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Commerce Act (Electricity Distribution Thresholds) Notice 2004

Threshold Compliance Statement

Consumer Engagement

Sixth assessment (31 March 2008)

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SUMMARY

1 This report details Orion's compliance with the customer communication requirements of section 6(1)(c) of the Commerce Act (Electricity Thresholds) Notice 2004 (the *notice*).

2 We outline:

2.1 the consumer engagement requirements of section 6(1)(c);

2.2 the consumer engagement best practice recommendations identified in the Parsons Brinckerhoff Associates report (*the PBA report*) prepared for the Commerce Commission in April 2005[1];

2.3 our main customer groups;

2.4 our asset management planning process and customer involvement in that process;

2.5 our security of supply standard and customer involvement in that standard;

2.6 customer engagement carried out via retailers;

2.7 customer surveys undertaken by us;

2.8 direct customer feedback; and

2.9 customer consultation over pricing and major projects.

3 We believe that a continuous process of customer consultation is necessary to provide customers with service levels that meet their long term needs. We regularly undertake the customer engagement exercises listed above in sub-paragraphs 2.4 – 2.9 to ensure that we know customers' views and preferences.

4 Both our asset management plan and our security of supply standard reflect customer requirements. Our asset planning process incorporates customers' views on:

4.1 the quality of service that we supply, and

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[1] Parsons Brinckerhoff Associates, *Electricity Distribution Business and Asset Management Plans and Consumer Engagement: Best Practice Recommendations*, April 2005.

4.2 the price-quality trade-offs that surround our service quality level.

5 We endeavour to provide a quality of supply that meets customers' requirements while taking into consideration the range of customers that we serve.

6 Based on all available information, we believe the large majority of our customers are satisfied with the level of service that we provide and our asset planning decisions.

7 We will continue to engage with customers to ensure our future asset planning decisions reflect customer requirements.

QUALITY THRESHOLD - CONSUMER ENGAGEMENT CRITERION

Section 6(1)(c)

8 The Commerce Commission's quality threshold (as set out in the thresholds decisions paper[2] and the notice) specifies the consumer engagement criterion in relation to quality. Section 6(1)(c) of the notice states:

> *(6) Quality Threshold*
>
> *(1)(c)* customer communication*: at least once during the period of 2 years ending 31 March 2006, and at least once during the period of 2 years ending 31 March 2008, a distribution business is to –*
>
> *(i) properly advise (or ensure that another person properly advises on its behalf) its customers (or another person that accurately reflects the interests of those customers) about the price-quality trade-offs available to them in relation to the goods and services provided by the distribution business; and*
>
> *(ii) consult (or ensure that another person properly consults on its behalf) with its customers (or another person that accurately reflects the interests of those customers) about the quality of goods and services that they require, with reference to the prices of those goods and services; and*

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[2] Commerce Commission, *Regulation of Electricity Lines Businesses Targeted Control Regime Thresholds Decisions (Regulatory Period Beginning 2004)*, 1 April 2004.

(iii) properly consider the views expressed by customers during and after that consultation; and

(iv) adequately take these views into account when making its asset management decisions.

9 The Commission acknowledged that the method of meeting the requirements of section 6(1)(c) is not clear-cut, and stated in its thresholds decisions paper[3] that:

> *In the case of the consumer engagement criterion, the Commission does not intend to prescribe the manner in which lines businesses demonstrate compliance. The Commission is aware that distribution businesses are required to disclose asset management plans annually, and considers that consumer engagement should be central to the asset management planning process. Therefore, the documented asset management plans are likely to be an important component for demonstrating compliance with the consumer engagement criterion, provided the Commission is satisfied with the scope and detail of such plans, and with the nature of engagement with consumers.*

10 The Commission also noted:[4]

> *….lines businesses should be able to demonstrate:*
>
> - *how they engage with consumers, directly or indirectly, to explain the trade-offs between quality and price, and to assess consumers' willingness to pay for different quality levels;*
> - *what service offers or commitments they make to consumers, directly or indirectly, in response to information obtained during these engagements;*
> - *how they make decisions about target quality levels;*
> - *what types of contractual or other arrangements, if any, they enter into in relation to quality; and*
> - *how they plan to deliver the target quality in terms of medium-term service delivery.*

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[3] Ibid, para 83.

[4] Ibid, paras 93 – 95.

For the avoidance of doubt, the Commission does not require lines businesses to embark upon exhaustive or comprehensive research into consumers' willingness to pay for different levels or quality of line services. However, the Commission does require lines businesses to demonstrate that they have well developed business processes directed at understanding and responding to the preferences of consumers.

Distribution businesses may choose to engage directly with consumers and/or consumer groups, and/or via the retailers with which they have use of system agreements. However, in the latter cases, distribution businesses should be confident, and should seek to demonstrate to the satisfaction of the Commission, that the retailers or consumer groups accurately reflect the interests of the consumers which they supply or represent.

The PBA report - best practice recommendations

11 The PBA report identified best practice recommendations for consumer engagement by lines businesses. To our knowledge, the PBA recommendations remain current and no further recommendations have been released by the Commission during the current assessment period.

