ASSET MANAGEMENT PLAN 2004-2014

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(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 shareholders. 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 shareholder 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 2004 and is for the period 1 April 2004 to 31 March 2014. It is intended that this document is revised 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 2004.

(iii) Asset Management Systems, Processes and Information

Asset management systems owned by the asset manager, PowerNet, 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 some townships including Balclutha, Palmerston, Milton, Middlemarch, Ranfurly and Owaka.

There is approximately 75km of 66kV, 550km of 33kV, 250km of 22kV and 3,300km of 11kV and 400v network.

The network is supplied through three Transpower Grid Exit Points (GXPs) and there are 31 zone substations and approximately 4,000 distribution transformers. There are a total of 14,650 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

Price, reliability and the respective trade off between them have been highlighted by the recent Commerce Commission Price Path and Reliability Regulations.

During the past year the OtagoNet consulted with local dairy farmers, commercial businesses, domestic customers and the major users at a number of venues in Otago. Generally these users were happy with the levels of service and while some may have liked increased levels of service, they did not want to have increased network charges.

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 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 achieve an overall figure of less than five faults per 100 circuit kilometres. The current level of 11kV line faults is 5.24 faults per 100 kilometres with 33kV faults at 1.6 faults per 100 km.

The current CAIDI index for network faults, excluding 38 minutes from the extreme weather events of 17/18 November 2003 and 24/25 February 2004, is 100 minutes and the objective is to further reduce it to 80 minutes during the next 10 years.

The equivalent SAIFI, less 0.95 for the extreme weather events is 1.91 and over the next 10-year period the objective is to achieve a figure of 1.8.

If the above can be achieved it will result in a SAIDI for network faults of 145 minutes compared to the current level of around 195 minutes after subtracting 200 minutes for the extreme weather events.

Taking into account the increased use of live line working, the CAIDI for planned interruptions is expected to remain at about 175 minutes, SAIFI reduce to 0.28 resulting in a SAIDI of about 50 minutes.

The above sets of indices result in the following overall 10-year targets for the OtagoNet network:

CAIDI	-	95 minutes
SAIFI	-	2.1 times
SAIDI	-	200 minutes

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 there will be an increasing revenue required to fund the capital expenditure, it is thus acknowledged that the ability of the Company to achieve the above targets will then also 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 at approximately 1% of replacement value of the assets or 2% of the Depreciated Replacement Value.

Data for the maintenance programmes originate 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 Directors. This tool will 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 southeastern 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.

Other risks to the business include technology changes, increased embedded generation inside the network, significant load pattern changes either by customer group or throughout the network, regulatory changes and finally economic changes.

Changes in technology normally improve cost effectiveness of the network but can also impact on utilisation and hence load duration curves. Although on a national basis it is anticipated that there will be an increased level of embedded generation, it is not anticipated this will have a significant impact on this network over the next ten years.

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

(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, better targeted maintenance and 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 three years.

Requirements of the Asset Management Plan are also incorporated into 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.

(ii) Planning Periods

The Asset Management Plans are based on a 10-year period.

(iii) Stakeholder Interests

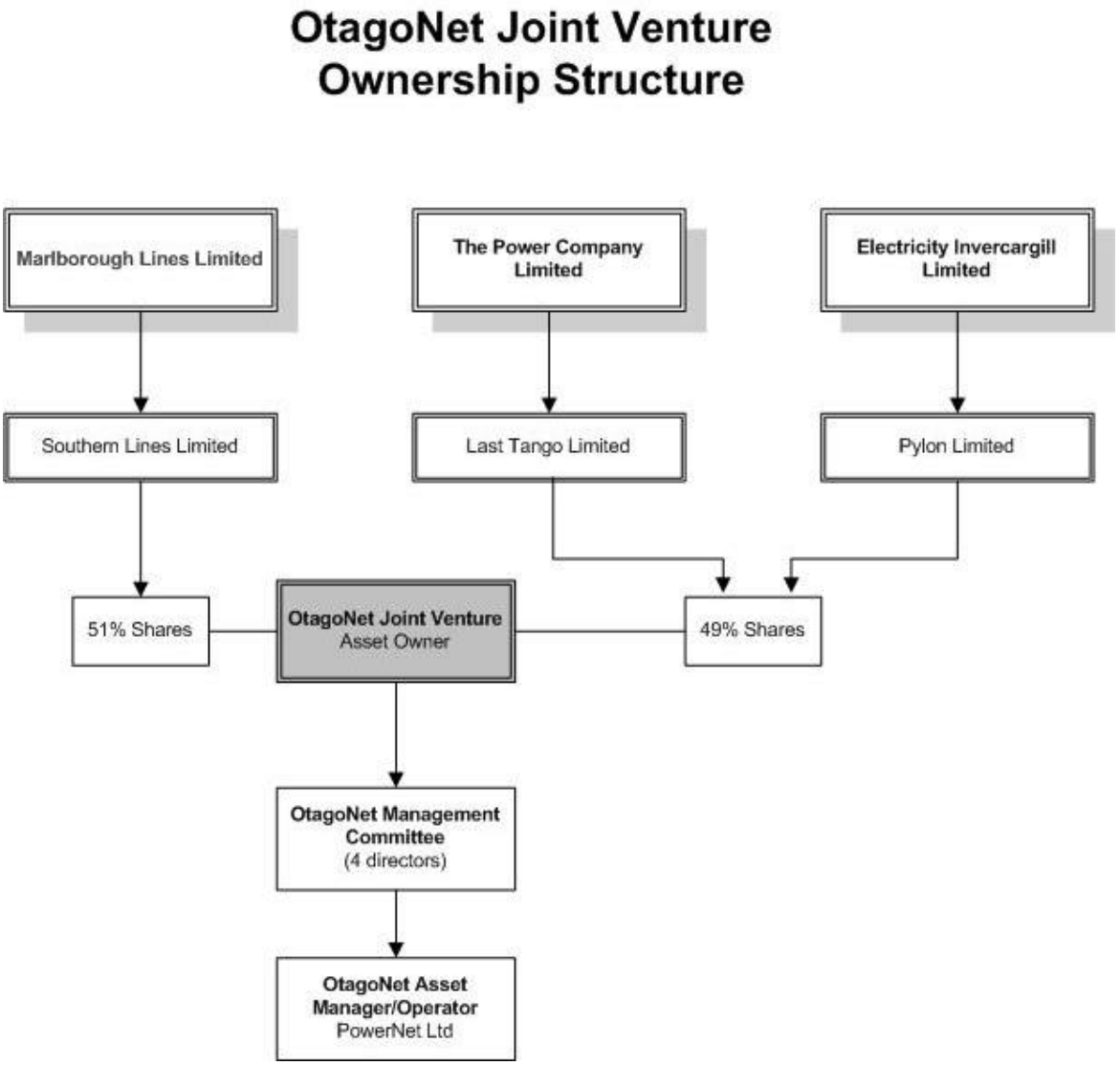
The principal stakeholders in the performance of the network assets are the end-use customers, the shareholders of the company, the electricity retailers and PowerNet as the asset manager.

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.

(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.



(v) Asset Management Systems and Processes

The principal systems used for the management of these 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 the attributes to every pole which are also separately identified on plans and physically in the field.

   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.

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.

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.

(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.

