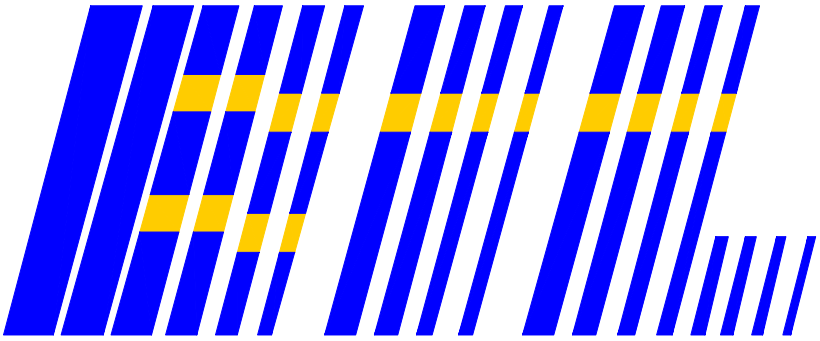


ASSET MANAGEMENT PLAN
2005-2015

TABLE OF CONTENTS

(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 Electricity Invercargill Limited (EIL) and its 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, and stakeholder requirements in the most cost effective manner.

(ii) Date and Period of Plan

This Asset Management Plan is dated 30 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 with publication in June 2006.

Submissions were requested from the public via an advertisement in The Southland Times and 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 Intergraph G/Frame Geographic Information System (GIS) databases, reliability databases, 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 EIL network is in two non-contiguous sections: the larger network supplies most of the urban area of Invercargill (City), the other network supplies the area, which was formerly the Borough of Bluff.

The City section of the network is supplied from the Transpower substation at Findlay Road.

The four 33/11kV zone substations are supplied by five dedicated 33kV circuits. One CBD zone substation can also be supplied at 33kV from the Transpower North Makarewa Substation via The Power Company 33kV network. Another zone substation can also be supplied via a dedicated cable connected to The Power Company 33kV network.

The 11kV network is mainly underground and heavily meshed.

The Bluff section is supplied via The Power Company Limited's Bluff 33/11kV substation and the network is almost entirely overhead.

(v) Service Level Objectives

Consultation has taken place with different customer groups to ascertain whether the network reliability and system security policies are meeting their requirements. The result of this consultation confirmed the current policies especially the undergrounding policy.

Although reliability statistics vary each year, the 10-year objective for the Electricity Invercargill Limited network is to maintain its present level of reliability, which is one of the best in New Zealand. The Company is optimistic that this can be achieved but it would be subject to regulatory controls on expenditure.

The current SAIDI index for network faults is 13.3 minutes. Over the 10-year period the objective is to maintain a level of under 28.9 minutes.

The equivalent SAIFI is 0.25 and the objective is to maintain this at under 0.93 over the 10 years.

If the above can be achieved it will result in a CAIDI for network faults of 31.1 minutes.

Taking into account the continuing undergrounding of the network, the SAIDI for planned interruptions is expected to remain at about 4.23 minutes, SAIFI at 0.043 resulting in a CAIDI of 98.8 minutes.

(vi) Life Cycle Asset Management

The philosophy for asset management is based on condition-driven maintenance, which is determined from diagnostic testing, visual inspections, fault incidents and technological, safety and operational obsolescence. Therefore assets are not replaced by age alone, they remain in service until they become uneconomic to repair or fail to meet service level requirements.

Updates on the condition of equipment are provided by the field services contractors and from ongoing surveys.

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

There is also an ongoing tree trimming programme, which has an objective of ensuring all trees are trimmed on a three-year basis.

Maintenance budgets average at approximately 1.9% of the replacement value.

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

The resulting projects are then considered by the spend optimisation tool, which compares all the projects against a number of criteria set by the Company Directors. This tool helps to ensure the best outcome for the dollars spent.

(vii) Risk Assessment

The reticulation network covers two urban networks. There have been two major floods with minor impact and damage to the network. Eighty-four (11kV and 400V) percent of the reticulation in the Invercargill city network is underground and unaffected by storms. Maximum loading of cables and transformers occurs in winter when ambient and ground temperatures are low.

The main risks to reliability are associated with the 11kV switchboards in zone substations, the Transpower Grid Exit Point (GXP) supply and a large local earthquake.

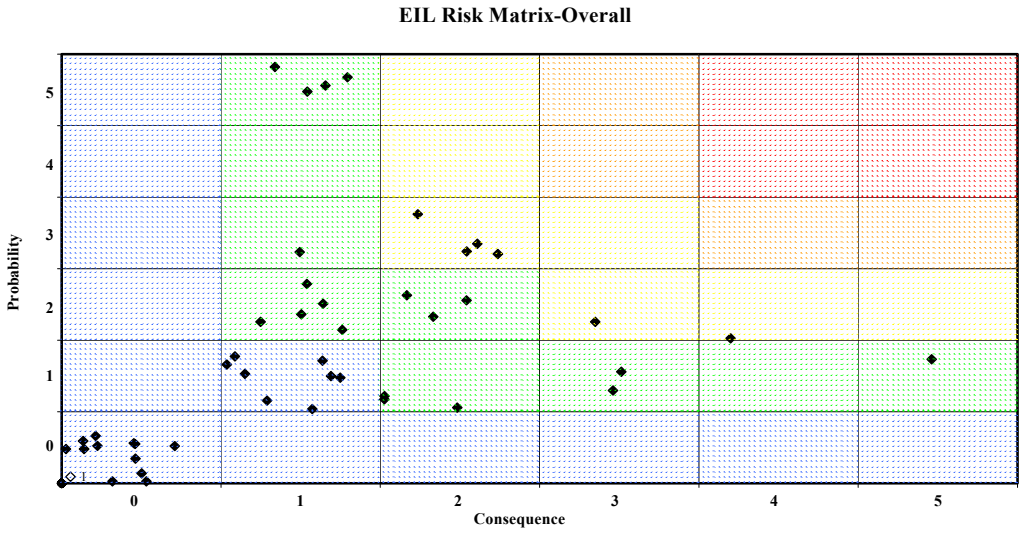
Other risks to the business include technology changes, increased embedded generation inside the network, significant load pattern changes either by customer group or throughout the network, regulatory changes and finally economic changes.

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 10 years.

All projections have been based on no significant changes to the local economy.

It is not projected that there will be any significant changes to Asset Management policies subsequent to 2013 when the obligation to supply is scheduled to cease.

Risk assessment is also a key part of the spend optimisation process and the matrix from the model is shown below:



The vertical axis is "probability" and the horizontal axis is "consequence". There are no considered high risk scenarios to be addressed on the EIL 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, better targeted maintenance, vegetation control and increased live line working.

The Council driven undergrounding programme is having a significant impact on reliability, mitigating Telecom induced voltage problems, increasing safety in urban areas and improving quality of supply.

Network performance incentives are included in maintenance and faults contracts, which 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 Annual Business Plan preparation, which extends over a period of five years.

The Annual Business Plan also 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 EIL.

All planning is coordinated with the Company's Statement of Corporate Intent, Vision Statement, Key Performance Indicators and Goals and Strategies. These are all reviewed and approved by the EIL Board on an annual basis.

The Corporate Objectives for the Company are listed as follows:

(a) The Company intends to manage its operations in a progressive and commercial manner.
(b) Undertake new investments, which are:
- Within the core business
- Yielding an acceptable return for the degree of risk
- Undertaken in a manner which will maximise the commercial value of the business

(c) Strive to become an efficient and effective operation within the electricity industry and provide its customers with competitive prices and above average levels of service.