12 In particular, the PBA report recommended that consumers be divided into two categories – large and small users. In general, large users are supplied by dedicated assets or assets engineered to meet a consumer's specific requirements and small users are supplied from the shared distribution network[5].

13 The report acknowledged that not all the engagement options may be feasible in all circumstances – lines businesses should identify what is practical in their situation[6].

14 The following three main components were identified for best practice engagement with small consumers:[7]

14.1 regular one-way communication between a distribution business and all small consumers on service levels provided. Where practical, this should be broadly segmented by network area so the indicators are more closely related to the service levels experienced by individual consumers;

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[5] Parsons Brinckerhoff Associates, *Electricity Distribution Business and Asset Management Plans and Consumer Engagement: Best Practice Recommendations*, April 2005, p 63.

[6] Ibid.

[7] Ibid.

14.2 provision of a communication channel whereby individual consumers can provide direct feedback on the service levels received; and

14.3 a demonstrated willingness by a distribution business to be responsive to feedback received. Often the problem will relate to an asset problem at a specific location that can be readily addressed.

15 The following tables set out the best practice recommendations for engagement with large consumers:[8]

[8] Ibid, p 64.

Table 1: Engaging with large consumers: providing information

Information to be provided to large consumers	Recommended means of communication	Comments
Definition of service levels offered (in general, or as agreed for specific supplies) (to be provided annually)	• Direct relationships using dedicated staff • Mailed information pieces • Individual meetings by key account managers • Published AMPs • Trade-fairs or seminars	Service levels offered should be consistent with the distribution business AMP, tariff schedules, or as negotiated with the consumer
Actual performance against service level targets (to be provided annually)		Actual performance of the distribution businesses against the service levels offered should be described, for the last year Performance descriptions should correspond with that in the AMP, or the measures negotiated with the consumer
Price/quality options: • Negotiated, tailor-made connections/supply networks (at desired reliability level) • Demand control • Time-of-use prices • Fail-safe supplies • Power factor correction options • Harmonic filtering options • Split quality supplies		In general, the supplies to large industrial consumers should be individually negotiated, advising consumers of the available price/quality alternatives
Contact details or feedback mechanism (if not through key account manager)		Large consumers should have direct access to key account managers

Table 2: Engaging with large consumers: obtaining information

Information to be obtained from commercial consumers	Recommended means of communication	Comments
Consumer satisfaction levels (to be assessed at least annually)	• Feedback sessions with key account managers • Mail-out surveys • Phone surveys	• See survey design criteria (section 6.3.4 of PBA report) • General trends may be more important than absolute information • Individual problems to receive direct technical attention • Satisfaction with service levels to be recorded in AMP
General desire for change to service levels	Should form part of survey questions, or as negotiated with individual consumer	• Questions guided by actual service levels experienced • Performance descriptions should correspond with that in the AMP, or the measures negotiated with the consumer
Frequency/type of complaints received (as these arise)	• Through key account managers or call centre • Other consumer communication received • Web-logged complaints	Valid complaints should be tracked as a consumer service performance measure. May have contractual implications
Requests for service level changes by individual consumers	• Through key account managers • Direct approaches	Changes in consumption patterns by large consumers could have major network implications – to be accommodated in forecasts and AMPs

16 We outline below our compliance with the customer communication requirements of section 6(1)(c). In doing so, we detail our compliance with the PBA report best practice recommendations identified above.

OUR CUSTOMERS

17 Our customers comprise the following four main groups:

17.1 residential customers (approximately 139,000). Most of these customers are in Christchurch;

17.2 rural customers (approximately 21,000). These customers are located throughout our network (which runs between the Waimakariri and Rakaia rivers) in varying topography, from Banks Peninsula to the Canterbury plains and the Southern Alps;

17.3 irrigation customers. Our network serves approximately 1450 irrigation installations. These installations vary from small scale domestic pumps of a few kW to large scale deep well pumps of 200-500kW. Many farms contain several deep-well pumps and total connected load per farm can exceed 1MW. Approximately 880 irrigation installations have pump capacities exceeding 20kW. A significant proportion of our rural network reinforcement over the last eight years has been driven by the installation of deep-well pumps along the north bank of the Rakaia river and the upper plains between Darfield and Burnham. In the last three years alone we have spent more than $6m on reinforcement to meet irrigation load growth, and a further $4m to service associated milk powder plant electricity demand. New irrigation connections also require an extension of the existing 11kV distribution network, and sometimes also require upgrades to historic 11kV network capacity. Few networks outside of Canterbury supply this type of customer on this scale; and

17.4 business customers (approximately 25,700). These customers vary in size from small/medium sized businesses to large, high electricity usage businesses. The 390 largest business customers are regarded as major customers.

18 We engage with these groups collectively, and separately, in a variety of ways. Our extensive consultation ensures that, as far as practicable, all customer groups are satisfied and no one party is unfairly advantaged or disadvantaged. The sections below set out methods of engagement for the different customer groups, and how feedback gathered from customers is taken into account and incorporated into our asset management process.

ASCERTAINING 'AGREED LEVELS OF SERVICE AND QUALITY'

19 Each of our four customer groups has different needs in regard to the quality and level of service they require from our network. Their views also differ on the price they are willing to pay for that quality of service. Even within these groups, customer opinions vary.