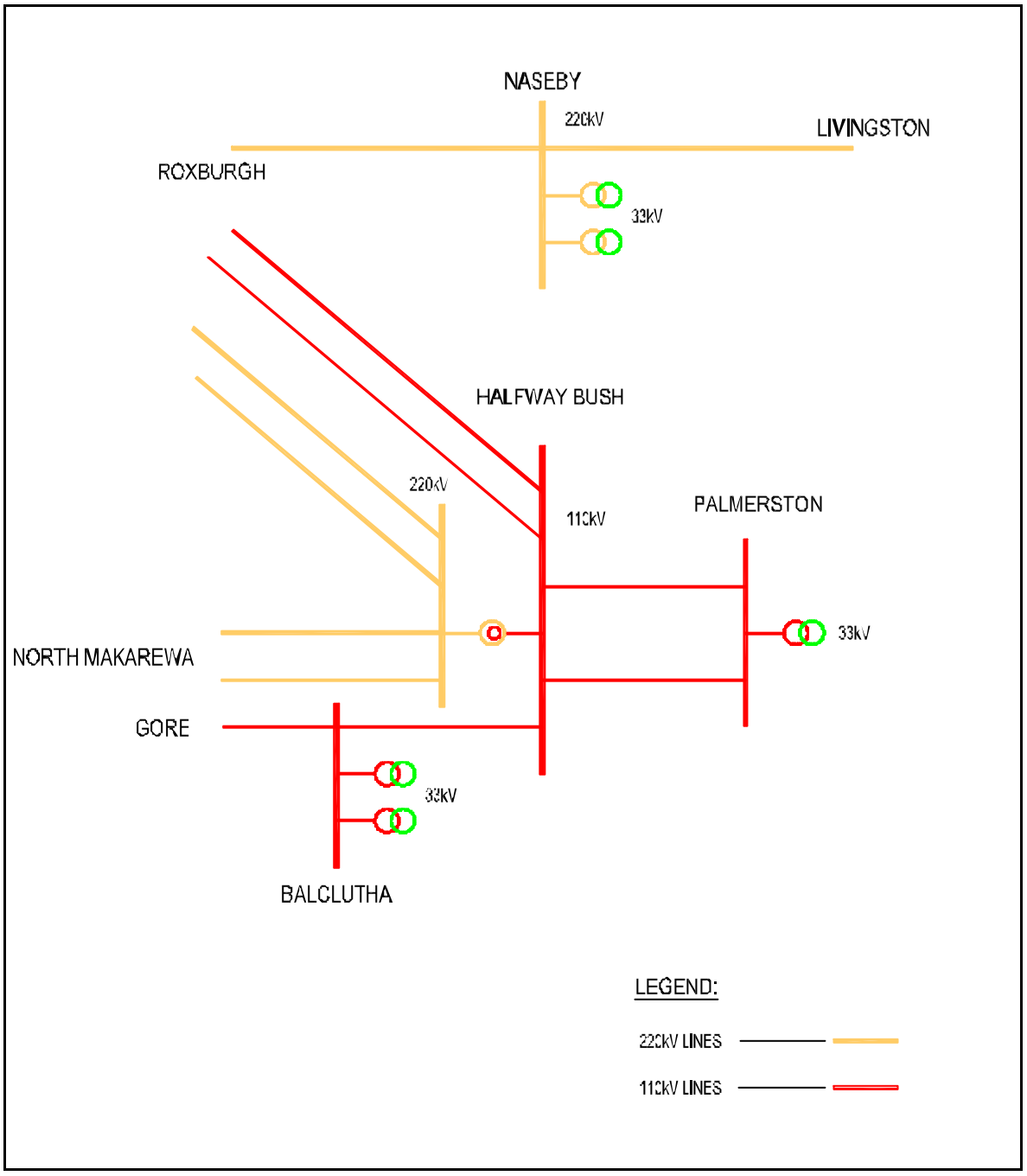
The Naseby point of supply is mid point on the Roxburgh Livingston single 220kV line with two 20 MVA supply transformers. Similarly, Balclutha is midway between Gore and Dunedin on a single 110kV line with two 20 MVA transformer banks. The Transpower substations on either side of these points of supply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

The Palmerston point of supply is a single 10 MVA 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.

There are also two embedded generators in the Maniototo area, feeding into the Ranfurly substation. Paerau has three generators totalling 12.5 MW and Falls Dam has one generator of 1.25 MW. 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 are concerns about the loads on both Balclutha and Naseby, as they are now greater than the N-1 rating, that is in both cases loads of up to 25 MVA exceed the 20 MVA rating of a single transformer. In Naseby this risk is reduced by the presence of the generators who mainly keep the Transpower offtake below 20 MVA. At Balclutha there is a larger amount of controlled load meaning that in the short time load could be kept below one transformer's rating while the spare (onsite) transformer unit was installed.

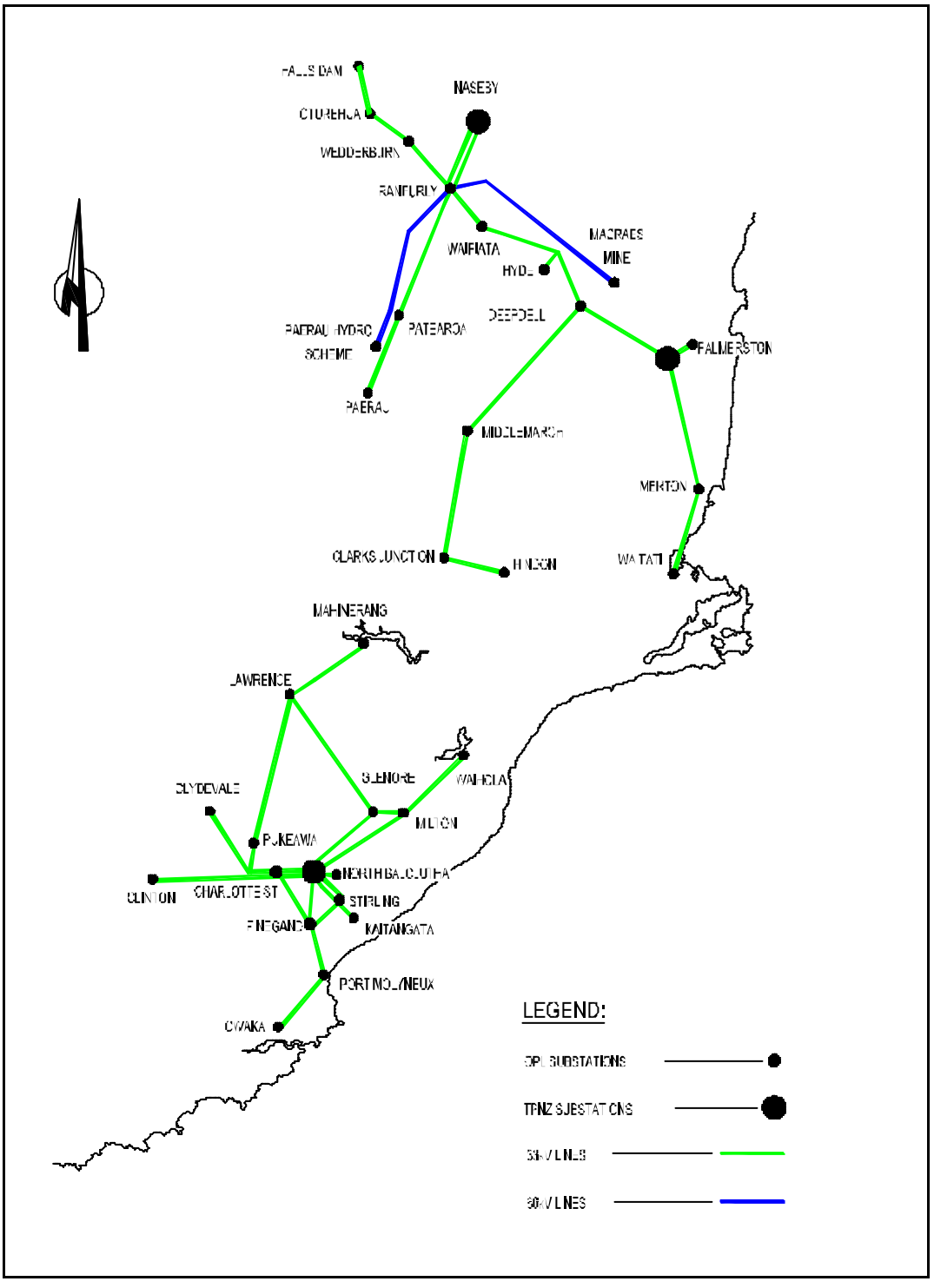
The drawing shows the Transpower grid in Otago.



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 a 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 backup is from Palmerston on the 33kV line through Deepdell to Hyde, Waipiata and back to Ranfurly. There is inadequate capacity in this line to pick up any substations beyond Waipiata.

The main vulnerability in this area is the major customer, Macraes Mine that is supplied through one 66kV radial line but is supplied through a dual 33/66kV bank at Ranfurly which in turn is supplied by the double circuit line from Naseby. Macraes Mine is the only customer at the end of the single circuit 66kV line and it is their choice to remain as a single circuit supply.

GRDMacraes is expanding its mining operations and has requested additional power from the OtagoNet network. Options are presently being investigated, but it is possible that upgrading of the 33kV line from Ranfurly to Deepdell to 66kV may satisfy this load growth. However, satisfactory interconnection arrangements would be required to safeguard the supply to the existing OtagoNet customers in the Middlemarch area.

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

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. The Palmerston zone substation has dual transformers.

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 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 this area will necessitate the need to provide further ties between and around the Clinton and Clydevale zone substations to satisfy the dairy customers.

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

Distribution

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

The lines are mostly radial, reducing in capacity with greater distance from the zone substations, often ending up in light two-wire circuits or single wire earth return systems. The Clarks and Hindon area is fed exclusively at 22kV single wire earth return from the zone substations.

Milton Area Load Increases

During the early to middle part of 2004 there have been a number of proposals for increased load to the North of Milton. The possibilities are a Corrections Department facility for 300-500 inmates and at least two new timber-processing plants. If one or more of these proposals goes ahead it will require a new zone substation in the Milburn area. If two or more went ahead some reinforcement of the 33kV lines from Balclutha to Milton or a possible new Transpower point of supply would be required. Preliminary investigations are underway to find the best options if this load does develop. There is a strong probability that there will be extensive load increases in this region over the next few years.