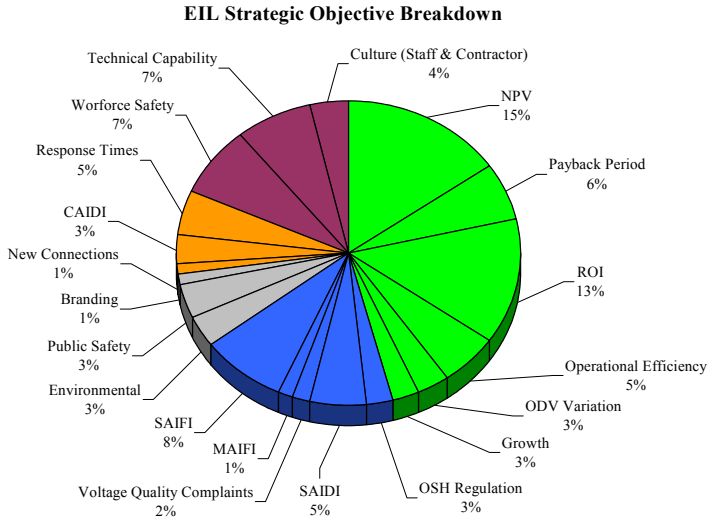
These objectives are used as drivers within the Asset Management Plan process with all work evaluated against the above criteria with the appropriate projects being undertaken.

Requirements of the Asset Management Plan are also incorporated into the PowerNet Quality System (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 cognizance of environmental considerations including the Invercargill City undergrounding policy.
(h) Rate of return.

The strategic objectives weightings for EIL as determined by the Directors are shown below:



(ii) Planning Periods Adopted

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

Each asset category has a different life cycle with some assets having expected lives of over 60 years. Each asset category is evaluated against its appropriate maximum age over this period.

(iii) Stakeholder Interests

The principal stakeholders in the performance of the network assets are the end-use customers, the shareholder, ie Invercargill City Council as the ultimate owner, Invercargill City Holding Company, the electricity retailers and PowerNet.

Other stakeholders indirectly involved with the management of the assets are the suppliers such as Transpower, contractors and equipment and service providers.

The interests of stakeholders are taken into account by the following methods:

(a) End Use Customers – A survey is undertaken by an external consultant. Discussion fora and presentations are made to interest groups.
(b) Shareholders – Shareholders are represented by Directors in the Company and input from Shareholders is received by setting the criteria in the Optimisation tool for evaluating projects and by approving the Annual Business Plans.
(c) Retailers – Negotiations on the Use of System Agreement and other meetings.
(d) PowerNet Limited – Through negotiation of the Management Contract and feedback to the Board.
(e) Transpower New Zealand Limited – Through the Transpower Connection Contract and other meetings.
(f) Contractors – Input is received from fault contractors on the work that they deem necessary to meet their service level requirements.
(g) Material and Equipment Suppliers – A contract is held with the main supplier, presently MasterTrade Limited. Regular discussions on equipment standards and equipment held in stock.

(iv) Accountabilities and Responsibilities for Asset Management

The ultimate responsibility for the management of the Company's assets lies with the Electricity Invercargill Limited Directors who are appointed by Invercargill City Holdings Limited who are appointed by the Invercargill City Council who are in turn elected by the ratepayers.

The day to day management of the network is contracted to PowerNet Limited, a joint venture network management company whose co-owner is The Power Company Limited. Field resources are provided by Continuity Contracting Limited and Transfield Services Limited who undertake the majority of the works on the network.

(v) Asset Management Systems and Processes

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

1. The Intergraph 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 of all cables and 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 improves the operational efficiency and safety of the network. This system provides information on loads, faults and other operations to the System Control room staff and expedites supply restoration through remote switching capability etc.

3. The Faults and Outage databases which are linked to a network model and GIS which 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. Ongoing condition driven maintenance surveys carried out by the field contractors.

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

9. Inspections carried out in preparation of the schedules for the Asset Management Agreement between PowerNet and Electricity Invercargill Limited.

10. The UMS Optimisation tool that will ensure operational expenditure (opex) and capital expenditure (capex) is targeted at work, which will support the strategic objectives of the company.

    The UMS Spend Optimisation Tool combines economic, logistics, technical and decision theory to select the best investments as measured by a balanced score card of business value and with an acceptable risk profile.

    The tool uses a forced pairs referencing matrix and relative waiting matrix to develop the balanced score card.

    Scoring criteria are developed to provide a tool for staff to enter projects consistently and with risk information. The balance score card is developed with the Company Directors and provides a guideline for the PowerNet staff when undertaking work on each of the managed networks.

The degree of integration between the above systems is presently limited but several projects are underway to increase this integration between systems.

Asset Management processes are managed via the PowerNet Quality Management System with the following procedures in the system:

- PNM-105 Maintenance Planning
- PNM-113 Network Development

These systems are quality audited by Telarc New Zealand Limited and managed by PowerNet Limited.

(C) DETAILS OF ASSETS COVERED

(i) Current Network Configuration

Transpower GXP

The point of supply for the Electricity Invercargill Limited network is based at Invercargill. Invercargill is supplied by the 220kV grid through 2 x 50MVA 33kV transformers.

Supply security from Transpower satisfies PowerNet's requirements although there have been two total supply interruptions from Invercargill GXP within the last 20 years.

Subtransmission

The Electricity Invercargill Limited 11kV distribution network in the Invercargill City part of the network is supplied from four zone substations. These substations are Doon Street, Southern, Leven Street and Racecourse Road.

Doon Street substation has two 11.5/23MVA OFAF* transformers supplied by two 33kV oil filled cables.

Southern Substation has one 11.5/23MVA OFAF* transformer which is normally supplied by one 33kV oil filled cable. A 33kV cross-linked polyethylene cable has been installed from this substation to connect into The Power Company Limited 33kV overhead line from Invercargill Transpower GXP to its Seaward Bush substation. This cable would be used in an emergency in the event of failure of the oil filled cable.

At this substation the structure has also been extended so that a spare transformer could be installed there quickly in the event of a failure of the 11.5/23MVA transformer.

Leven Street substation has two 11.5/23MVA OFAF* transformers and is supplied by a 33kV cross-linked polyethylene cable from the Invercargill Transpower GXP. Its supply can also be backed up by a 33kV cable and overhead line connecting Leven Street to The Power Company Limited 33kV overhead line from the Invercargill Transpower GXP to Otatara. During 2002/2003 a second 11.5/23MVA transformer was installed at site. Note that as the alternate cable is from another GXP full non-interruption n-1 reliability is not achieved but a short changeover time will be required.

As Otatara can be supplied from the North Makarewa Transpower GXP, it will result in the CBD and hospitals within Invercargill being able to be supplied from two separate Transpower GXPs.

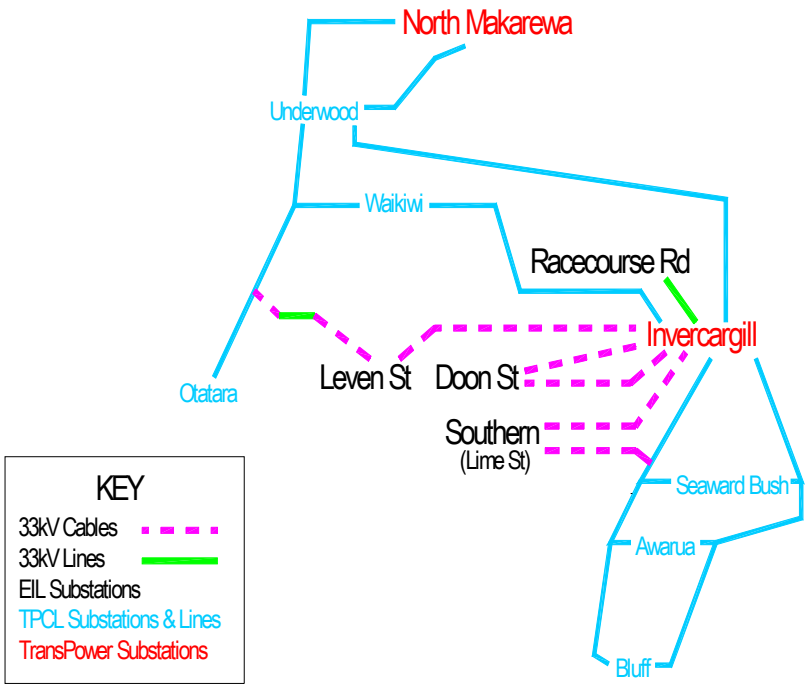
Racecourse Road substation has one 11.5/23MVA OFAF* transformer and is supplied by a short 33kV overhead line from the Invercargill Transpower point of supply. There is provision for an emergency transformer to be installed there in the event of a failure of the existing 11.5/23MVA transformer. Adjacent to the substation is The Power Company Limited 33kV overhead line which supplies Waikiwi and Otatara.