20 Each year we publicly disclose an asset management plan. The plan looks ahead for at least 10 years and identifies the principles we use to maintain our existing network, and the basis for future network extensions.

21 The purpose of our asset management planning process is:

> *To provide, maintain and operate Orion's electricity network while meeting agreed levels of service, quality, safety and profitability.*

22 Setting 'agreed levels of service, quality, safety and profitability' is not a simple process as the diverse range of customer groups exists, each with different views and preferences.

23 Our customer consultation has helped define our asset management plan process over the last few years and has helped confirm that this process is what customers want.

24 We adopt varied engagement approaches to ensure we are fully aware of customer needs. By using a range of techniques, we often obtain information that could be missed if we only carried out customer surveys or only undertook specific consultation with certain groups.

25 Although the core results of the different consultation methods are 'aligned', each provides a slightly different level of understanding of particular customer groups and issues.

26 We briefly outline below the engagement methods used for each of these customer groups, and then describe these methods in more detail later in the report.

SUMMARY OF ENGAGEMENT METHODS

Summary of residential customer engagement methods

27 Residential customers are directly engaged through a number of methods, such as surveys, invitations to comment on asset plans and target levels, our website and interactions with our contact centre.

28 We also directly engage residential customers via publications, such as our *Network Quality Report*[9]*, Pricing Guide*[10] and *Summary Asset Management Plan*[11], which are updated annually.

29 We indirectly engage residential customers through representative groups such as Greypower Superannuitants' Association, Power Consumers' Society, Christchurch Budget Advisory Services and the Tenant's Protection Society and through Territorial Local Authorities and Environment Canterbury.

30 Our relationship with electricity retailers is also an important link between us and our residential customers, as we do not have direct contractual relationships with our residential customers.

31 These methods of engagement provide one-way communication between us and residential customers on service levels provided. They also provide a communication channel whereby individual customers can provide direct feedback on the service levels received.

Summary of rural customer engagement methods

32 Rural customers are also directly and indirectly engaged using the methods listed above for residential customers.

33 Representative groups/entities engaged to express rural customers' views include Federated Farmers, Greypower Superannuitants' Association, Environment Canterbury and the Selwyn District Council[12].

Summary of irrigation customer engagement methods

34 Irrigation customers are also directly and indirectly engaged using the methods listed above for residential customers and rural customers.

35 In addition, in 2005 we met with irrigation customers to specifically seek their views on price and quality of service[13]. We published the results of that meeting on our website in late 2005 and 2006 and invited interested

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[9] First published in 2004. Attached in Appendix 1.

[10] First published in 2005. Attached in Appendix 2.

[11] First published in 2007. Attached in Appendix 3.

[12] The Selwyn District Council area encompasses 6492 square kilometres of predominantly rural land. The majority of Orion's rural connections are within the Selwyn District Council boundaries.

[13] This consultation is detailed further in paragraphs 122 – 131.

parties to comment.

Summary of business customer and major customer engagement methods

36 Business customers are also directly and indirectly engaged using the methods listed above for residential customers and rural customers.

37 Representative groups engaged to express business customers' views include the Canterbury Employers' Chamber of Commerce and Canterbury Manufacturers' Association.

38 In relation to major customers (typically with loads large enough to require a dedicated transformer), we engage the Major Electricity Users Group and invite major customers to seminars at least twice a year. These seminars provide an opportunity to define and explain the quality of our delivery service and the level and structure of our pricing, and also enable us to obtain information from major customers on their level of price/quality satisfaction.

39 We also carried out an extensive written and verbal pricing and peak load management consultation process with major customers in 2005.

40 A Billing and Support Manager coordinates the relationship with major customers and is the direct contact for any major customer queries or complaints.

METHODS OF CONSULTATION/ENGAGEMENT

41 We expand below on the five main methods of customer consultation/engagement which we undertake:

41.1 customer involvement in setting our security of supply standard;

41.2 engaging with customers via retailers;

41.3 customer surveys;

41.4 obtaining direct customer feedback; and

41.5 consulting customers on selected major projects and pricing.

Customer input to our security of supply standard

42 Security of supply is an electricity network's ability to meet electricity demand when a significant item of network equipment fails. The more secure the network, the greater the ability of that network to 'keep the lights on' or recover quickly from a fault or a series of faults.

43 In 1998 we adopted a security of supply standard after a detailed review of our 10 year asset management plan. We undertook the review with an independent expert engineering company[14] and consulted with local stakeholders including consumer groups.

44 Adopting a security of supply standard was considered prudent by us and local stakeholders after the Mercury Energy Auckland power supply failure in early 1998. Our security of supply standard is detailed in Appendix 4.

45 Our security of supply standard (as amended in 2007– see paragraphs 67 - 74) underpins and strongly influences our 10 year asset management plan. We engineer our network and invest in it according to this standard.

46 To ensure that our security of supply standard was initially set at a level that properly considered customer requirements for the quality and price of service that we provide, we took the three steps outlined below when adopting the standard in 1999.

Step 1

47 As there was no New Zealand security of supply standard, we based our security of supply standard on a UK standard (P 2/5).