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	7.6	AA	Alternative	Yes	OK	
Clarks Junction	0.4	A(ii)	Single	Yes	OK	
Clinton	1.9	A(i)	MV Alternative	Yes	OK	
Clydevale	1.6	A(i)	MV Alternative	Yes	OK	
Deepdell	0.5	A(ii)	Alternative	Yes	OK	
Elderlee Street	4.4	AA	Dual Circuit	Yes	OK	
Finegand	2.0	A(i)	Alternative	Yes	OK	
Glenore	0.6	A(ii)	Alternative	Yes	OK	
Hindon	0.4	A(ii)	Single	Yes	OK	
Hyde	1.1	A(ii)	Alternative	Yes	OK	
Kaitangata	1.3	A(i)	MV Alternative	Yes	OK	
Lawrence	1.6	A(i)	Alternative	Yes	OK	
Macraes Mine	21.6	AA	Single	No	OK	Single customer choice
Mahinerangi	0.1	A(ii)	Single	Yes	OK	
Merton	2.8	A(i)	Single	No	HV Alternative	Complete 2nd 33kV line
Middlemarch	0.8	A(ii)	Single	Yes	OK	
North Balclutha	3.3	A(i)	MV Alternative	Yes	OK	
Oturehua	0.4	A(ii)	Single	Yes	OK	
Owaka	1.5	A(i)	Single	No	MV Alternative	Remote, no easy solution
Paerau	0.5	A(ii)	Single	Yes	OK	
Paerau Hydro	12.3	AA	Single	No	OK	Single customer choice
Palmerston	2.1	A(i)	Short Single	No	HV Alternative	Short length of 33kV
Patearoa	1.0	A(ii)	Single	Yes	OK	
Port Molyneux	0.8	A(ii)	Single	Yes	OK	
Pukeawa	0.3	A(ii)	Alternative	Yes	OK	
Ranfurly	2.0	A(i)	Dual Circuit	Yes	OK	
Ranfurly 66/33	21.6	AA	Dual Circuit	Yes	OK	
Stirling	3.2	A(i)	Alternative	Yes	OK	
Waihola	1.0	A(ii)	MV Alternative	Yes	OK	
Waipiata	0.8	A(ii)	Alternative	Yes	OK	
Waitati	1.6	A(i)	Single	Yes	OK	
Wedderburn	0.2	A(ii)	Single	Yes	OK	

(ii) Assets by Category

Assets have been classified as:

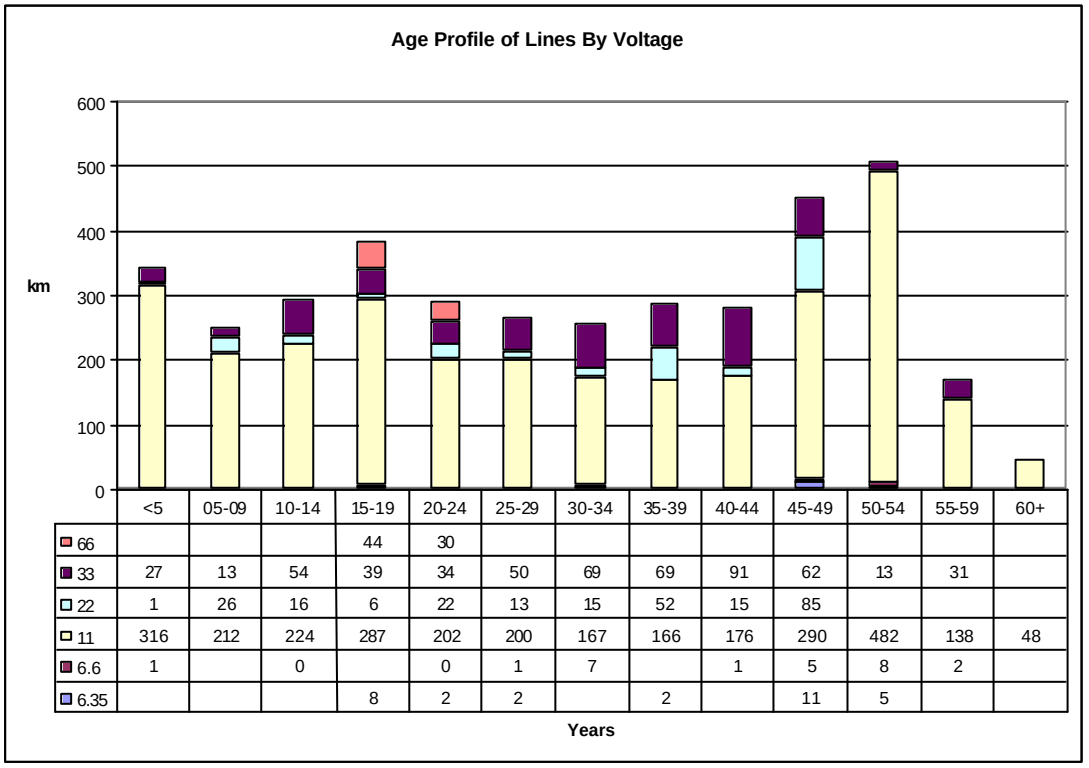
- Overhead Lines
- Substation Buildings
- Power Transformers
- Zone Substation Structures
- Circuit Breakers
- Distribution Transformers

(iii) Justification for Assets

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

(iv) Location, Age and Condition

Overhead Lines

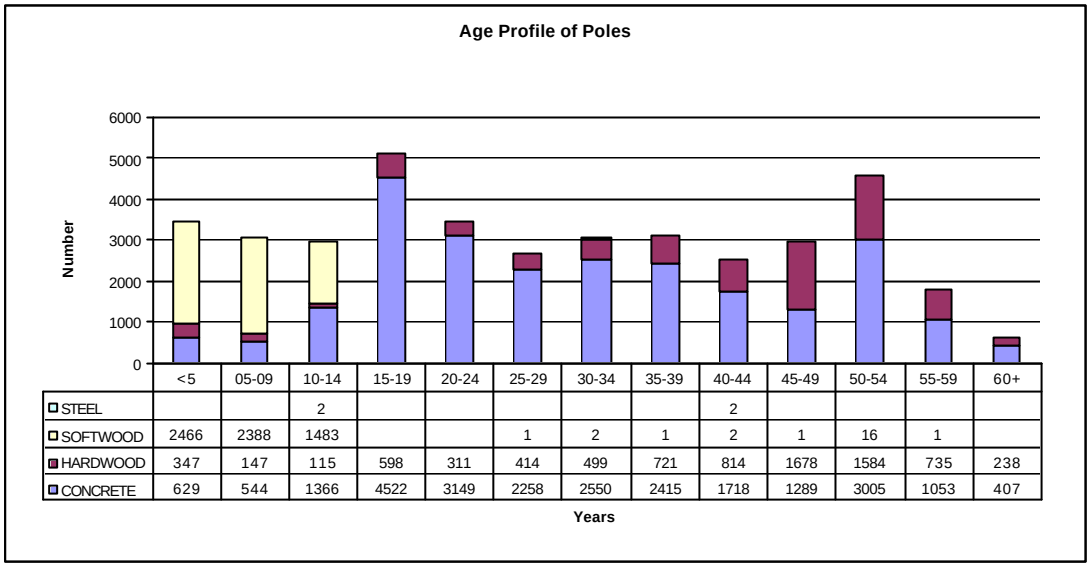


	<5	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
66				44	30								
33	27	13	54	39	34	50	69	69	91	62	13	31	
22	1	26	16	6	22	13	15	52	15	85			
11	316	212	224	287	202	200	167	166	176	290	482	138	48
6.6	1		0		0	1	7		1	5	8	2	
6.35				8	2	2		2		11	5		

The chart shows the length of line constructed on the OtagoNet network over the last 60+ years. It can be seen that a significant length of line was built 45-55 years ago.

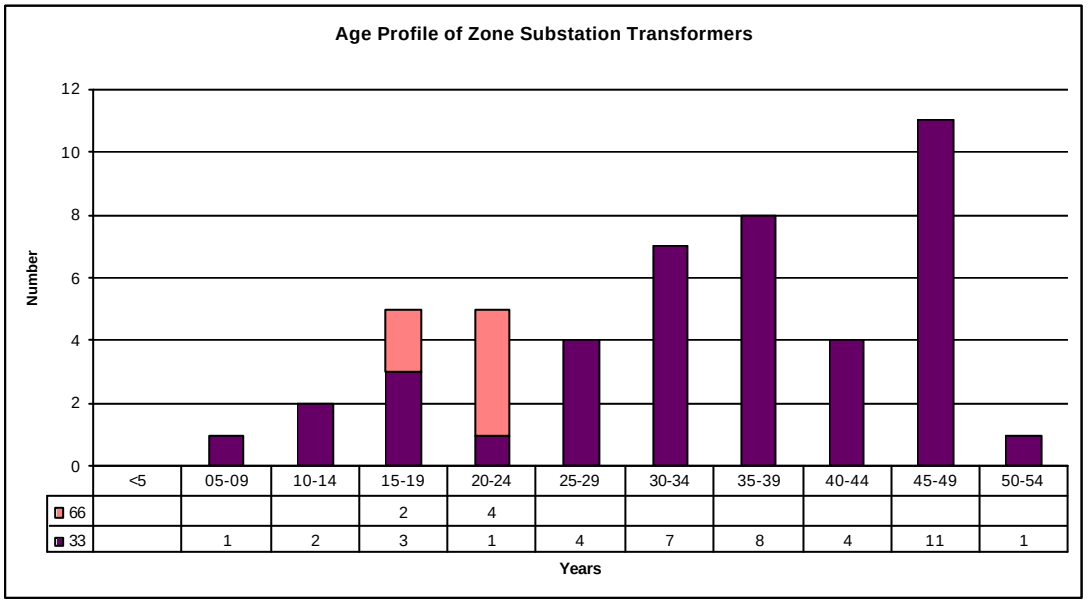
Many of these lines will have been substantially maintained since then as part of the annual maintenance programs and the remainder will be targeted for replacement or upgrading during this planning period.