Supply security for the zone substations has in the past been reliant on the 11kV interconnections between these substations. This was partly historic as originally the entire City was supplied at 11kV from the Invercargill Transpower GXP and thus there was a reasonably solid 11kV reticulation network in Invercargill.

As loads and the age of equipment have increased, there was an increasing risk of a high impact failure occurring and inadequate backup capacity available to supply the CBD and some emergency services. This has now been addressed to a large extent except the risk of a catastrophic failure of either Doon Street or Leven Street substations.

The Bluff part of the network is supplied from Bluff's zone substation which itself is supplied via two 33kV Power Company Limited owned overhead lines. There is full parallel protection thus the failure of any section of the line supplying Bluff does not result in an interruption of supply to this township. Both 33kV lines have recently been reinsulated to reduce problems with salt pollution.

* 23MVA rating OFAF is an Emergency Standby Rating (ESR) at 5°C ambient



11kV Distribution

Most of the 11kV distribution network in the City area is underground but with some overhead sections still in operation. Most substations are 200kVA and above and with a supply security of manually switched (n-1) via the 11kV network or via the 400 volt network.

There are some areas, which are still overhead with a capacity of less than 1MVA which are single circuit security with no adequate 400 volt backup. This single circuit security also applies to individual transformers of less than 1MVA capacity. The 400 volt system is over 94% underground with good backup capacity and good reliability. Cables in the CBD area are a mixture of paper lead and PVC depending on the size and date of installation. Switching in the CBD area is via under footpath link boxes or switching pillars. Backup 400 volt supplies in the residential and non-CBD areas are via physically connecting cables within pillar boxes.

Current Supply Security

The summary of the supply security for the four zone substations and The Power Company Limited's Bluff Substation are shown in Table 1.

Racecourse Road's maximum demand is growing slowly and it is expected to exceed the threshold after the end of the planning period.

Leven Street Substation almost meets the required security level. The difficulty is that the alternate 33kV supply is from a separate GXP and therefore cannot operate closed. Therefore a short changeover time will occur if the primary 33kV is isolated.

At present the 11kV meshed network to other Electricity Invercargill Limited and The Power Company Limited substations can maintain supply after manual reconfiguration of the network.

Table 1 Supply Security

Zone Substation	2005 Maximum Demand MVA	2005 Customer Connections	Security Rating Required	Present Security Rating	2015 Required Security Rating
Doon Street	27.5	7,844	AAA	AAA	AAA
Leven Street	15.5	1,504	AAA	AAA	AAA
Racecourse Road	11.2	2,816	AA	AA	AA
Southern Sub	10.2	3,671	AA	AA	AA
Bluff (TPCL)	6.1	1,006	AA	AAA	AA

See Page 19 for the definition of the EIL Security Ratings.

(ii) Network and Asset Description

Assets have been classified as:

- Subtransmission Circuits.
- Subtransmission Transformers and Switchgear.
- 11kV Overhead Lines and Underground Cables.
- Distribution Substation Switchgear.
- Distribution Transformers.
- 400V Overhead Lines and Underground Cables.
- SCADA System
- Ripple Injection System
- Communications System
- Metering

(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.

There are no major customers on the network who have unique load patterns which will require a differing application of the standards.

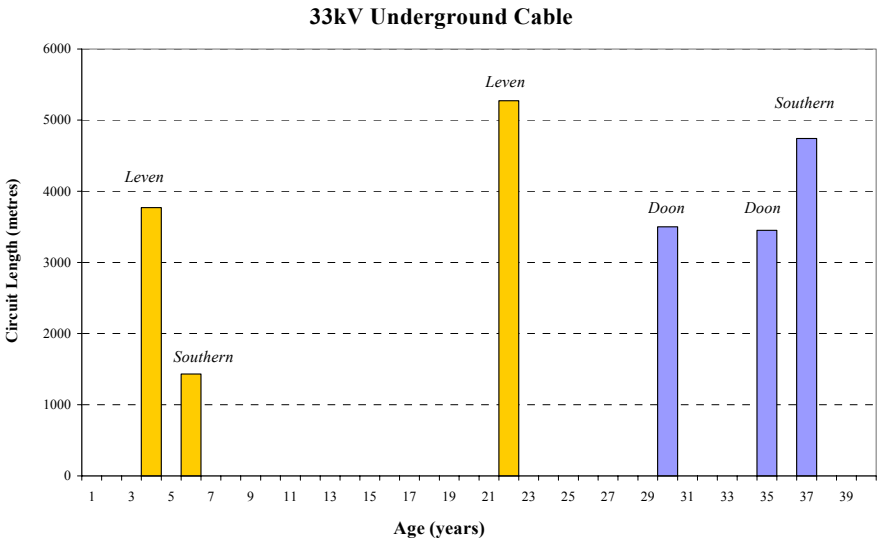
(iv) Location, Age and Condition

The ages given in the following section are guidelines only, refurbishment will depend on a combination of the following factors:

(i) Safety
(ii) Failure to meet technical and service level requirements
(iii) Economics
(iv) Condition/Failure rates
(v) Synergy with other related work.

The general condition of the network is determined by ongoing checks and inspections that ensure that service levels are maintained. The majority data collection exercise with the GIS project determined the condition of all assets into a number of categories, for example a number of poles were tagged as ‘good’, ‘five year recheck’ or ‘red tag’.

Subtransmission Circuits

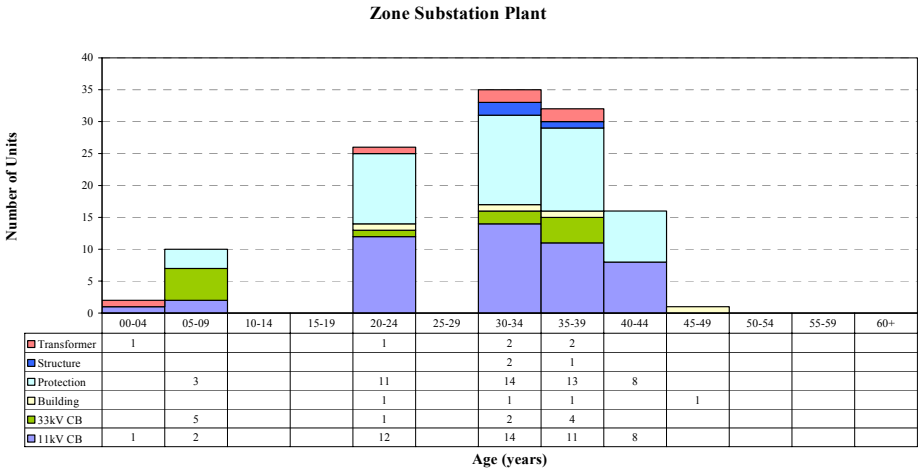


The above graph shows the age profile of the 33kV cables supplying the Electricity Invercargill Limited City network. All cables are less than 40 years old and considering the loading of the cables, they should all be inside the first half of their economic lives. The three oldest cables are oil filled and the three younger cables are XLPE.

In addition, there is a short (0.6km) overhead 33kV line supplying the Racecourse Road Substation and (1km) part of the Otatara to Leven Street Substation supply.

The condition of the subtransmission circuits has been assessed by PowerNet Limited as being good.

Subtransmission Transformers and Switchgear



	00-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
Transformer	1				1		2	2					
Structure							2	1					
Protection		3			11		14	13	8				
Building					1		1	1		1			
33kV CB		5			1		2	4					
11kV CB	1	2			12		14	11	8				

Transformers
All transformers would be still within the expected life after 10 years, therefore, there are no replacement plans within the planning period.

11kV Circuit Breakers
Within the next planning period the circuit breakers at Doon Street and Southern Substation will reach the end of their theoretical life. It is proposed to replace the switchboard at Doon Street in two stages within the next 10 years. When the circuit breakers are replaced the associated protection on these will also be replaced with modern equipment.