48 The UK P 2/5 standard was founded on the underlying philosophy that:

> *The aim of the electricity industry should be to match its marginal costs of preventing loss of supply to the marginal benefit consequently obtained by customers.*

49 In order to determine the benefit obtained by customers from investments in security, the UK regulators made an estimate of the average customer's valuation of a 'kWh saved'. This estimate was based on both local UK information and international information.

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[14] UK based EA Technology.

50 The UK P 2/5 standard, on which our standard is based, considers the price-quality trade-off. It recognises that quality of supply standards should not be set at such a high level that the costs to the customer of implementing them outweigh the benefits obtained from them by the customer.

Step 2

51 We then adapted the UK standard for local conditions, prices and customer expectations.

52 The first part of this adaptation process was a rigorous review of the UK standard by us and our independent consultants. The review found that our local standard did not need to be as high as the UK standard. This reduction was due to local conditions. Consequently, we set less stringent standards for some aspects of our network, such as busbar security criteria.

53 The second part of the process was customer consultation. We prepared a paper titled *Proposals for a Security of Supply Standard*[15] and distributed it to local stakeholders. We also prepared and gave a presentation on the proposed standard.

54 Stakeholders consulted included:

54.1 local councils;

54.2 electricity retailers;

54.3 Canterbury Manufacturers Association;

54.4 Major Electricity Users Group; and

54.5 small consumer representatives[16].

55 Stakeholders welcomed a security of supply standard as it gave them criteria to judge our performance, allowed them to know what to expect in

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[15] Available from Orion on request.

[16] Small consumer representatives are often not elected representatives but parties who are interested in the effects of electricity proposals on smaller consumers. While we recognise they are not elected by the general public we believe they often provide the best point of contact for smaller consumers.

terms of supply security and allowed them to ensure that local community needs were met.

Step 3

56 As a check to ensure that our proposed security of supply standard would yield real benefits for our customers, we completed a cost benefit analysis of the primary investments required under the standard.

57 These investments in security related to constructing a cross-city 66kV interconnection to reduce the Christchurch central business district's dependence on only one grid exit supply point.

58 A *Supply Security Investment Cost/Benefit Study*[17] was distributed to stakeholders. This study found that for a cost of $9.4m, Christchurch city would derive a benefit of between $16 and $98m, with a likely benefit figure of $49m. The primary supply security enhancements were therefore considered economically justifiable and were again supported by stakeholders following this report.

59 To determine the worth or benefit of the cross city interconnection, we placed a value on the load that would effectively be 'saved' from being lost as a result of the cable. This value represents the value our local community puts on electricity supply and was based on an extensive Centre for Advanced Engineering (University of Canterbury) study undertaken in 1993.

60 The *Reliability of Electricity Supply* study concluded that the cost of non-supply for residential customers is typically $1.50 to $5.00/kWh and sometimes up to $10/kWh. For business customers the cost of non-supply is in the order of $10 to $70/kWh. We interpreted this to suggest, as did ECNZ, that a power cut costs a customer between $5 to $15/kWh of load not supplied.

61 The figure of $5 to $15/kWh is considered low, based on international studies into the value of lost load (*VoLL*).

62 In May 2004 we commissioned Australian economics consultancy company NERA to review:

62.1 international economic studies on VoLL; and

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[17] Available from Orion on request.

62.2 regulated wholesale electricity market price caps that are based on VoLL.

63 Based on this review[18], the figure of $5 to $15/kWh used by us for security of supply purposes is very conservative. Recent international studies, including two comprehensive Australian studies, have indicated a value of around $35/kWh would be more appropriate.

64 The NERA report also noted that:

> *In every jurisdiction we examined, the price cap in the wholesale market was not intended to be based on the "true" VoLL. This reflects the fact that the level at which price caps are set depends on a much wider range of considerations, namely to reduce market power in generation and to prevent unacceptably high prices for consumers.*

65 Price caps are therefore typically not based on "true" VoLL, but are set at a lower level. In August 2003 consultants to the Ministry of Economic Development (*MED)* provided further evidence that a figure of $5-15/kWh, as used by us, was a conservative figure for VoLL. In examining the issue of dry year generation, the MED's consultants[19] investigated both New Zealand and overseas jurisdictions and placed the average VoLL in the region of $5 to $15/kWh. However, many of the figures on which they based this finding were in fact not VoLL figures but rather price caps put on generation by regulators. This suggests that a figure of $5-15/kWh is at the lower end of "true" VoLL estimates.

66 In summary, while VoLL is important, we also believe that customer consultation must occur before significant investment that is primarily for security purposes is undertaken. We actively engaged in customer consultation when setting our security of supply standard, the primary standard around which we base our asset management planning and investment initiatives. This customer engagement involved:

66.1 customer input through direct customer consultation on what our standards should be; and

66.2 financial justification based on conservative estimates of the value our customers place on lost load.

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[18] Available from Orion on request.

[19] Morrison & Co Limited.

Amendments to the security of supply standard

67 We amended our security of supply standard in 2007 following a review of:

67.1 the range of VoLL for different customer groups;

67.2 credible alternative network architectures/designs and costs; and

67.3 assessment of an 'optimum network' using an economics and reliability model.