The following graph shows that the majority of the older poles are concrete which have a far greater life expectancy than hardwood because they show little sign of any degradation. However, maintenance of the cross arms, conductor and fittings should 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	2466	2388	1483			1	2	1	2	1	16	1	
HARDWOOD	347	147	115	598	311	414	499	721	814	1678	1584	735	238
CONCRETE	629	544	1366	4522	3149	2258	2550	2415	1718	1289	3005	1053	407

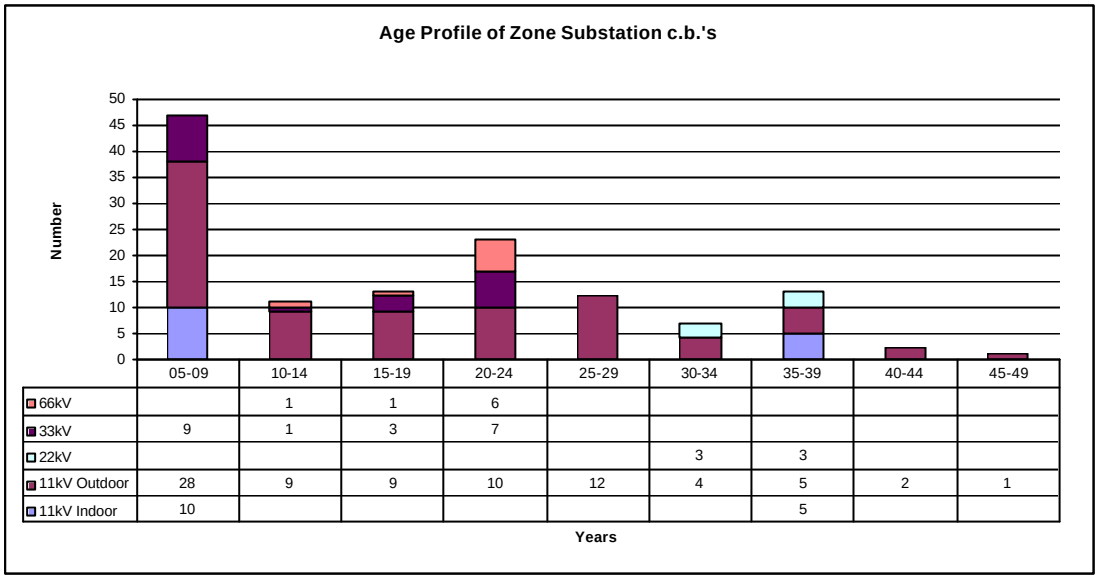
Power Transformers



	<5	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	2	3	1	4	7	8	4	11	1

At present OtagoNet has only one spare 1,000kVA 33/11kV transformer and one spare 33/22kV earth return transformer. Emergency replacement plans to move an existing unit exist to cover the remaining larger units, but this would be time consuming and require further load distribution to keep loads under ratings. The 12 transformers over 45 years are all smaller units up to 2.5 MVA and are planned for replacement during this planning period.

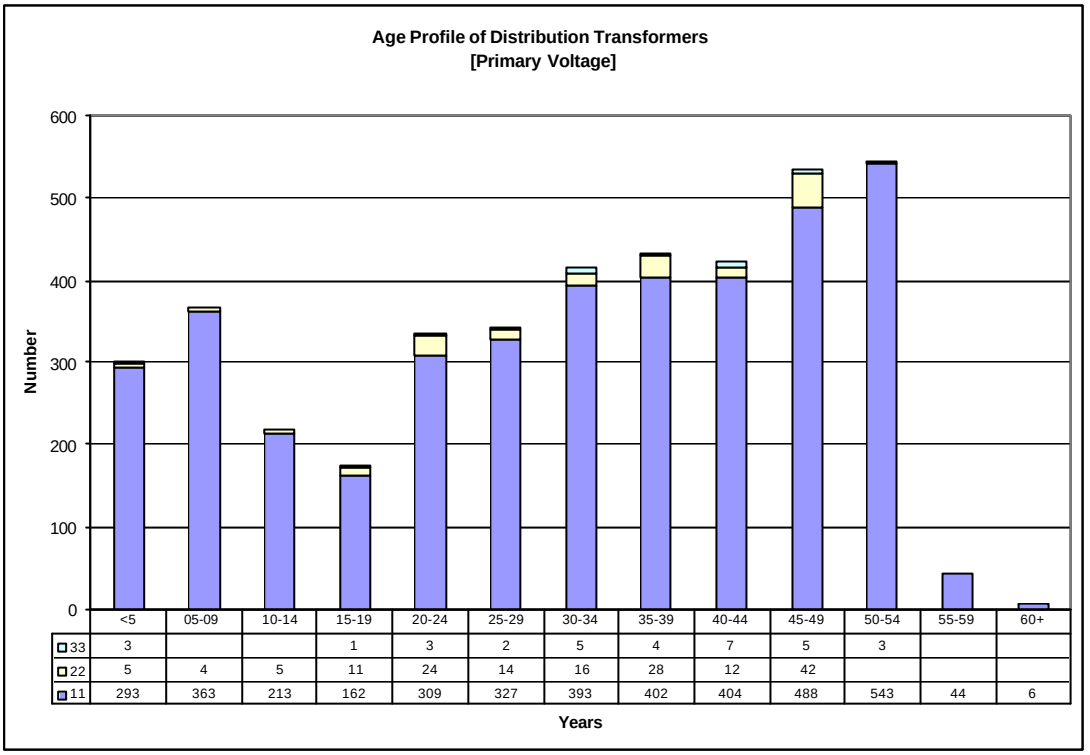
Circuit Breakers



	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49
66kV		1	1	6					
33kV	9	1	3	7					
22kV						3	3		
11kV Outdoor	28	9	9	10	12	4	5	2	1
11kV Indoor	10						5		

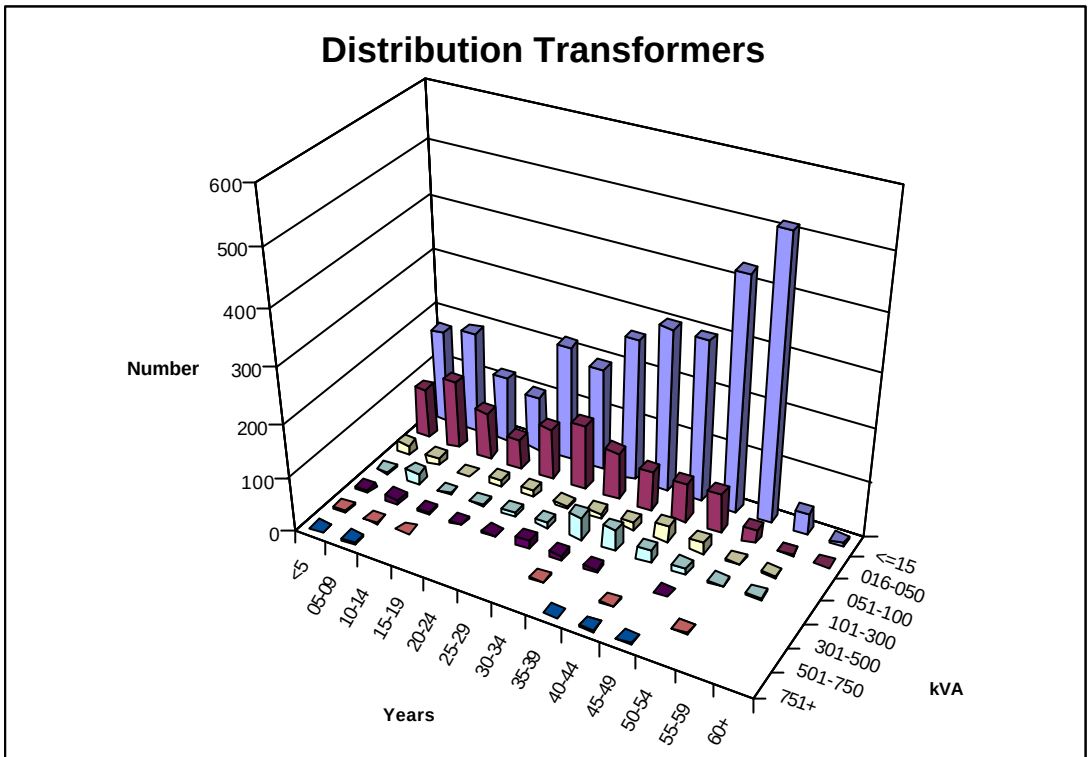
Most zone substations upgraded with the recent replacement of the circuit breakers. Some hardwood poles remain but isolators, fuses and bearers have been replaced or are in acceptable condition. Only three circuit breakers are over 40 years old and will be replaced in the near future as part of the SCADA actuator program.