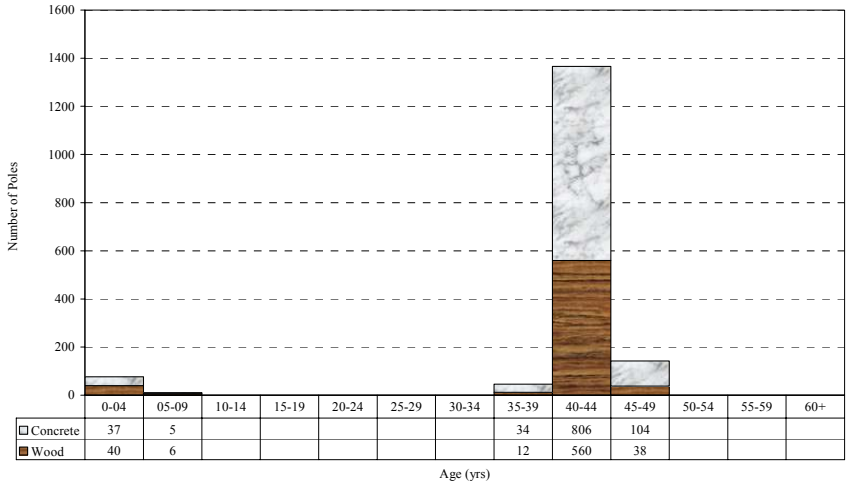
33kV Circuit Breaker
Two of the existing circuit breakers have been deemed suboptimal and are presently being removed. This will leave two 33kV circuit breakers that will be near the end of their life within the planning period. At this stage replacement of these is not programmed within the next 10 years.

Buildings
The four substation buildings on the network are of concrete block or brick construction and are expected to have an age of over 50 years. Maintenance will be undertaken to maintain these buildings and no replacements are planned within the next 10 years.

Structures
The three 33kV structures on the network are in good condition. They are constructed of concrete pillars with heavy duty airbreak switches and busbars. While these are nearing the end of their lives it is planned to carryout ongoing refurbishment and maintenance of these to keep them in service.

11kV Overhead Lines and Underground Cables

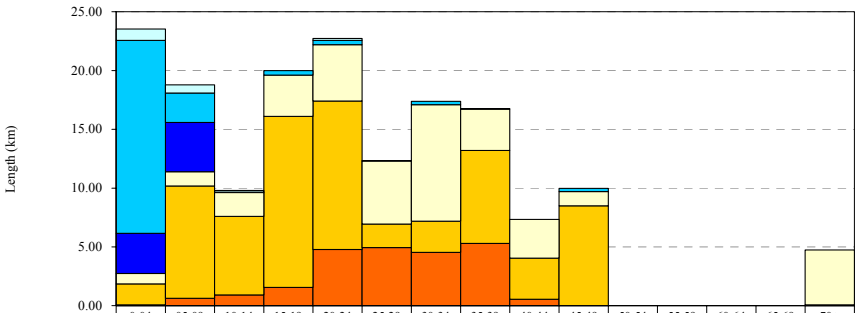
11kV and 400V Pole Ages



	0-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
Concrete	37	5						34	806	104			
Wood	40	6						12	560	38			

Age (yrs)

11kV Cables



	0-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+
Light XLPE	0.97	0.70	0.14		0.18	0.03									
Medium XLPE	16.42	2.50	0.04	0.38	0.36	0.00	0.29	0.02		0.26					
Heavy XLPE	3.41	4.19					0.00								
Light PILC	0.89	1.22	2.03	3.50	4.80	5.36	9.91	3.53	3.28	1.23					4.66
Medium PILC	1.77	9.56	6.68	14.55	12.63	2.00	2.65	7.90	3.51	8.49					0.08
Heavy PILC	0.09	0.63	0.92	1.56	4.77	4.95	4.54	5.30	0.55						

Age (yrs)

Electricity Invercargill Limited is 94% of its way through a programme to underground its network in Invercargill City.

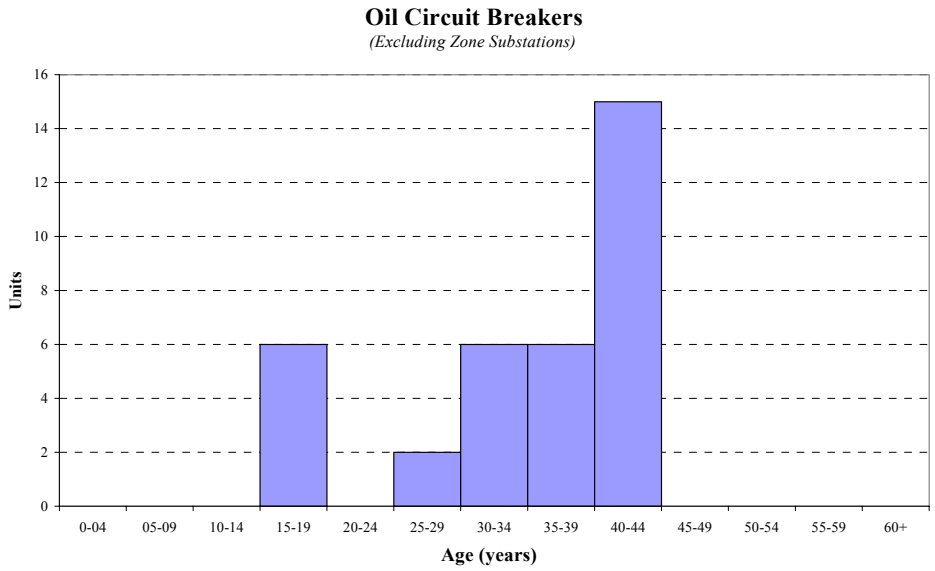
The undergrounding programme has primarily focussed on undergrounding the sections of overhead reticulation, which are in the worst condition to minimise maintenance costs.

Condition of the poles is reasonable with the undergrounding programme replacing any poor poles.

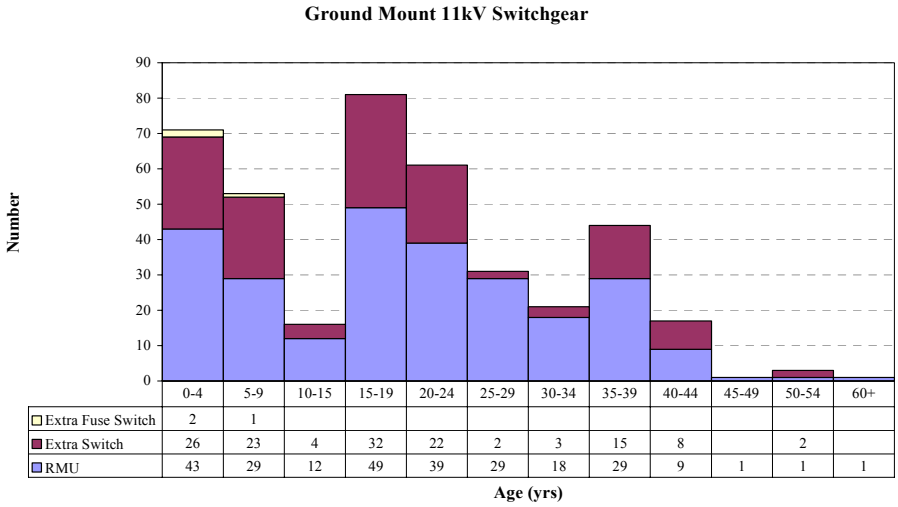
Most of the poles which will remain on the network are concrete with an expected life of over 60 years.

11kV Cables have been used in the network for a number of years with 4.7 kilometres of paper insulated lead covered (PILC) cable that is over 70 years old. These cables provide a back up between the old 11kV injection plants and rationalisation of these cables will be undertaken to lessen the impact of failure of these cables. While undertaking this work the condition of the remaining cables will be checked at which time a determination of the remaining life will be made.

11kV Distribution Substation Switchgear



Within the Central Business District (CBD) there are a number of oil circuit breakers installed in building basements or in underground substations. Twenty-one of these units will exceed their expected life of 45 years within the 10 year plan. It is proposed to undertake a programme to replace these beginning in 2008. Prior to each job being approved by the Board, analysis will be undertaken to determine whether some other options to replacement are available. The options can be from replacing the whole switch board to retrofitting modern equipment into the existing equipment or refurbishing and maintaining the existing equipment.