68 The purpose of the review was to assess relevant developments in the eight years since we first adopted our security of supply standard, with a view to identifying whether the standard could be improved. As a result of the review, we proposed some amendments that primarily related to:

68.1 the architecture of our outer urban 11kV network; and

68.2 the level of duplication of transformers at district substations.

69 The revised security of supply standard may result in slightly lower level of reliability for outer urban customers; however it will also lead to less upward pressure on future prices. It was incorporated into our 2007 Asset Management Plan following extensive consultation with our stakeholders (see below).

Consultation on proposed amendments to the security of supply standard

70 To ensure our proposed amendments met customer requirements, particularly in relation to the price/quality trade-off, we engaged Sinclair Knight Merz Consulting to help us prepare material and we consulted extensively with a wide range of stakeholders. These stakeholder groups and entities included:

70.1 Christchurch City Council;

70.2 Selwyn District Council;

70.3 Environment Canterbury;

70.4 Meridian Energy;

70.5 Contact Energy;

70.6 Mighty River Power;

70.7 Canterbury Regional Energy Group (comprising Meridian Energy, Transpower, Canterbury Chamber of Commerce and Environment Canterbury);

70.8 electricity retailer Chief Executive Officers;

70.9 Major Electricity Users Group Association;

70.10 Canterbury Chamber of Commerce;

70.11 Canterbury Manufacturers' Association;

70.12 the Meridian Community Group (comprising Christchurch Budget Advisory Services, Power Consumers' Society, Greypower, Lincoln Community Care, a representative of the disability sector and the Tenants' Protection Society); and

70.13 our major customers.

71 We also published a general invitation to comment on the proposed amendments in our 2006 Annual Report and on our website.

72 We received no feedback that our proposed amendments needed to be altered. Several comments were received commending us on:

72.1 our efforts to consult with community groups; and

72.2 the level of thought we had put into the issue.

73 One matter that was raised at meetings with the Canterbury Manufacturers' Association and our major customers was the need for better information on power quality performance of our network.

74 Although not directly related to our supply security discussions, this was valuable feedback and reinforces our current plans to install permanent power quality monitor units at various points on the network.

Customer engagement via retailers

75 Our contractual relationship with electricity retailers and connected customers is depicted in the diagram below. Aside from direct relationships with approximately 30 major business customers, we do not

have direct contractual relationships with customers on our network[20,21]. We do however initiate and receive direct customer feedback on our performance as outlined in paragraphs 87 – 112.

76 We view our relationship with each electricity retailer as an important link between us and our customers. We currently provide our delivery service to six retailers.

77 On a daily basis, the retailer represents the customers connected to our network so we rely, in part, on retailers to let us know how their customers feel about the price and quality of delivery of our network service.

78 We consider that retailers are in a position to ascertain the quality and reliability requirements of customers as retailers regularly engage with consumers through surveys, and through consumer complaints and queries. This engagement ensures that retailers are aware of consumer preferences.

79 We interact with retailers through our day-to-day business activities, including requests for customer service in respect of new connections or faults and billing. Our relationship with retailers involves many service areas within Orion including billing, distribution services, operations, contact centre and control centre. The relationship with retailers is coordinated by a Billing and Support Manager.

80 We also hold regular meetings with retailers. At these meetings retailers have an opportunity to discuss the level of service and the price of service that we provide.

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[20] We charge electricity retailers on the basis of electricity volume and demand that passes through our grid exit points. We do not charge via each connection. This charging system works very well and assists us to send correct pricing signals to users. The contractual relationship with retailers, not customers, is one of the reasons why we have achieved large energy efficiency savings and reduced network costs.

[21] We recognise that the Consumers Guarantee Act stipulates that such "use of system" agreements do not remove our liability to consumers.

81 Our contractual relationship with retailers is formalised in a network delivery services agreement. This agreement sets out the terms and conditions under which we provide distribution services. Schedule B of the agreement – Performance Targets – states our contractual obligations regarding:

81.1 network performance;

81.2 response to enquiries;

81.3 reporting unplanned interruptions to delivery; and

81.4 fault call receipt and field service despatch.

82 The agreement also requires that connected customers' installations comply with our *Network Code*. The network code was written to provide guidance to customers, retailers and contractors on how we manage our network. The code sets out standards for us and our connected customers in accordance with good industry practice.

83 Based on our dealings with retailers, we are not aware of any systematic customer concerns with the quality or price of our line delivery service. We recognise that consumer engagement via retailers is not in itself sufficient to comprehensively ascertain customer views on price and quality, therefore we also undertake the other forms of engagement outlined in this statement.

Customer surveys

84 Over the last few years we have undertaken numerous face to face interviews and telephone surveys with various customer groups.

85 Highlights of the more recent surveys are:

85.1 *"Ground Fault Neutraliser survey"*

In 2007 we trialled a new technology called a "Ground Fault Neutraliser" which will improve the reliability of electricity supply to our rural customers. To understand whether customers would be willing to pay for this improved reliability, or instead preferred to maintain existing reliability levels at less additional expense, we commissioned independent company Colmar Brunton to conduct a survey of 400 of our residential rural customers (margin of error of five per cent, at the 95 per cent confidence level).