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	60+
33	3			1	3	2	5	4	7	5	3		
22	5	4	5	11	24	14	16	28	12	42			
11	293	363	213	162	309	327	393	402	404	488	543	44	6

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	39	515	429	299	302	262	192	216	102	121	189	174
016-050	1	1	25	72	70	73	89	121	96	56	87	128	94
051-100		2	4	20	28	14	11	4	13	11	1	16	20
101-300		2	4	13	23	40	43	10	8	3	3	21	5
301-500				1		5	9	16	3	2	4	8	4
501-750			1		2		1				2	2	3
751+				2	1	1						3	1

(d) Details of Proposed Levels of Service

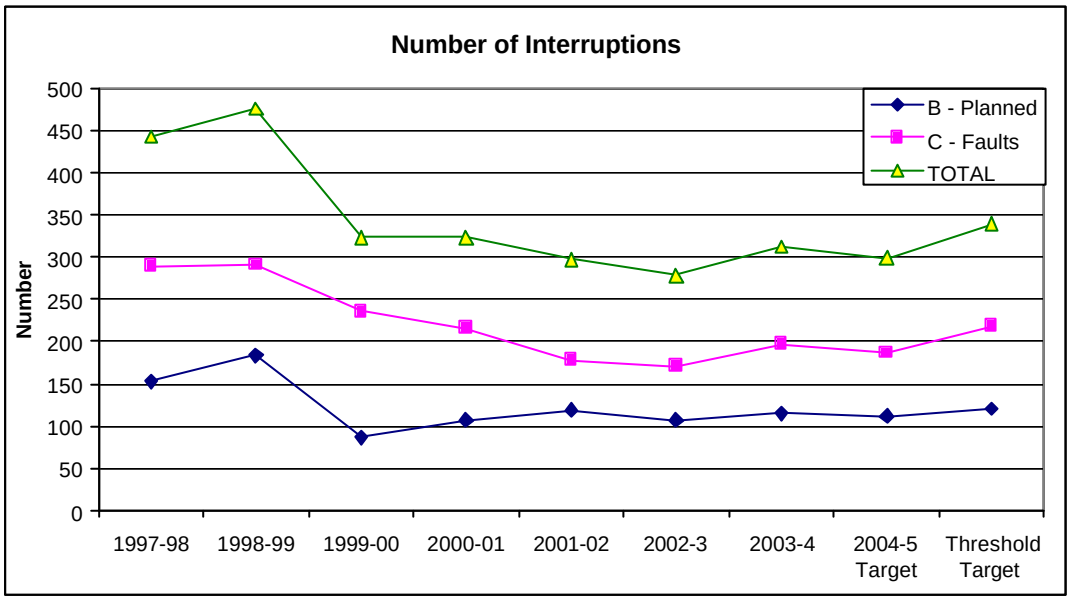
(i) Customer Oriented Reliability, Security and Availability Performance Targets

Reliability of Supply

The historical reliability performance figures for 1997 to 2004, the 2004-05 target and the Commerce Commission 5-year Threshold targets for outages originating within the OtagoNet network, are:

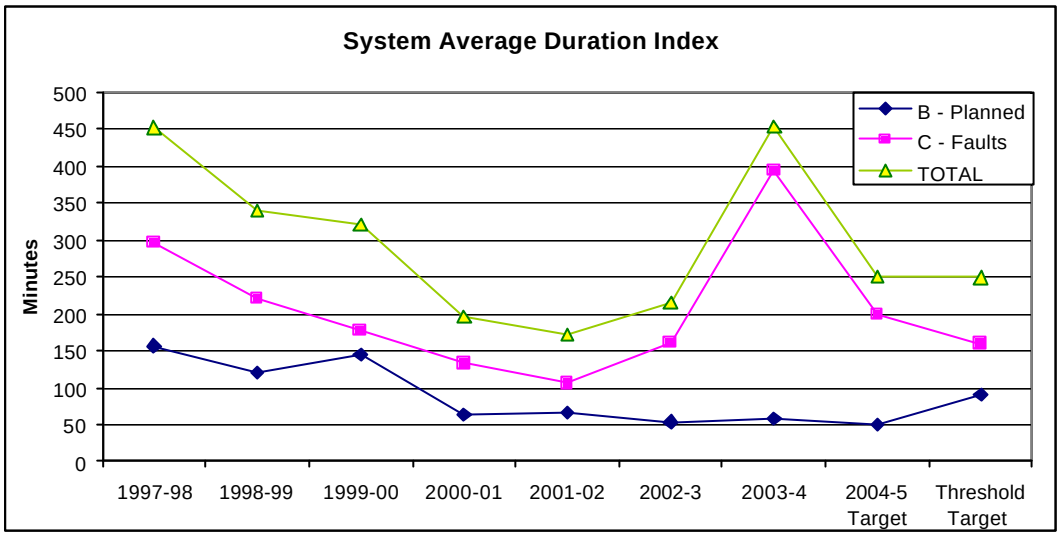
Interruptions

	Actual						Targets		
Class	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**Threshold**
B - Planned	153	184	87	107	119	107	115	100	107
C - Faults	289	291	236	216	178	171	197	170	179
TOTAL	442	475	323	328	299	278	312	270	286



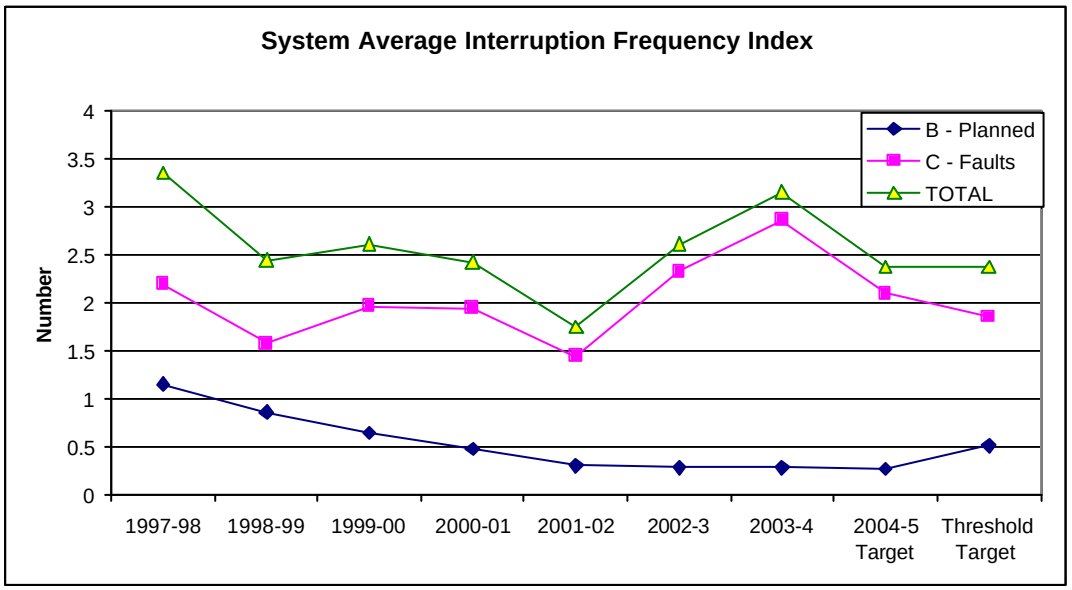
System Average Interruption Duration Index

	Actual						Targets		
Class	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	Threshold
B - Planned	157	120	144	64	66	54	59	50	90
C - Faults	296	221	177	133	106	162	395	200	160
TOTAL	453	341	321	197	172	216	454	250	249



