on experience and further investigations.

Network Line Renewals

Because of the age and condition profile of the overhead lines and the relative lack of renewals, years, there is a considerable amount of lines that need complete replacement or substantial maintenance. At present one third of the lines are at or beyond their normal economic life, this represents some 1,400km or a replacement cost of at least $35,000,000.

A ten year program is being developed to replace these lines in a timely manner, and will see a significant increase in the line renewal work starting this year. One of the initial tasks is to obtain a more accurate condition survey of every pole and line and use the data collected to more accurately and effectively plan the future replacement program.

OtagoNet 10 Year Capital Project Timeline

Major Capital Projects for 2005-06

(a) Stage 1 design and procurement of the new Milburn zone substation and 33kV line
(b) SCADA control of remaining Transpower and zone substation circuit breakers
(c) Install new oil containment at Clinton
(d) Refurbish the 33/22kV earth return transformer from Clarks
(e) Replace and refurbish the 2.5MVA transformer at Kaitangata
(f) Replace voltage regulating relays at Clinton and Kaitangata
(g) Install 11kV voltage regulators at Dunback
(h) Replace 33kV circuit breakers and protection at Port Molyneux and Middlemarch
(i) Maintain the 33kV transmissions lines between Charlotte Street, Pukeawa and Finegand and Balclutha to Milton.
(j) Rebuild SWER lines at Wilson Rd, Owaka Valley and Purekireki
(k) Continue to rebuild the Clydevale 11kV tie line for quality and security
(l) Rebuild 22kV lines in the Hindon area
(m) Rebuild 11kV lines in various locations throughout the network
(n) Rebuild LV lines in Purakanui and Palmerston

Major Capital Projects for 2006-07

(a) Stage 2 construction of the new Milburn zone substation
(b) Stage 1 of the new 33kV line from Balclutha to Milton
(c) Build 110kV line to and 110/66kV substation at Macraes
(d) SCADA indications, analogues and tap position indicators
(e) 33kV circuit breaker protection for major transformers
(f) Oil containment in zone substations
(g) Replace two 2.5MVA transformers at Palmerston
(h) Field circuit breaker replacement
(i) Voltage regulating relay replacement
(j) Substation outdoor bus upgrades
(k) Continue the new 33kV line from Tumai to Waikouaiti
(l) Reconductor the Charlotte Street to Finegand 33kV line
(m) Clarks and Hindon 22kV replacement program
(n) Rebuild 11kV lines in various locations throughout the network
(o) Replace SWER lines with 2 or 3 wire 11kV lines
(p) Rebuild LV lines in Palmerston

Major Capital Projects for 2007-08

(a) Stage 2 of the new 33kV line Balclutha to Milton
(b) SCADA indications, analogues and tap position indicators
(c) 33kV circuit breaker protection for major transformers
(d) Oil containment
(e) Field circuit breaker replacement
(f) Voltage regulating relay replacement
(g) New 2.5MVA 33/11 transformer for Port Molyneux
(h) New 2.5MVA 33/11 transformer for Middlemarch
(i) Substation outdoor bus upgrades
(j) Continue the Merton 33kV line to Waikouaiti
(k) 33kV line rebuilding
(l) Clarks and Hindon 22kV replacement program
(m) Rebuild 11kV lines in various locations throughout the network
(n) Replace SWER lines with 2 or 3 wire 11kV lines
(o) Rebuild LV lines in Naseby

Major Capital Projects for 2008-09

(a) SCADA indications, analogues and tap position indicators
(b) 33kV circuit breaker protection for major transformers
(c) Oil containment
(d) Field circuit breaker replacement
(e) Two new 1.5MVA 33/11 transformers for Lawrence
(f) Substation outdoor bus upgrades
(g) Bus and protection upgrade for Merton
(h) Clarks and Hindon 22kV replacement program
(i) Rebuild 11kV lines in various locations throughout the network
(j) Replace SWER lines with 2 or 3 wire 11kV lines
(k) Rebuild LV lines in Milton

Major Capital Projects for 2009-10

(a) SCADA indications analogues and tap position indicators
(b) 33kV circuit breaker protection for major transformers
(c) Oil containment
(d) Field circuit breaker replacement
(e) New 1MVA 33/11 transformer for Paerau
(f) New 1MVA 33/11 transformer for Wedderburn
(g) Substation outdoor bus upgrades
(h) Zone substation voltage regulator replacements
(i) Zone substation protection relay upgrades
(j) 33kV line rebuilding
(k) Clarks and Hindon 22kV replacement program
(l) Rebuild 11kV lines in various locations throughout the network
(m) Replace SWER lines with 2 or 3 wire 11kV lines
(n) Rebuild LV lines in Waikouaiti