In summary, the survey found:

(a) 68 per cent of our residential rural customers would be willing to pay an extra dollar per month on their electricity bill for a 'twenty percent reduction in the number of lengthy power cuts and, hopefully, completely eliminate momentary one or two second interruptions';

(b) those customers not willing to pay the extra dollar were more likely to be older (60+), have smaller electricity bills (less than $150 per month), and fewer lengthy power interruptions in the last six months (one or none) than those willing to pay; and

(c) if the cost of new technology was reduced to 50c extra per month on their electricity bill, then an additional six per cent of residential rural customers (a total of 74 percent of customers) would be willing to pay for improved reliability.

Based on these survey results, we concluded the proposed capital expenditure for the Ground Fault Neutraliser has a sound economic basis. We therefore plan to spend $3m on this technology in the next four years and expect our rural network reliability to improve by 20-40%.

85.2 *"Snow storm survey"*

This survey was undertaken in July 2006 for us by independent company Business Improvement Limited following the largest snow storm to hit our rural network in more than 30 years. The storm cut power supply to 8,000 of our customers. We restored 80 per cent of those connections within 48 hours and the remainder were reconnected in just five days. The survey asked a random sample of over 400 rural customers (margin of error of five per cent, at the 95 per cent confidence level) about their attitudes and opinions regarding our response to electricity supply problems during the storm.

This survey followed similar surveys undertaken in early 2004 and late 2005 (see below) when there had been no major storm/electricity outage.

In summary, the survey found:

(a) most people were happy with the speed that power was restored following the storm; and

(b) the large majority of rural customers were satisfied with their power reliability.

The survey captured both those that lost power supply (245 respondents) and those that did not lose power (170 respondents) during the storm. For those homes that lost power, the median time without power was 36 hours.

When respondents were questioned about their level of satisfaction with the speed with which electricity was restored after the storm, only 24 per cent were dissatisfied to any degree. Only four per cent were 'totally dissatisfied'.

Unsurprisingly, the survey found that those people who were without power the longest were most dissatisfied with the speed of restoration, however the relationship was statistically weak; a number of people who had long outages were still happy with the speed of restoration.

The survey findings, coupled with positive comments made to us by various stakeholders/customers and the lack of any feedback criticising our efforts following requests for comments (such requests were placed in full page advertisements in rural newspapers[22] after the storm), led us to conclude that, in the majority, our customers were happy with the way in which we restored power after the storm.

The overall level of satisfaction with the reliability of rural power supply fell slightly in the snow storm survey from what it had been in late 2005. However still only 10 per cent of respondents were dissatisfied to any degree (compared to four per cent in 2005).

When questioned as to how many power cuts of one hour duration were acceptable each year, there appeared to be an increased acceptance by people of power cuts being a 'reality of life'. After the storm only 14 per cent of people said they never expected a power cut; as opposed to 25 per cent before the storm.

In relation to communications, respondents were asked whether or not they tried to contact us after a power cut. The 2006 survey indicated 32 per cent of people tried to contact us (compared to 20 per cent in the pre-storm 2005 survey). Of those that tried to contact

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[22] Attached in Appendix 5.

us, 75 per cent of people said they obtained the information they required (down from 86 per cent in 2005). This indicates that some improvement in communication to customers is needed during a storm. We are implementing measures to improve this area of our service.

85.3 *"Network reliability customer survey"*

This survey was undertaken in December 2005 for us by independent company Business Improvement Group Limited. It surveyed a random sample of 400 urban and 400 rural households in our network area, and had a margin of error of five per cent (at the 95 per cent confidence level). It followed an initial survey undertaken in February 2004 of a random sample of 1000 Christchurch residents.

A number of results were obtained from this survey, including information on energy efficiency and different forms of home heating in Christchurch. In relation to the quality of service we provide, and the price-quality trade-off, the following results are relevant:

(a) 88 per cent of urban respondents considered rapid restoration of power either important or very important (compared to 87 per cent of all respondents in 2004);

(b) 83 percent of rural respondents considered rapid restoration of power either important or very important;

(c) based on the question "given the impact of power cuts upon you, if a power cut lasts for 1 hour, how many would you be willing to accept?":

(i) an 'average' residential customer was willing to accept between 5 and 43 minutes of power interruption per year (compared with between seven and 43 minutes in 2004) [23]; and

[23] Our 5 year urban average SAIDI is 19 minutes per annum. Our quality of supply performance therefore falls within the range preferred by residential customers.

(ii) an 'average' rural customer was willing to accept between 10 and 60 minutes of power interruption per year;[24]

(d) 94 per cent of urban respondents were either satisfied or very satisfied with the current reliability of their power supply (compared with 92 per cent of all respondents in 2004);

(e) 85 per cent of rural respondents were either satisfied or very satisfied with the current reliability of their power supply;

(f) from the total survey, the seven per cent of respondents who were dissatisfied or neutral about the reliability of their power supply were given the opportunity to indicate whether or not they would be prepared to pay for improved reliability of their power supply. The survey results show:

(i) 99 per cent of urban respondents were not prepared to pay more for improved power supply reliability; and

(ii) 94 per cent of rural respondents were not prepared to pay more for improved power supply reliability;

(iii) when there is an interruption to electricity supply, the vast majority of both rural and urban respondents consider that restoring the power is more important than getting information about what caused the interruption. However, when customers do want information about outages, it is usually in relation to when the electricity supply will be restored, rather than what caused the outage.