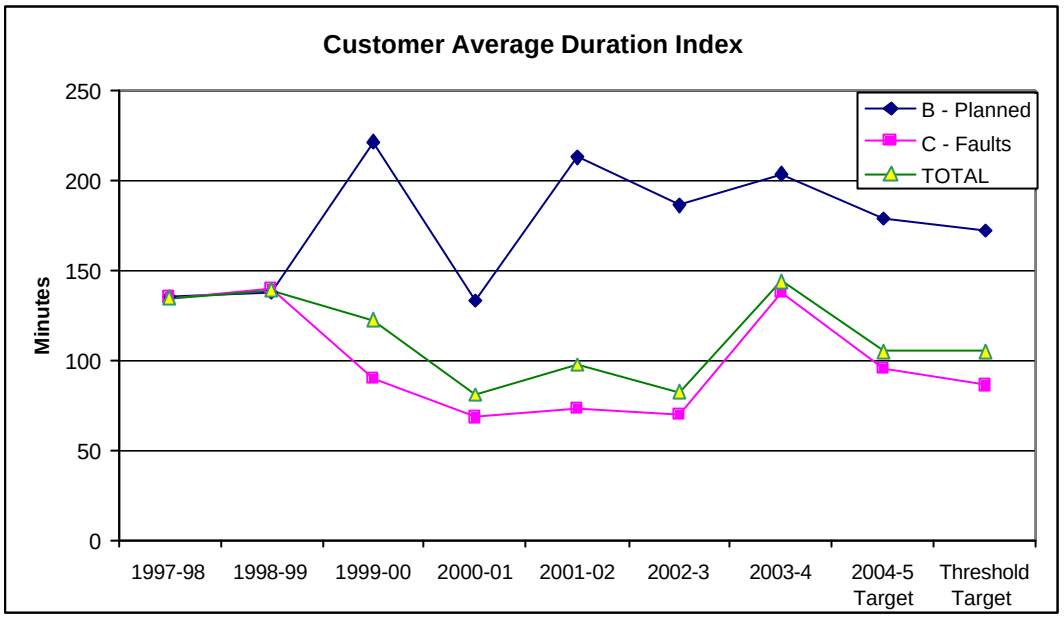
System Average Interruption Frequency Index

	Actual						Targets		
Class	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	Threshold
B - Planned	1.16	0.87	0.65	0.48	0.31	0.29	0.29	0.28	0.52
C - Faults	2.2	1.58	1.97	1.95	1.45	2.33	2.87	2.20	1.86
TOTAL	3.36	2.45	2.62	2.43	1.76	2.62	3.16	2.38	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	Threshold
B - Planned	135	138	221	133	211	186	204	179	172
C - Faults	135	140	90	68	73	70	138	95	86
TOTAL	135	139	122	81	98	82	144	105	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.

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.

(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 against targets to the Board.

Quality of Supply

The statutory requirements for voltage level and variation and for 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.

(iii) Justification for Target Levels of Service

Following consultation with customer groups, the reliability target levels of service are based on levels which the Company believes satisfy consumer expectations and which will compare favourably with the national statistics for rural networks similar to OtagoNet. It is also believed that these target levels can be achieved in a cost-effective manner through prudent investment in the network development and targeted maintenance.

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

(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.

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.

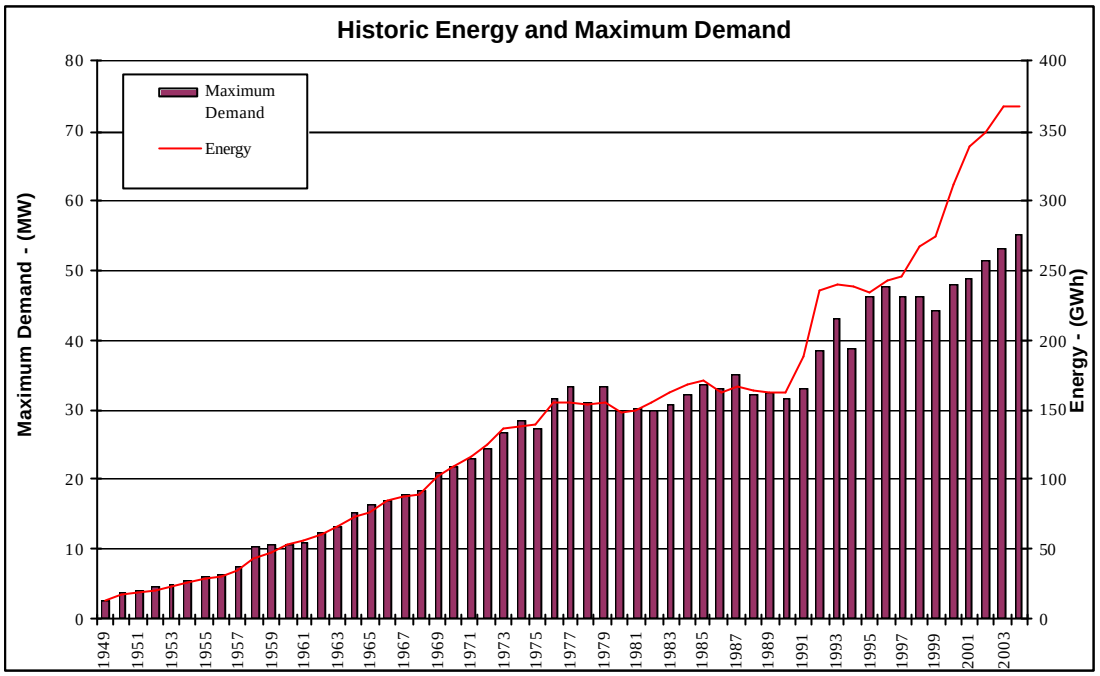
2. The above times are maximum and relate to network design parameters.

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 dairy farms, establishment of further timber mills and associated operations and some expansion in the popular coastal areas.

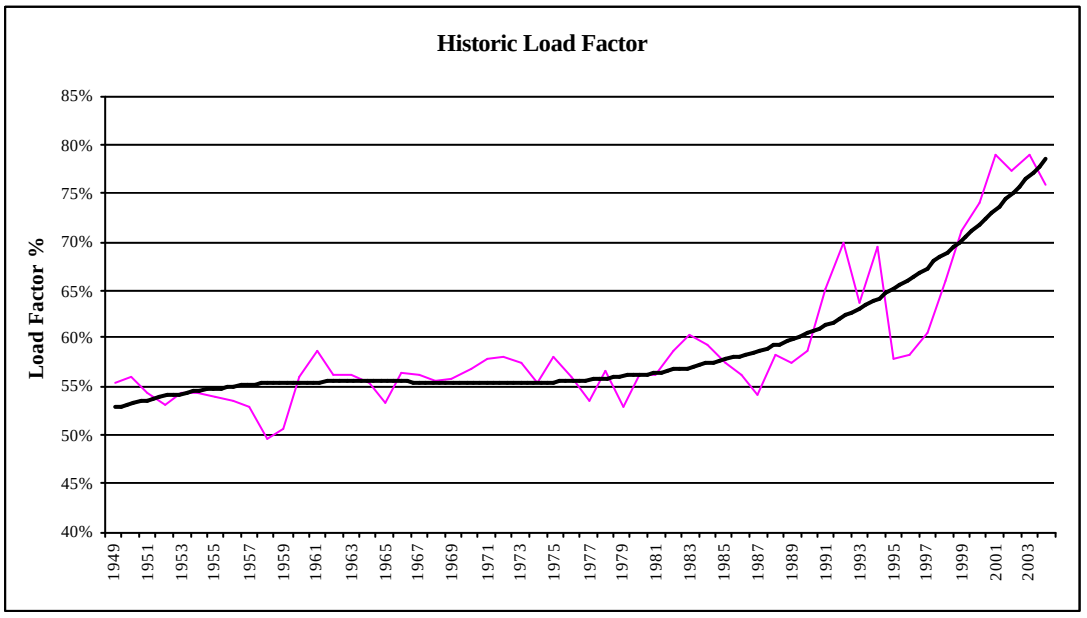


The above graph shows the growth on the network since 1949.

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 below 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 2004 (MVA)	Utilisation Factor 2004 %	Proposed Annual Growth %	Projected Demand 2014 (MVA)	Projected Utilisation 2014 %
Charlotte Street	10.0	7.6	76%	1.0%	8.4	84%
Clarks Junction	0.5	0.4	80%	0.5%	0.4	84%
Clinton	2.5	1.9	74%	2.0%	2.2	89%
Clydevale	2.5	1.6	64%	3.0%	2.1	83%
Deepdell	0.8	0.5	63%	1.0%	0.6	69%
Elderlee Street	10.0	4.4	44%	4.0%	6.2	62%
Finegand	2.5	2.0	80%	1.0%	2.2	88%
Glenore	1.5	0.6	40%	0.5%	0.6	42%
Hindon	0.5	0.4	80%	0.5%	0.4	84%
Hyde	2.5	1.1	42%	2.0%	1.3	51%
Kaitangata	2.5	1.3	52%	2.5%	1.6	65%
Lawrence	3.0	1.6	53%	0.5%	1.7	56%
Macraes Mine	30	21.5	72%	1.0%	23.7	79%
Mahinerangi	0.1	0.1	50%	0.5%	0.1	53%
Merton	5.0	2.9	58%	1.5%	3.3	67%
Middlemarch	1.5	0.8	52%	2.5%	1.0	65%
North Balclutha	5.0	3.3	66%	1.0%	3.6	73%
Oturehua	0.8	0.4	50%	1.0%	0.4	55%
Owaka	2.5	1.5	60%	1.0%	1.7	66%
Paerau	0.8	0.5	63%	0.5%	0.5	66%
Paerau Hydro	30	12.3	41%	0.0%	12.3	41%
Palmerston	5.0	2.1	42%	0.5%	2.2	44%
Patearoa	2.5	1.2	47%	5.0%	1.8	70%
Port Molyneux	1.5	0.8	53%	5.0%	1.2	80%
Pukeawa	0.8	0.3	31%	0.5%	0.3	33%
Ranfurly	5	2.0	40%	2.5%	2.5	50%
Ranfurly 66/33 kV	50	21.5	43%	1.0%	23.7	47%
Stirling	5.0	3.2	63%	2.5%	3.9	79%
Waihola	1.5	1.0	67%	1.5%	1.2	77%
Waipiata	1.5	0.8	52%	2.5%	1.0	65%
Waitati	2.5	1.6	64%	2.0%	1.9	77%
Wedderburn	0.8	0.2	25%	2.5%	0.3	31%

The table shows the projected demands for each zone substation over the next 10 years based on anticipated load growths.