	0-4	5-9	10-15	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	60+
Extra Fuse Switch	2	1										
Extra Switch	26	23	4	32	22	2	3	15	8		2	
RMU	43	29	12	49	39	29	18	29	9	1	1	1

11kV Switchgear is installed at various points throughout the network. Switchgear is mainly used to provide isolation and restoration of supply when faults occur. The installation location of this

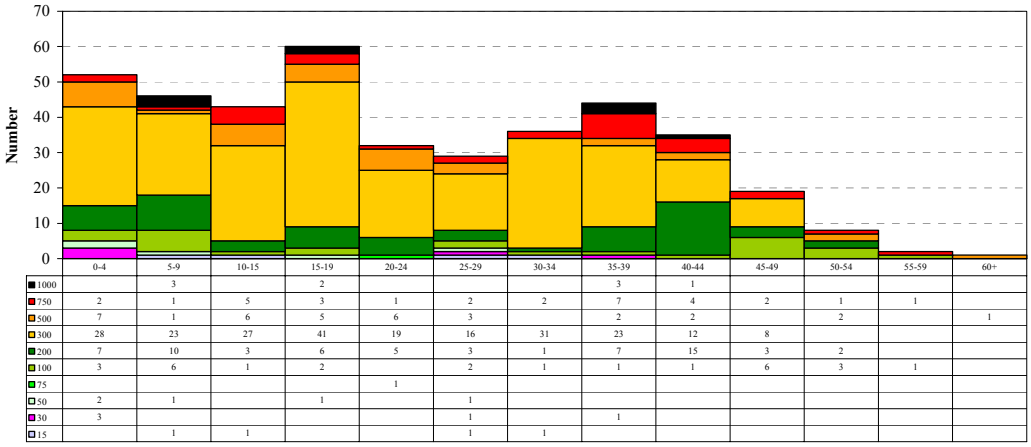
equipment varies between berm-mounted to inside buildings or enclosures. Therefore there is a variety of deterioration profiles.

Over the last period we have had problems with two types of switchgear and a programme is now underway to replace all Krone RMUs and Frank Wild Ts due to insulation deterioration and non availability of spare parts.

Distribution Transformers

The charts below show the age profile of the distribution transformers on the network. Ongoing refurbishment of larger units and the housing of many of these inside buildings will extend their life to 60 years. Transformers less than 50 kVA will be replaced when they fail, or when the area is undergrounded.

Distribution Transformers

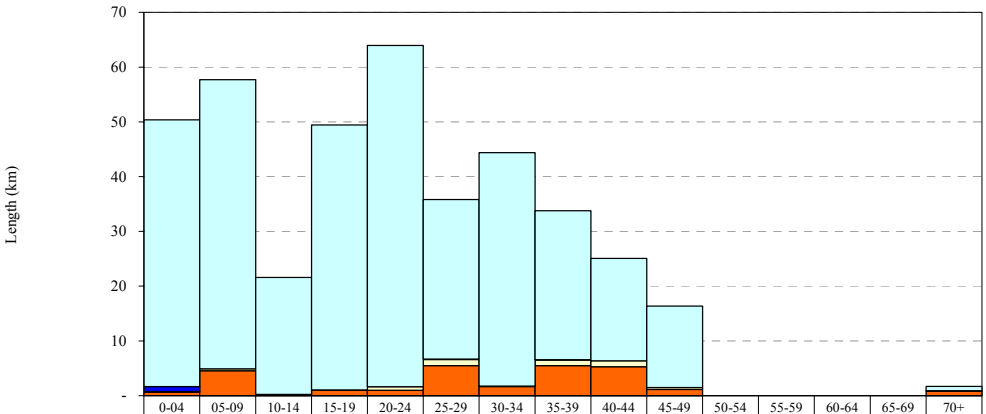


	0-4	5-9	10-15	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60+
1000		3		2				3	1				
750	2	1	5	3	1	2	2	7	4	2	1	1	
500	7	1	6	5	6	3		2	2		2		1
300	28	23	27	41	19	16	31	23	12	8			
200	7	10	3	6	5	3	1	7	15	3	2		
100	3	6	1	2		2	1	1	1	6	3	1	
75					1								
50	2	1		1		1							
30	3					1		1					
15		1	1			1	1						

400V Overhead Lines and Underground Cables

The age profile for 400 volt cables has been derived from the age of the supplying equipment. Overhead lines are being undergrounded in Invercargill, with only emergency maintenance repairs done. Lines in Bluff are not planned to be undergrounded and these will be maintained to ensure reliable service.

400V Cables



	0-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+
XLPE MEDIUM	48.74	52.81	21.38	48.40	62.37	29.11	42.61	27.21	18.71	14.89					0.79
XLPE HEAVY	0.88	0.00				0.09	0.04	0.02	0.02						
PILC MEDIUM	0.07	0.37	0.07	0.07	0.60	1.12	0.10	1.05	1.08	0.36					0.03
PILC HEAVY	0.70	4.55	0.16	0.99	1.01	5.48	1.63	5.48	5.28	1.13					0.87

Communication Systems

Electricity Invercargill Limited owns a network of multi-core cables around central Invercargill, and to each zone substation. These are used for protection and SCADA communication. The total length of the cables is 32 kilometres with a replacement cost of $162,000. The condition of the cables is good but some of the joint pits and pillars are deteriorated and cause failure of some cores.

Refurbishment of the multi-core pits and pillars has restored service of the failed cores to allow reliable service. Estimated average age of the multi-core network is 26 years.

SCADA Systems

The Master Station for the SCADA is provided by PowerNet Limited as Electricity Invercargill Limited's network asset management company. It is an iFIX base system with a New Zealand company's developed add on called iPOWER, which has configured iFIX for the electrical industry application.

Three types of RTU are installed on the network:

(a) GPT Mini RTU – 8 CBD substations (1995)
(b) Harris D20++ RTU – Leven Street Substation (2000)
(c) Kingfisher RTU – Southern, Doon and Racecourse Road Substations (2005)
Also at Stadium Southland (2004) and at Site 520 (2005)

Replacements of the GPT RTUs as programmed over the next two years and communications to the PowerNet Control Centre is via multi-core cables and Dataradios.

Ripple Injection

Electricity Invercargill Limited owns one 33kV 217Hz ripple injection plant on the Invercargill GXP with back up provided by and supplied to The Power Company Limited plant next door. The Plant was built in 1988 and has had some electronics replaced in 2004 after repeated failure of these other plants. The plant is in good condition with all the 33kV gear housed inside the building. Expected life of this equipment is over 25 years so major upgrades are projected within the next 10 years.

Metering

The domestic and commercial metering on the EIL network is owned and operated by a separate business unit of EIL.

EIL also has some time of use meters installed on incomers and feeders to give load profile information for asset utilisation monitoring and for undertaking ODV valuation calculations.

(D) DETAILS OF PROPOSED LEVELS OF SERVICE

(i) Service Level Objectives

Reliability of Supply

The historical reliability performance, projected values for 2005/2006 and the target five-year averages for outages originating within the Electricity Invercargill Limited network are:

Total Number of Interruptions

[Number]	Target	Projected	Actual				
Class	**10 Year Average**	**2005/06**	**2004/05**	**2003/04**	**2002/03**	**2001/02**	**2000/01**
B	9	8	5	9	6	11	11
C	21	20	15	19	15	22	29
TOTAL	30	28	20	28	21	33	40

System Average Interruption Duration Index

[Minutes]	Target	Projected	Actual				
Class	**10 Year Average**	**2005/06**	**2004/05**	**2003/04**	**2002/03**	**2001/02**	**2000/01**
B	4.23	3.3	2.1	4.5	2.0	4.0	4.0
C	28.93	28.1	13.3	45.1	19.4	32.0	31.0
TOTAL	33.16	31.4	15.4	49.6	21.3	35.9	35.0

System Average Interruption Frequency Index

[Number]	Target	Projected	Actual				
Class	**10 Year Average**	**2005/06**	**2004/05**	**2003/04**	**2002/03**	**2001/02**	**2000/01**
B	0.043	0.031	0.026	0.028	0.011	0.040	0.050
C	0.931	0.874	0.247	1.247	0.686	1.120	1.070
TOTAL	0.973	0.905	0.273	1.275	0.697	1.160	1.120

Customer Average Interruption Duration Index

[Minutes]	Target	Projected	Actual				
Class	**10 Year Average**	**2005/06**	**2004/05**	**2003/04**	**2002/03**	**2001/02**	**2000/01**
B	98.78	106.45	81.37	161.07	180.91	98.75	80.40
C	31.09	32.15	53.80	36.15	28.21	28.54	28.90
TOTAL	34.07	34.70	56.43	38.89	30.62	33.34	31.25

NB: Class B are planned interruptions; Class C are unplanned interruptions due to faults.