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[24] Our current 5 year rural average SAIDI is 443 minutes per annum. Our quality of supply performance therefore suggests that we may not be delivering the level of reliability that rural customers want, however:

- only 1.9 per cent of rural respondents indicated they were willing to pay more for improved reliability; and
- 85 per cent of rural respondents were either satisfied or very satisfied with the current reliability of their power supply.

These figures illustrate the conflicting results that sometimes arise in surveys, and that it is important to engage in various forms of consumer consultation, rather than rely solely on surveys. Conflicting results in previous surveys on customers' willingness to pay more for increased reliability was one of the reasons we commissioned the Ground Fault Neutraliser survey, before committing to expenditure on the new technology.

86 We note that the PBA report recommends that mail-out surveys and phone surveys be carried out annually to assess large consumers' satisfaction levels[25]. We do not carry out formal surveys of these types targeted at major customers, as we consider that our face-to-face interaction with our major customers (through seminars and interaction with our Billing and Support Manager) provides comprehensive information about satisfaction levels.

Direct customer feedback

87 We receive direct customer feedback on our performance in four main ways:

87.1 major customer contact initiated by us, including seminars, telephone calls and meetings;

87.2 stakeholder meetings initiated by us;

87.3 direct customer feedback initiated by the customer through avenues provided by us; and

87.4 invitations from us to comment on asset plans, target levels and our performance generally.

88 These methods are explained in the following sections.

Major customer contact

89 We have approximately 390 major customers. These customers typically have loads large enough to require a dedicated transformer. Approximately 30 of them contract directly with us for their delivery service.

90 We invite all of our major customers to at least two seminars a year. These seminars are typically very well attended. Our senior management team attends the seminars to answer major customers' questions. During the seminars we frequently explain the quality of our delivery service and the level and structure of our pricing.

91 Seminars are also used as an opportunity to address other pertinent issues. Topics covered in recent seminars include Environment

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[25] Parsons Brinckerhoff Associates, *Electricity Distribution Business and Asset Management Plans and Consumer Engagement: Best Practice Recommendations*, April 2005, p 64.

Canterbury's Clean Air Plan, possible winter electricity shortages, night load switching and energy efficiency initiatives. Additionally, the Electricity Commission has presented on investment incentives for compressed air and electric motors, while power quality experts have talked about minimising the effects of voltage excursions.

92 We view our relationship with major customers very positively. Our regular seminars benefit us and our customers, and while each seminar discusses pricing and quality levels, we have not been alerted at these seminars to any fundamental concerns about our quality and price of supply.

93 In addition to opportunities at major customer seminars, major customers can directly contact our staff at any time about reliability issues. In the last two years one major customer has contacted us expressing concern about the reliability of their power supply. We investigated this concern and identified it as part of on-going internal factors at the customer's site (i.e. unrelated to us).

94 If major customers wish to increase or decrease the quantity or reliability of supply to their site, they contact us. We then work with the customer to provide the best solution for the customer's needs.

95 In regard to pricing, our major customer charging basis differs from that offered by most other network companies in New Zealand. Our prices to major customers reflect our marginal cost of supply during times of peak loading. Major customers have a relatively low network supply price for most of the year, and for approximately 80 - 100 hours per winter, face significantly higher prices for network supply. During those 80 - 100 hours (which we notify in advance to major customers), major customers have the opportunity to:

95.1 continue their usual electricity use;

95.2 shed load (through measures such as turning off non-essential load); and/or

95.3 generate electricity on-site, through using diesel generators (which are economic to operate given our marginal cost pricing during these 80 - 100 hours).

96 If the customer decides to shed load and/or generate electricity on-site, they can save significant electricity delivery costs.

97 For example, if a major customer with 1 MVA of load stops drawing that load from our network during our times of peak loading (only 80 to 100 hours per annum), that customer will save a peak load distribution price of $83.26 per kVA, which equates to a saving of $83,260 per annum. Including transmission, the delivery charge equals $122,670 per annum. If the customer chooses to shed its entire load during times of peak loading, the customer will effectively save $122,670 in delivery charges[26]. This saving equates to a 70 per cent reduction in the customer's total annual delivery charges.

98 If, alternatively, the customer decides to shed its entire load during times of peak loading and use a diesel generator to maintain its 1MVA of electricity supply, the customer will save $89,420 after subtracting the cost of operating the diesel generation (assuming that running the diesel generation costs 35 cents per kWh being $33,250 in total)[27].

99 We have found that, due to our marginal cost pricing approach, many major customers have installed diesel generation on-site. This alternative form of energy supply gives major customers greater security of supply than would be the case if we adopted a pricing system similar to the large majority of other New Zealand network distribution companies. Our pricing has effectively given major customers greater security of supply at no net additional cost. Our pricing offers major customers an excellent price-quality trade-off option[28].

Stakeholder meetings

100 Since our last threshold compliance statement in 2006, we have met with the following groups:[29]

100.1 Christchurch City Council;

100.2 Selwyn District Council;

100.3 Environment Canterbury;

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[26] The customer will also 'save' the retail energy charge.