(iii) Asset and Non Asset Policies

The aim of the Company is to remain at the forefront of the utilisation of 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, replacement and performance, ie losses and operations.

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.

Through the use of databases and records of maximum demand readings etc transformers are shifted from location to location to improve utilisation factors and reduce the degree of under-utilised capacity.

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.

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 will result in significantly increased expenditure over at least the next three years.

2. Reduce the number of Planned Interruptions

This is being achieved 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. Improved work programmes, which coordinate all the work required on areas of the network and faults contracts which include incentives for contractors to improve performance in their respective areas also contribute to reducing planned interruptions on the network.

It is PowerNet 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°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 into 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

Maintenance for each asset group is shown below:

1. Overhead Lines/Underground Cables

Annual maintenance includes visual inspection of each circuit with approximately 1,000 pole top inspections and wooden pole tests.

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

33kV and 66kV Overhead Lines	$100,000
11kV Overhead Lines	$550,000
400V Overhead Lines	$60,000

2. Substation Buildings and Structures

Annual estimated expenditure is $60,000.

3. Power Transformers

Transformer maintenance includes the following:

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

Transformer maintenance and overhauls are then based on the condition.

Tap changer overhauls are based on the number of operations.

Annual estimated expenditure is $120,000.

4. Circuit Breakers

Circuit breaker maintenance is based on the results of monthly visual inspections, number and type of operations and specific time intervals.

Oil levels, gas pressures, battery condition and protection devices are checked regularly.

Injection testing of protection systems are carried out at five-yearly intervals.

Annual estimated expenditure is $60,000.

5. Distribution Transformers

Approximately 20-30 transformers of rating 15kVA or above are overhauled annually.

Approximately 30 transformers of rating less than 100kVA are replaced annually.

Annual estimated expenditure is $100,000.

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 Naseby is being studied in conjunction with proposed load increase to GRDMacraes Mine. This may allow greater flexibility for the timing of Transpower shutdowns and provide some backup capacity for a Transpower interruption. However there is still a need for reconfiguration of 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 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.
- As part of the switching alterations above a second circuit will be available to be built the short distance to the Palmerston zone substation, again achieving the desired circuit reliability and allowing greater flexibility in switching and maintenance work. This 2.5 km line should be completed after the new switching structure.
- To complement the dual lines above, the Palmerston transformers will need to be replaced with individual transformers with on load tap changers. Two 2.5 MVA transformers will be purchased installed with the second 33kV line.
- 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.

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

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 the proposed rural water-pumping scheme out of the Pomahaka River at Popotunoa. The preferred solution is detailed below:

- Upgrade the initial parts of the new tie line at the Clydevale ends by replacing the existing squirrel conductor with a suitable heavier AAAC conductor.
- Maintain and upgrade the spare Clifton to Clydevale 33kV circuit and liven 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.

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 will 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 2010 due to the low customer numbers and expense of the solution.

GRDMacraes Increased 66kV supply

This major customer has requested a proposal to take a substantial additional load at 66kV for mine and processing developments. Various options have been considered including the ultimate 110kV supply from Transpower Palmerston down to taking a smaller amount from the 33kV lines. At present the most likely prospect is to upgrade the Ranfurly to Deepdell 33kV line to run at 66kV in parallel with the existing 66kV line. If adopted this will involve the following work:

- Reinsulate the 38 km of 33kV line to 66kV and extend it 1 km to meet the existing line on Horse Flat Road.
- Build a new 66kV bay and protection changes at Ranfurly
- Build a new 66kV substation at Horse Flat Road with a 66/33kV interconnecting transformer to feed into Deepdell.
- Build a new 7 km 11kV line to the Hyde pumps and upgrade the line back to SH 87 including voltage regulator – all to remove the Hyde substation.
- Build a new 5.5 km 33kV line to Waipiata to feed it from the Patearoa 33kV line and release the Deepdell line for upgrading to 66kV.
- Install automatic undervoltage load shedding at GRDMacraes Mine to protect the 66kV supply to all customers in the event of a line of transformer failure overloading the remaining circuit.

Milburn Zone Substation

This new supply will be required if one of the proposed projects goes ahead, the potential projects being the Corrections Department prison, the Dunedin City Forest and Brightwood timber mills respectively.

Initially a 5MVA single transformer substation will be built on land 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 all three projects were to proceed the single transformer would have to be duplicated, as there would not be enough capacity for back feed from the Elderlee Street substation in Milton.

The 33kV supply would come from a single T off the Waihola line less than 2 km to the West on Jensen Road.

Milton Area 33kV supply

If two or more of the above projects in Milburn were to proceed, the 33kV supply into the Milton area would be inadequate in the event of a 33kV line failure. Investigations are presently underway to evaluate the following options:

- Upgrade the lightest 33kV line to Mata, this would be costly and may only be sufficient for the immediate future loads.
- Upgrade the voltage on the two lines to 66kV with transformation to and from 33kV at one or both ends.
- Obtain a new 33kV point of supply from Transpower at Milton close to the existing Kiness switching station. This solution would have the potential benefit of lower losses, greater security, least capital cost to OtagoNet and avoid an upgrade of transformer capacity at Transpower Balclutha.

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 effect of general load growth is in 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 wire earth return system.

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 later in this 10 year 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. This year three bulk oil indoor circuit breakers at Elderlee Street zone substation will be replaced with Vacuum circuit breakers to gain additional safety, lower maintenance and more operational remote control flexibility.

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 13 zone substations have oil bunding installed with 17 left to complete. The first 13 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 recent influx of new dairy farms has slowed at present in South Otago. However irrigation in the Maniototo continues to be the main source of load growth with conversions from boarder dyke to more water efficient sprayed irrigation. The range of 11kV line extensions required is dependent on the position of these new dairy farms, but in many recent cases has involved a 1 to 2 km line extension with some upstream distribution reinforcement.

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 is now marginal and below reliable signal levels in some areas. The two plants will be run in parallel for a number of years while the Retailer progressively replaces old 492 Hz receivers with the new 317 Hz. The network owned street light receivers are being replaced this year. No allowance has been made for a new injection plant if a new Transpower GXP is established at Milburn.

Protection Policy

Up to this time the high voltage side of the 33/11kV zone substation transformers has only been protected with 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 at present 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 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 single transformer sites depending on experience and further investigations.

OtagoNet 10 Year Capital Project Timeline

Capital Projects for 2004-05

(a) Phase 1 of the new Milburn zone substation
(b) Circuit Breaker Replacements at Ranfurly and Elderlee Street
(c) Relocate SCADA master to PowerNet office Balclutha
(d) SCADA control of Transpower circuit breakers
(e) Ranfurly install protection relay and voltage regulating relays
(f) Complete SCADA control at Clydevale, Ranfurly, Glenore, Paerau, Patearoa, Deepdell
(g) Install new oil containment at Finegand
(h) Refurbish the 33/22kV earth return transformer at Clarks
(i) Replace and refurbish the 33/11kV transformer at Middlemarch
(j) Rebuild Stirling 33kV switching structure
(k) Maintain the 33kV transmissions lines between Barnego to Charlotte Street, Greers to Clifton, Clifton to Pomohaka and Balclutha to Milton.
(l) 11kV River crossing at Tuapeka to security to Clydevale
(m) Install 11kV SWER isolators at Hill End, Nugget Stream Road and Tiroiti.
(n) Install new ABC LV at Shag Point
(o) Rebuild 11kV lines in Lawrence, Waikouaiti, Heyward Point, Dunback, Long Beach, Middlemarch and Gimmerburn

Capital Projects for 2005-06

(a) Phase 2 of the new Milburn zone substation
(b) SCADA indications analogues and tap position indicators
(c) 33kV circuit breaker protection for major transformers
(d) Oil containment
(e) New 2.5 MVA 33/11 transformer - spare
(f) Balclutha area SCADA comms upgrade
(g) Substation outdoor bus upgrades
(h) Continue the Merton 33kV line around Waikouaiti
(i) Reinsulate the Balclutha - Milton 33kV lines to 66kV
(j) Establish new 33/66kV substations at Balclutha and Milton
(k) Install extra 66kV bay at Ranfurly for Macraes supply
(l) Reinsulate the Ranfurly - Deepdell 33kV line to 66kV
(m) Establish new 66kV substation at Horse Flat Road Macraes
(n) Clydevale 11kV line connections for security
(o) Clarks and Hindon 22kV replacement program
(p) Purakanui rebuild LV at Southern end
(q) Rebuild the following 11kV lines – Middlemarch, Waitati, Clydevale, Port Molyneux, Glenore and Tokoiti