Targets for future years are calculated on the average of the middle five values of the last seven years. Justification for no improvement is that due to the degree of undergrounding on the network, higher levels of reliability are unlikely to be achieved at an economical rate.

In accordance with some of the retailer agreements, the Company also has performance incentive payments which include payments to domestic customers following a “no power” call received by the PowerNet Control Room if there has been no attendance by a PowerNet authorised contractor on site within four hours of that notification. The payment in this case is $40.

If as a result of a general network failure, the power supply has not been restored within six hours of notification of the failure then the Company will pay each domestic customer $50.

There are certain conditions where the payment is exempted such as widespread severe snowstorms, windstorms or lightning etc, or faults caused by third parties such as Transpower or major damage to equipment.

Payment to the retailers for extended outages and long service times over the last year has been zero.

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

Network Efficiency (Losses)
Current system losses are reported at 7.4%. Any significant reduction would require major capital expenditure. This level is seen as high based on the size of the network and we believe that 2% – 3% is due to non-technical losses[1].

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.

The Company has a target of no more than 10 justified voltage complaints per 10,000 ICPs. The result for 2004/2005 was two unjustified complaints with no justified complaints for the year.

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 56 business days unless resource consent is required for any remedial works (2004/2005 equalled zero).

Asset utilisation is analysed by the installed transformer capacity against the system maximum demand.

Year	Percentage of Asset Utilisation
2004/2005	42%
2003/2004	42%
2002/2003	42%
2001/2002	44%
2001/2000	41%

(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. 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. The targets are also in line with the Commerce Commission regulatory thresholds.

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.

[1] Non-technical losses include: Retailer reconciliation errors, Theft, Non-metered loads, meter errors.

(E) DETAILS OF NETWORK DEVELOPMENT

(i) Network Planning Criteria and Assumptions

The planning criteria for the Electricity Invercargill Limited network are 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 are shown below.

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

Prioritisation is undertaken with the UMS optimisation tool and based on achieving the required levels and outcomes just prior to the service level need.

Load shifting is used to transfer loads between zone substations. This year it is planned to transfer load from Doon Street Substation to Leven Street and Racecourse Road Substation to keep the peak at Doon Street under the firm capacity.

Security Standards
The Standards of Security of Supply adopted by the Company are summarised in the following table:

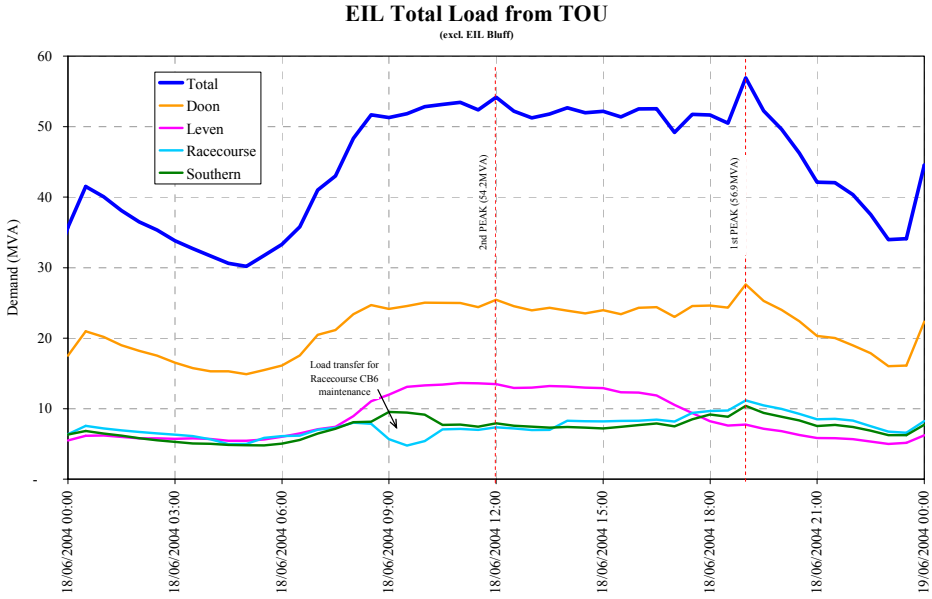
EIL SECURITY RATINGS		
Group Demand	**Security Rating**	**Arrangement**
>12 MWatts or 6,000 connections	AAA	(n-1) Uninterrupted
4-12 MWatts or 2,000 to 6,000 connections	AA	15 minutes restoration time
1-4 MWatts	A(i)	Isolate and Restore (2hrs)
<1 MWatt	A(ii)	Repair time

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. 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, eg CBD 11kV network will require a level of security of AA.
5. Where possible part group demand will be supplied via LV interconnections prior to the repair being actioned.
6. For AAA and a second circuit outage, restore 33% of the group demand within two hours.
7. Excludes short-term interruptions of less than one minute duration, and events external to the local network, eg energy storage, Transpower outages, storms, etc.

(ii) Demand Forecasts

Forecasts are based on load profiles recorded on each zone substation incomer CB and the trend over the last three years. Loads are dependant on the weather and each zone substation peak is impacted by load transfers in restoring supply after faults or during maintenance. Last year two system peaks occurred on Friday, 18 June 2004 as displayed in figure below.

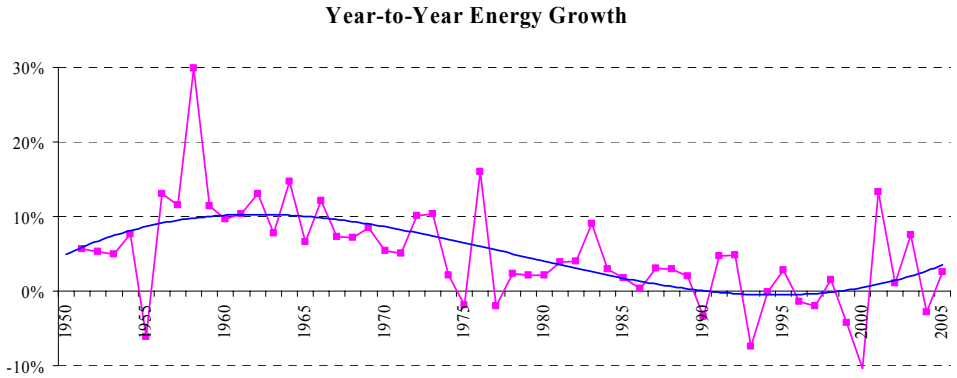


The Asset Management Plan projected a maximum demand increase of 0.36MW with an actual increase of 0.54MW.