Major Capital Projects for 2010-11

(a) 33kV circuit breaker protection for major transformers
(b) Oil containment
(c) Field circuit breaker replacement
(d) New 1MVA 33/11 transformer for Glenore
(e) Substation outdoor bus upgrades
(f) 33kV line rebuilding
(g) Clarks and Hindon 22kV replacement program
(h) Rebuild 11kV lines in various locations throughout the network
(i) Replace SWER lines with 2 or 3 wire 11kV lines
(j) Replacement of galvanised steel wire conductors
(k) New 11kV interconnections for security and reliability

Major Capital Projects for 2011-12

(a) 33kV circuit breaker protection for major transformers
(b) Oil containment
(c) Field circuit breaker replacement
(d) Second 2.5 MVA 33/11 transformer for North Balclutha
(e) Substation outdoor bus upgrades
(f) 33kV line rebuilding
(g) Clarks and Hindon 22kV replacement program
(h) Rebuild 11kV lines in various locations throughout the network
(i) Replace SWER lines with 2 or 3 wire 11kV lines
(j) Replacement of galvanised steel wire conductors
(k) New 11kV interconnections for security and reliability

Major Capital Projects for 2012-13

(a) 33kV circuit breaker protection for major transformers
(b) Oil containment
(c) Field circuit breaker replacement
(d) New 1.5MVA 33/11 transformer for Waipiata
(e) Substation outdoor bus upgrades
(f) 33kV line rebuilding
(g) Clarks and Hindon 22kV replacement program
(h) Rebuild 11kV lines in various locations throughout the network
(i) Replace SWER lines with 2 or 3 wire 11kV lines
(j) Replacement of galvanised steel wire conductors
(k) New 11kV interconnections for security and reliability

Major Capital Projects for 2013-14

(a) 33kV circuit breaker protection for major transformers
(b) Oil containment
(c) Field circuit breaker replacement
(d) New 2.5MVA 33/11 transformer for Finegand
(e) Substation outdoor bus upgrades
(f) 33kV line rebuilding
(g) Clarks and Hindon 22kV replacement program
(h) Rebuild 11kV lines in various locations throughout the network
(i) Replace SWER lines with 2 or 3 wire 11kV lines
(j) Replacement of galvanised steel wire conductors
(k) New 11kV interconnections for security and reliability
(l) 33kV circuit breaker protection for major transformers

Major Capital Projects for 2014-15

(a) 33kV circuit breaker protection for major transformers
(b) Oil containment
(c) Field circuit breaker replacement
(d) Second 2.5MVA 33/11 transformer for Waitati
(e) Substation outdoor bus upgrades
(f) 33kV line rebuilding
(g) Clarks and Hindon 22kV replacement program
(h) Rebuild 11kV lines in various locations throughout the network
(i) Replace SWER lines with 2 or 3 wire 11kV lines
(j) Replacement of galvanised steel wire conductors
(k) New 11kV interconnections for security and reliability
(l) 33kV circuit breaker protection for major transformers

OtagoNet 10 Year Capital and Maintenance Budget Cost Summary

	Annual Costs ($000)									
Project	**05-06**	**06-07**	**07-08**	**08-09**	**09-10**	**10-11**	**11-12**	**12-13**	**13-14**	**14-15**
Customers	$1,378	$2,057	$887	$918	$951	$990	$1,040	$1,080	$1,120	$1,160
Reinforcement	$540	$975	$1,850	$400	$150	$200	$200	$200	$200	$200
Safety	$44	$45	$50	$50	$50	$50	$50	$50	$50	$50
Reliability	$176	$155	$161	$285	$140	$150	$150	$160	$160	$160
Regulatory	$475	$448	$255	$264	$273	$275	$285	$290	$295	$300
Renewals	$1,810	$3,096	$3,439	$3,742	$4,115	$4,100	$4,100	$4,000	$4,000	$4,000
Efficiency	$373	$206	$136	$87	$140	$150	$150	$160	$160	$170
Faults & Maint.	$2,271	$2,128	$2,133	$2,207	$2,282	$2,300	$2,300	$2,300	$2,300	$2,300
Total Business	$7,065	$9,110	$8,911	$7,953	$8,101	$8,215	$8,275	$8,240	$8,285	$8,340

(f) RISK POLICIES

(i) METHODS, DETAILS AND CONCLUSION OF RISK ANALYSIS

As the assets are distributed over a wide geographical area, they are not susceptible to a single event and typically major wind and storms have not affected more than a small proportion of the network.

Most failures can be restored within days by the construction of new lines etc.

A risk analysis has been carried out on the network and from this analysis critical items were identified and plans put in place to mitigate the risk. These plans also included the levels and location of network spares and contractor availability and training.

The highest risk equipment is the 11kV indoor switchgear panels inside zone substations. Regular diagnostic testing of this gear is now an important part of the maintenance programme to try and identify suspected faults before they occur.