Capital Projects for 2006-07

(a) Phase 3 of the new Milburn zone substation
(b) SCADA indications analogues and tap position indicators
(c) 33kV circuit breaker protection for major transformers
(d) Oil containment
(e) Substation outdoor bus upgrades
(f) Reinsulate the Balclutha - Milton 33kV lines to 66kV
(g) Establish new 33/66kV substations at Balclutha and Milton
(h) Establish new 66kV substation at Horse Flat Road, Macraes
(i) Alter Deepdell substation for dual supply
(j) Install radio protection signalling for Macraes
(k) Continue the Merton 33kV line around Waikouaiti
(l) Build new 33kV line to Waipiata from Patearoa
(m) Build new 33kV line from Deepdell to Hors Flat Road
(n) Reconductor the Charlotte Street to Greers 33kV line
(o) Reconductor the Charlotte Street to Finegand 33kV line

(p) Clarks and Hindon 22kV replacement program
(q) Rebuild the following 11kV lines – Kaka Point, Finegand, Pukemoa, and Owaka Valley

Capital Projects for 2007-08

(a) SCADA indications analogues and tap position indicators
(b) 33kV circuit breaker protection for major transformers
(c) Oil containment
(d) Establish new 33/66kV substations at Balclutha and Milton
(e) New 2.5MVA 33/11 transformer for Port Molyneux
(f) Substation outdoor bus upgrades
(g) Bus and protection upgrade for Merton
(h) Clarks and Hindon 22kV replacement program
(i) Rebuild the following 11kV lines – Gimmerburn, Kaka Point, Cairn Rd, Clutha Valley, Waitepeka, Chaslands, Ratanui and Ahuri Flat
(j) Commence distribution transformer replacement backlog – 100 units

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) Two new 2.5 MVA 33/11 transformers for Palmerston
(e) Two New 1.5 MVA 33/11 transformers for Lawrence
(f) Substation outdoor bus upgrades
(g) Reconductor the Balclutha Milton 33kV line
(h) Clarks and Hindon 22kV replacement program
(i) Rebuild the following 11kV lines – Gimmerburn, Kaka Point, Owaka, Cairn Rd, Warepa, Chaslands, Palmerston, Warrington, Doctors Point and Waiwera
(j) New 11kV interconnections for security and reliability
(k) Distribution transformer replacement backlog – 100 units

Capital Projects for 2009-10

(a) 33kV circuit breaker protection for major transformers
(b) Oil containment
(c) New 1 MVA 33/11 transformer for Paerau
(d) Substation outdoor bus upgrades
(e) 33kV line rebuilding
(f) Clarks and Hindon 22kV replacement program
(g) 11kV line rebuilding
(h) Single Wire line rebuilding in 2 to 3 wires
(i) Replacement of galvanised steel wire conductors
(j) New 11kV interconnections for security and reliability
(k) Distribution transformer replacement backlog – 100 units

Capital Projects for 2010-11

(a) 33kV circuit breaker protection for major transformers
(b) Oil containment
(c) New 1 MVA 33/11 transformer for Wedderburn
(d) Substation outdoor bus upgrades
(e) 33kV line rebuilding
(f) Clarks and Hindon 22kV replacement program
(g) 11kV line rebuilding
(h) Single Wire line rebuilding in 2 to 3 wires
(i) Replacement of galvanised steel wire conductors
(j) New 11kV interconnections for security and reliability
(k) Distribution transformer replacement backlog – 100 units

Capital Projects for 2011-12

(a) 33kV circuit breaker protection for major transformers
(b) Oil containment
(c) New 1 MVA 33/11 transformer for Wedderburn
(d) Substation outdoor bus upgrades
(e) 33kV line rebuilding
(f) Clarks and Hindon 22kV replacement program
(g) 11kV line rebuilding
(h) Single Wire line rebuilding in 2 to 3 wires
(i) Replacement of galvanised steel wire conductors
(j) New 11kV interconnections for security and reliability
(k) Distribution transformer replacement backlog – 100 units

Capital Projects for 2012-13

(a) 33kV circuit breaker protection for major transformers
(b) Oil containment
(c) New 1 MVA 33/11 transformer for Wedderburn
(d) Substation outdoor bus upgrades
(e) 33kV line rebuilding
(f) Clarks and Hindon 22kV replacement program
(g) 11kV line rebuilding
(h) Single Wire line rebuilding in 2 to 3 wires
(i) Replacement of galvanised steel wire conductors
(j) New 11kV interconnections for security and reliability
(k) Distribution transformer replacement backlog – 100 units

Capital Projects for 2013-14

(a) 33kV circuit breaker protection for major transformers
(b) Oil containment
(c) New 1 MVA 33/11 transformer for Wedderburn
(d) Substation outdoor bus upgrades
(e) 33kV line rebuilding
(f) Clarks and Hindon 22kV replacement program
(g) 11kV line rebuilding
(h) Single Wire line rebuilding in 2 to 3 wires
(i) Replacement of galvanised steel wire conductors
(j) New 11kV interconnections for security and reliability
(k) Distribution transformer replacement backlog – 100 units

OtagoNet 10 Year Capital Budget Cost Summary

Year	Connections	Annual costs - Distribution	Subtransmission	Total
2004-05	$780,000	$940,000	$1,250,000	$2,970,000
2005-06	$790,000	$1,050,000	$4,540,000	$6,380,000
2006-07	$800,000	$1,010,000	$4,420,000	$6,230,000
2007-08	$820,000	$1,350,000	$1,710,000	$3,880,000
2008-09	$830,000	$1,750,000	$1,230,000	$3,810,000
2009-10	$840,000	$1,470,000	$1,490,000	$3,800,000
2010-11	$850,000	$1,470,000	$1,370,000	$3,690,000
2011-12	$870,000	$1,500,000	$1,270,000	$3,640,000
2012-13	$880,000	$1,520,000	$1,280,000	$3,680,000
2013-14	$890,000	$1,540,000	$1,280,000	$3,710,000

(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 even 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.

There is a fully documented Disaster Recovery Plan being established covering both network and office contingencies. This is due for completion by December 2004.

(g) Details of Performance Measurement, Evaluation and Improvement

(i) Review of Progress Against Physical and Financial Plan

PowerNet provides monthly Board Reports are provided which include a summary of all network operations for both the Company Directors. 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 years capital plan was as follows:

- New connections were completed totalling $800k compared to a budget of $654k.
- The remaining work for the Falls Dam 33kV connection was completed at Oturehua, Wedderburn and Ranfurly at a cost of $333k.
- The 33kV regulator was installed at Palmerston and 11kV regulators installed at Stoneburn and Redbank as the first stage in improving the Palmerston area supply.
- The Ranfurly 11kV circuit breakers were purchased and preliminary work started on the protection and VRR, these will be completed in 2004.
- Paerau oil containment for the 66kV transformers was completed.
- The refurbished 33/22kV earth return transformer for Hindon was refurbished and installed.
- The following 11kV line rebuilds were completed during the year:
  Stirling – Wt Wallace, 3.2 km
  Waikouaiti – Glasgow St, 1.2 km
  Kaitangata – Edystone St, 4.8 km
  Clinton – Blakie Rd, 2.8 km
  Lawrence - Harrington, 1.8 km
  Lawrence – Irvine + Hill St, 2.3 km
  Ranfurly – Gimmerburn Rd, 2.6 km
  Kaitangata – Wangaloa, 4.3 km
- The Deepdell – Middlemarch 33kV line had half of the programmed poles replacements completed, the remainder were changed in April 2004.
- The 33kV Barnego switching structure was rebuilt.
- At Transpower North Balclutha a 33kV transfer switch was installed.
- A number of miscellaneous supply quality upgrades were carried out at a cost of $105k compared with a budget of $64k.

For the 12 month period the capital project costs were $2,538 some $192k under budget and the maintenance project costs were $1,801k some $364k over budget.

The OtagoNet total network costs for the year were $4,340 some $171k over 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 is showing a positive improvement reflecting the significant capital investment in the network over the past five years. Performance for the year ending 31 March 2004 did not achieve some performance targets due to the severe storms that occurred in November 2003 and in February 2004.

The SAIDI target of 249.3 minutes would have nearly been met if the additional 200 minutes in the two events above were excluded. The SAIFI target of 2.38 times would have been easily met if the 0.95 times relating to the two events were excluded.

(iii) Gap Analysis and Identification of Improvement Initiatives

In general the Company has met or exceeded 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 and include improving the utilisation factor and load factor by the redeployment of under-utilised assets and more interactive load control respectively.

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 within Otago Power Services Limited will all contribute to improving the efficiency of the Company.

As the Company has not set targets for energy delivery efficiency no comparisons are available.