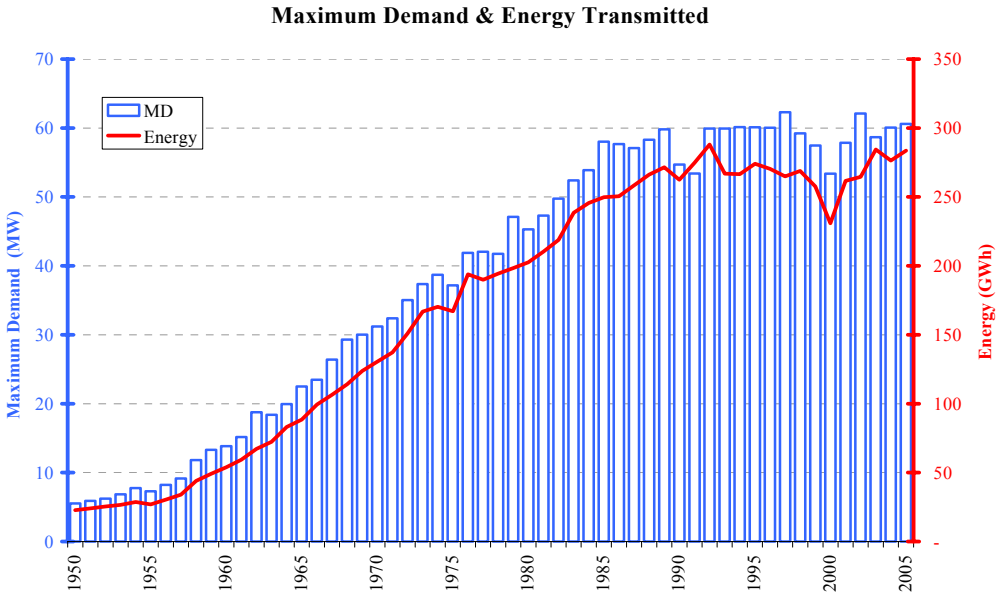
The following growth rates have been selected for the next 10 years.

Zone Substation	Growth (per annum)	Maximum Demand 2015 (MVA)
Doon Street	0.25%	22.70
Leven Street	1.60%	22.67
Racecourse Road	0.25%	11.48
Southern Sub	0.25%	11.46
Bluff (TPCL)	0.25%	6.25

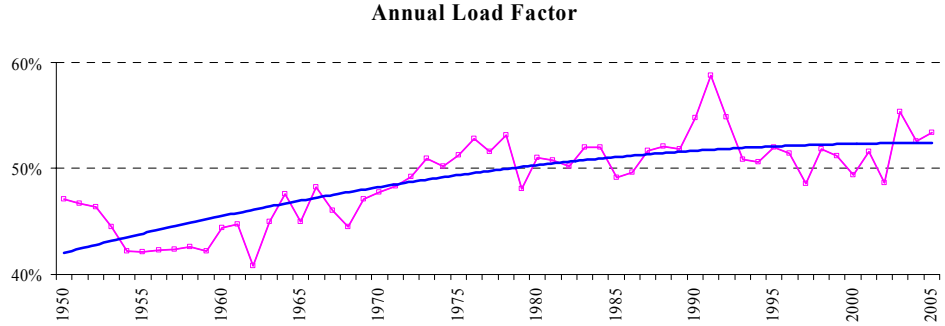
Over the last 20 years the Energy Usage and Maximum Demand have increased at 0.7% per annum. Use of load control to limit the Invercargill GXP peak is done in conjunction with The Power Company Limited to reduce overall Transpower charges. This can cause variations in the peak occurring on the Electricity Invercargill Limited network.



The graph below shows the growth and stabilising of demand and energy growth over the past 50 years:



The graph of Annual Load Factor below shows the impact of the introduction of ripple control in 1956 and the gradual increase in Off Peak Water and space heating up to 1990:



(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 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. Transfer of load off the Doon Street Substation is planned to reduce the expected peak to under the emergency rating of one transformer.

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 stranded capacity. Prior to any transformer purchase a check is done to analyse whether a presently underutilised transformer on the network can be relocated and a smaller transformer purchased.

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. This is planned for the CBD 11kV CB replacement as access to the underground sites is very difficult and extended life gear may prove to have a lower life cycle cost. All capital projects are evaluated by the UMS Optimisation Tool prior to recommending to the Chief Executive and the Board.

The impact of distributed generation is unlikely to affect the network due to the limited area and with the area being urban nature.

Power factor of the network is monitored and controlled by the Use of System Agreements. If a customer has a power factor of less than 0.95 extra charges are applied giving a good incentive to maintain good power factor.

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 by either the Chief Executive or Board.

(iv) Options Available

No allowance for inflation is included and no customer contributions are included in the budget costs. As large projects maybe tendered, no detailed budgets are shown.

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 good maintenance and progressing the undergrounding programme in the City. The recent introduction of the tree regulations will result in 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 on the remaining overhead high voltage lines. Justification is based on the economics taking into account the cost of non-supply, advertising, control room operations and switching.

   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 three hours or when customers agree to the duration of the outage.
   - Supply interruptions should not extend over the normal lunch time period, usually 12.00 noon to 1.00 pm.
   - Morning and afternoon supply interruptions shall take place only if warranted. Time span shall be 9.00 am to 12.00 noon, and 1.00 pm to 4.00 pm. Only in exceptional circumstances will they be permitted during May to September inclusive. 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.

- 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.
- Nighttime supply interruptions shall be considered under some circumstances.
- Some areas with special conditions shall be treated on an individual basis.

3. *Reduce the Impact and Duration of Supply Interruptions*

The use of SCADA not only provides indication from all zone and CBD distribution 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.

- Unless the existing reticulation is predominantly overhead (Bluff) all new extensions will be installed underground.
- 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.

(v) Maintenance

The objective of maintenance is to maintain an appropriate level of service at the least present value cost. This involves calculating the likely future costs and benefits for each alternative and finding the Net Present Value (NPV). The alterative with the lowest NPV would likely be actioned.

Overall expenditure is shown below, with future years costs reducing by 1% due to efficiency and productivity gains. The replacement cost from the 2004 ODV is listed to indicate the level of expenditure.

($000)	**05/06**	**14/15**	**Replacement Cost**
33kV Lines	2.0	1.8	85
11kV Lines	30.0	27.7	1,832
11kV Switchgear	120.0	110.7	5,786
400V Lines	30.0	27.7	1,733
33kV Cables	100.0	92.3	4,801
11kV Cables	265.0	244.6	14,582
400V Cables	475.0	438.4	28,145
Buildings & Structures	40.0	36.9	2,041
SCADA & Comms	16.0	14.8	732
Power Transformers	75.0	69.2	3,660
Circuit Breakers (incl. Protection)	90.0	83.1	4,036
Distribution Transformers	245.0	226.1	12,855
Ripple Plant	10.0	9.2	307
Total	**1,498**	**1,382**	**80,595**

Costs include PowerNet and Contractors' overheads related to maintenance management.

Maintenance for each asset group is shown below:

1. *Subtransmission Circuits*

   Maintenance includes monthly visual inspection of terminations and continuous monitoring by SCADA of oil pressures, quarterly checking of cable pressure alarms and annual cable sheath integrity testing.

   Tri-annual profiling by Time Domain Reflexology (TDR) is done to allow early detection of insulation degradation.

   The systematic maintenance is to ensure;

   (a) Cable screen integrity with any variations investigated and if appropriate repaired.
   (b) Maintain oil pressure, any leaks are located and repaired.
   (c) Maintain suitable plant to enable first aid of any major oil cable fault.
   (d) Provision of experts to undertake repairs would be obtained from outside of Invercargill.

2. *Zone Substations, Power Transformers and Switchgear*

   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.

   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 is carried out at five-yearly intervals.

3. *11kV Overhead Lines and Underground Cables*

   Annual maintenance includes a visual inspection of the overhead lines and cable terminations.

4. *11kV Switchgear*

   Maintenance of the oil filled circuit breakers is similar to those in zone substations.

   For the 11kV ground mounted switchgear, 30 units are overhauled each year, oil routinely changed in external units every five years and a “visual” inspection carried out annually.

   Ground mounted switchgear is a mixture of oil filled metal clad equipment and epoxy resin insulated (air insulated). Air Insulated RMUs, in damp locations, are maintained every three years.

   A programme is underway to replace all Krone RMUs due to premature failures. The manufacturer of Krone has ceased manufacturing this unit and spares to refurbish existing units are not available.

   CBD substations are inspected monthly including all of the equipment therein.

5. *Distribution Transformers*

   Transformers in CBD substations are visually checked monthly, others at six-monthly intervals when MDIs are read.

A number of transformers are protected from the elements and extended life is expected.

Approximately 20 transformers are overhauled annually.