Other risks include the records and computer data located in the asset manager's offices and these risks are reduced by offsite storage of both hard copy records and computer backup tapes etc.

(ii) EMERGENCY RESPONSE AND CONTINGENCY PLANS

Emergency response for the OtagoNet network is centred on the System Control Room, which is manned 24 hours a day, by PowerNet staff. The company encourages customers to use its 0800 number for all system faults to expedite service and repairs to equipment in the event of faults.

OtagoNet has faults contracts with its contractors who have people on immediate standby at all hours in case of equipment breakdowns. There are various levels of backup to respond to the different types of fault or widespread events such as storms etc.

There is also an asset manager engineer on standby at any time to provide backup assistance for contract issues and other engineering or network operational issues.

A fully documented Disaster Recovery Plan is being prepared covering both network and office contingencies. This is due for completion during 2005.

(g) Details of Performance Measurement, Evaluation and Improvement

(i) Review of Progress Against Physical and Financial Plan

PowerNet provides monthly Board Reports which include a summary of all network operations for the Company management committee. These reports review progress against the annual Business Plan both from a physical aspect and financially.

In addition engineering staff of PowerNet attend weekly network performance meetings at which all incidents on the network are examined and actions taken to prevent reoccurrence, mitigate the effects or investigate further.

Physical progress on last year's major capital projects were as follows:

Description	Budget	Actual
New Connections	660,000	720,000
Replace CBs	88,000	87,000
Protection upgrade at Ranfurly and Elderlee St	46,500	57,500
Relocate SCADA Master PC into PowerNet office, Balclutha	9,000	7,200
SCADA control of Transpower 33kV circuit breakers	30,000	7,000
Surge diverters for 11kV lines at substations	10,000	21,000
Install Voltage Regulators at Redbank and Tahhakopa	74,500	77,100
Hindon - install refurbished 33/22kV ER transformer	46,500	38,500
SCADA control of CBs at 7 stations	85,000	90,500
VRR replacement – Owaka	9,000	10,300
Oil containment painting - Oturehua & Palmerston	16,500	17,400
Oil containment – Finegand	35,000	63,000
VRR replacement – Finegand	9,000	10,000
Stirling - rebuild structure plus new switches †	100,000	17,000
Clydevale 33kV rebuild/conductor Greers to Clifton	115,000	111,600
Clydevale 33kV rebuild Clifton to Pomomhaka River	35,000	41,500
Transformer Site and Earth Upgrades	60,000	23,000
Legal Easement Backlog Work	30,000	16,000
Misc Quality of Supply upgrades, including transformer upgrades	100,000	67,000
Replacement 11kV SWER isolators	156,500	49,600
Shag Point replace poles and new ABC	81,000	80,000
Waihola - rebuild initial span of Taieri Mouth 11kV feeder	24,500	18,600
Ground substation 11kV cable replacements	16,000	20,100
Whatetoa, Popotunoa 11kV line rebuild †	122,000	70,000
Lawrence 11kV line rebuild	95,500	104,600
Edinburgh Street Waikouaiti - rebuild 11kV line	90,000	95,200
Heyward Point 11kV line last section to replace	11,500	11,500
Middlemarch, Ngapuna Rd - repole 2 wire 11kV line	21,000	21,700
Wangaloa - rebuild SWER line ‡	1,000	34,300
Kaka Point, replace 11kV conductor ‡	0	94,800
Deepdell - Middlemarch 33kV line pole replacements ‡	0	66,200
Total Capital Projects	**2,178,000**	**2,149,200**
Notes		
† Projects not completed at end of year, carried over into 2005-06		
‡ Projects extra to budget		

(ii) Evaluation and Comparison

The evaluation and comparison of performance against the targets is shown in the Information Disclosure Regulations and in the Annual Reports where performance is compared to the targets in the Statement of Corporate Intent.

The Company showed a positive improvement in supply reliability reflecting improved management investment in the network over the past five years. Performance for the previous year ending 31 March 2004 did not achieve some performance targets due to the storms that occurred in November 2003 and in February 2004 together with the fact that many of the assets have now attained the end of their useful lives.

There were more interruptions than targeted, but these related to planned interruptions and reflected the increased capital spend on network rebuilding. Other performance targets for 2004-05 were met overall.

(iii) Gap Analysis and Identification of Improvement Initiatives

In general the Company has met its KPI's in all areas except in 2003/04 when two storms resulted in the Company failing to meet the reliability targets. Most improvement initiatives have already been mentioned in the previous text. Until significant capital expenditure is undertaken the performance of the network can not be expected to improve. Even worse if timely capital and maintenance expenditure is not effected the performance of the network will deteriorate from current levels.

Part of the Company's capital plan also includes projects to reduce losses where there are significant losses occurring.

Increased use of live line techniques, SCADA, WASP and integration of databases and software will all contribute to improving the efficiency of the Company.