6. *400V Overhead Lines and Underground Cables*

Maintenance includes annual inspection of underground link boxes, distribution pillars and overhead lines.

(vi) Network Development Programme

Subtransmission System

As stated previously the security of the Company's City subtransmission system still relies mainly on the backup capability of the 11kV network between the four zone substations. The main drawback to this arrangement is the time taken to restore supplies through the 11kV network if a loss of supply is caused by a fault on the subtransmission network and the need for all the various parts of the 11kV network to operate to full capacity during this period.

This is particularly so in the winter when significant peak periods do occur on the Company's network.

To reduce the risk the Company has already embarked on reinforcing the subtransmission network to three of the four zone substations. In 1998/99 the installation of a backup cable connecting the Southern substation to The Power Company Limited 33kV line was completed. The provision to enable a second transformer to be installed quickly was also completed.

In 2000/2001 the backup 33kV supply to Leven Street substation was done on the network with the upgrade of the TPCL subtransmission network in 2001/2002. This permits a backup from an alternative Transpower point of supply via The Power Company Limited subtransmission network into the CBD area and to supply hospitals within the City.

A second 33/11kV transformer has been installed at Leven Street substation in 2003.

The final part of this reinforcement was the provision for a second temporary emergency transformer at Racecourse Road in 2004.

Depending on growth rates provision is allowed in the Capital Works Programme for a second transformer at Southern substation in 2014/2015 and a second transformer at Racecourse Road Substation after 2015.

As all existing oil cables are under 60 years old and 35 years for the XLPE cables there are no plans to replace any of them within the next 10 years. Likewise the power transformers and zone substation switchgear that will reach their maximum life of 45 years will be refurbished to extend their lives to 60 years.

It is planned to retrofit or replace the 11kV oil filled circuit breakers at all zone substations to reduce the risk of fire and catastrophic failure of the substation. It is proposed to commence the programme at Doon St in 2007.

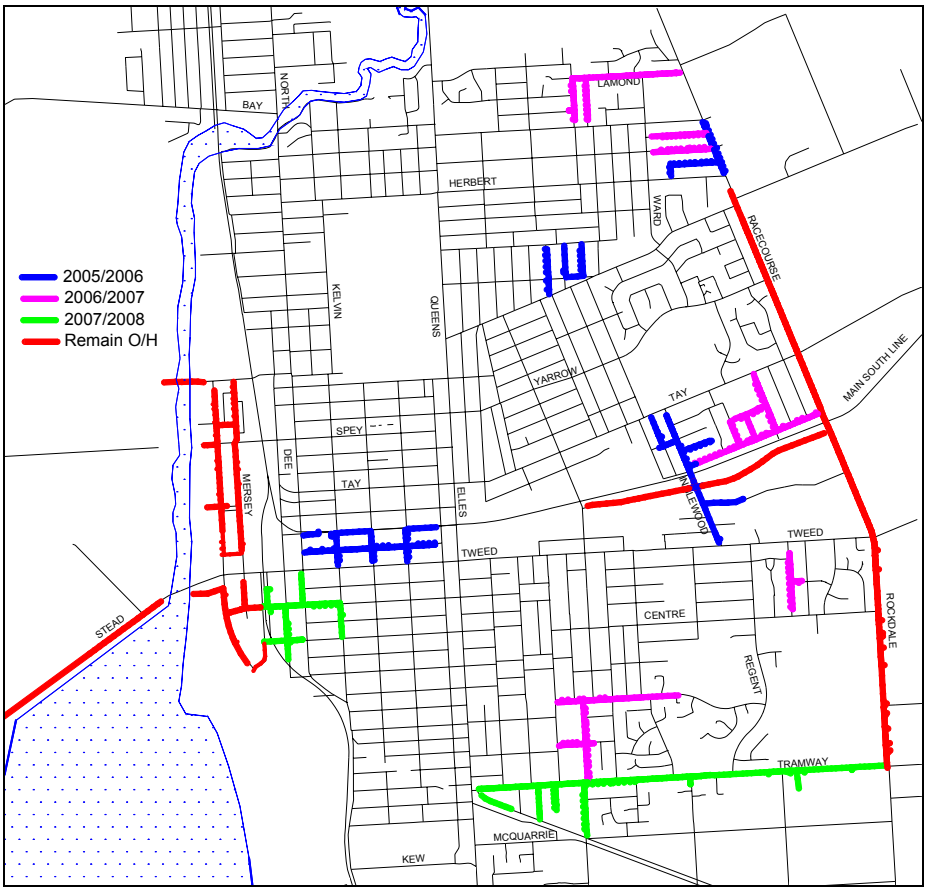
The ripple control plant continues to provide reliable service and with the back up from The Power Company Limited plant no changes are planned within the next 10 years.

Protection relays are planned to be replaced when the CB on which they operate is replaced.

Distribution

The major part of the distribution capital work involves the continuation of the programme to underground the Invercargill City network. The programme is well advanced and has negated the need to do some major overhead line maintenance and renewals during the past few years.

Figure 1 shows the undergrounding programme:



The thrust of the programme over the next few years is to complete the undergrounding of the City area by area.

The undergrounding programme is scheduled to cost between $1.0 and $2.0 million per annum until 2008 depending on other works and the availability of funds.

In addition to the above work, general capital expenditure will be required for replacement of transformers, upgrading of earths, expansion of the SCADA system, renewal of old unreliable multi-core cables and replacement of oil filled 11kV switchgear in high risk locations.

Replacement of the early 400V single core PVC cables is planned to begin in 2008/2009 and is estimated to take seven years at $400,000 per annum.

The total annual budget for capital expenditure will be between $1.5 and $3.0 million depending on the funds available to continue the undergrounding policy and other capital works.

Most of the reticulation in the Bluff Township was upgraded when the reticulation was converted from 3.3 to 11kV. There are only minor areas remaining for upgrading.

A copy of the 10 Year Capex Plan is shown below:

Electricity Invercargill Limited - Proposed Future Capital Expenditure

$000	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14
Distribution Total	323	252	286	180	183	371	951	955	1,240	581
New Customers Total	214	90	102	103	103	105	103	103	103	103
Substations Total	224	60	692	410	413	72	300	300	16	675
Subtransmission Total	17	15	17	6	7	7	7	8	8	8
Undergrounding Total	1,560	1,604	1,136	1,462	1,449	1,067	11	6	6	6
Grand Total	**2,337**	**2,021**	**2,234**	**2,160**	**2,155**	**1,623**	**1,373**	**1,373**	**1,373**	**1,373**

(F) RISK POLICIES

(i) Methods, Details and Conclusion of Risk Analysis

As the assets are distributed they are less susceptible to a single event.

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 PowerNet 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 Company 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.

PowerNet 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 are also PowerNet engineers on standby at any time to provide backup assistance for contract and 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 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 both the PowerNet Directors and 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 in last year's capital plan was as follows:

- Completion of undergrounding in Princes Street area
- Completion of undergrounding in the Hamilton Street area
- Completion of undergrounding in the Lorn Street area
- RTU replacements at Racecourse Road and Southern Substations
- New customer connections

Both Capex and Opex were under spent for the period 1 April 2004 to 31 March 2005. This is due to the renegotiation of the Faults Contracts, changing from 14 contractors to three contractors with the set up time for the new contractors reducing productivity.

The capex budget was $2.0 Million for 12 months and expenditure incurred was $1.6 Million.

(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.

Operational performance for the year ending 31 March 2005 was well under the targets. SAIDI was 15.4 minutes and SAIFI was 0.27 compared to the Commerce Commission targets of 35 minutes and 1.0 respectively.

A shortcoming last year was the non completion of the Risk Disaster Recovery Plan. With work still continuing on completion of this document, the completion date for this is now December 2005.

The Company is showing an overall improvement reflecting the significant capital investment in the network over the past five years. This improvement is mainly manifested in the increased reliability to its customers.

(iii) Gap Analysis and Identification of Improvement Initiatives

In general the Company has met or exceeded its Key Performance Indicators (KPI) in all areas. 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.

Increased use of live line techniques, SCADA, WASP and integration of databases and software within PowerNet will all contribute to improving the operation of the Network.

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