[27] Again, the customer will also 'save' the retail energy charge.

[28] We note that our structure of pricing for non-major customers also encourages retailers to offer price-quality trade-off decisions to non-major customers. Our prices allow retailers to present to customers whatever tariff structures they want. For instance, retailers offer tariffs with lower night rates and cheaper rates where hot water is controlled.

[29] We meet with some of these groups more than once per annum.

100.4 Canterbury Regional Energy Group (comprising Meridian Energy, Transpower, Canterbury Chamber of Commerce and Environment Canterbury);

100.5 Major Electricity Users Group Association;

100.6 Canterbury Chamber of Commerce;

100.7 Canterbury Manufacturers' Association; and

100.8 the Meridian Community Group (comprising Christchurch Budget Advisory Services, Power Consumers' Society, Greypower, Lincoln Community Care, a representative of the disability sector and the Tenants' Protection Society).

101 Overall, we have received positive feedback with regard to the quality and price of supply we provide. In some instances, we have received feedback that we need to continue to invest in the network because of the increase in products with electronic components that require a reliable electricity supply.

102 Of particular interest was our meeting with the Selwyn District Council following the major snow storm in June 2006, which disconnected power to 8,000 of our rural customers. We met with the Council shortly after power was restored, to gauge its views on the quality of our service during and immediately after the storm. Overall, the feedback was very positive. In particular we were told that it was impressive how we mobilised our resources to quickly and efficiently restore power supply within the Selwyn District.

Direct customer feedback

103 Direct customer feedback generally occurs through three methods:

103.1 telephone calls to our contact centre;

103.2 contact with our operations field staff and contractors; and

103.3 contact with our distribution services staff.

104 Customers can use these methods to discuss issues relating to service levels and pricing, and in particular, our distribution service staff assist customers to set an appropriate level of supply that meets their needs.

105 Our contact centre operates 24 hours a day, seven days a week to take general calls and fault calls from customers.

106 Our operational field staff (12) and contractors work in the community and actively respond to electricity network and installation supply issues. These issues can be of a highly technical nature, and our trained staff use appropriate diagnostic equipment to determine and if possible resolve issues, even when issues are caused from within a customer's installation[30].

107 Our distribution services section has 20 staff members. This section interfaces directly and indirectly with customers to manage works. Works include capital installation and maintenance projects, customer driven work and all new connections to our network. A focus of the distribution services section is to communicate with all affected customers to discuss and minimise the impact of works.

108 When a new customer applies for a connection to our network, our distribution services section works with that customer (or their approved agent) to identify the most cost-effective options that meet the customer's requirements. This work often includes providing design/build solutions to assist in customers' decision-making. Customers can get competitive pricing for works from approved contractors.

109 We recognise that our distribution services team has valuable experience in this area that can assist customers and/or their agents. Their experience and skills are used to ensure that our customers achieve their electricity supply goals in a timely manner.

Invitation to comment on asset plans, target levels and our performance generally

110 Every year customers are invited to comment on our asset plans and performance target levels in a variety of ways. In particular:

110.1 we publicly release an asset management plan each year and welcome comments and suggestions on the plan. In 2007, to encourage a greater understanding and response, we also

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[30] Most electricity distributors maintain electrical equipment up to the boundary of a property. Beyond the boundary it is the property owner's responsibility. We however commit to maintaining the lines, poles and all other electrical equipment up to the point of entry to the house or building. We do this regardless of whether the electrical equipment between the boundary and the building is owned by us, the property owner or some other third party.

released a simplified summary of our AMP (see paragraph 110.2 below). The plan details:

(a) our approach to managing our electricity network and how we will manage and invest in our network to meet customers' requirements regarding quality of supply; and

(b) performance level targets. These targets cover both reliability criteria and power quality criteria. Our performance target levels as detailed in our asset management plan for the year to 31 March 2007, and our actual level of performance against those targets, are detailed in the table below:

Key service criteria	Quality characteristic	Target level of service (2008-2012)	Level of service for the year ended 31 March 2007	Outcome	New Zealand average (year ended 31 March 2005)
Reliability	Faults/100km of circuit	< 11.0	8.7	Achieved	8.0
Reliability	SAIDI[31]	< 63	80(1)	Achieved	167(2)
Reliability	SAIFI[32]	< 0.76	0. 7(1)	Achieved	2.2(2)
Reliability	CAIDI[33]	< 83	109(1)	Achieved	76(2)
Efficiency	Capacity utilisation	> 33%	38.1%	Achieved	33%
Power quality	Proven voltage complaints	< 70	28	Achieved	Not available
Power quality	Harmonics (wave form)	< 2	0	Achieved	Not available

(1) 5 year average ended March 2007 – snow storm of June 2006 caused target to be exceeded.

(2) 5 year average ended March 2006.

110.2 in 2007 we also produced a summary of our asset management plan inviting comment[34]. It details, in plain English, the main considerations, principles and strategies that influence how we manage our electricity network. It is intended to help our customers understand how we invest in our network to meet their quality of supply requirements. This summary will be updated annually;

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[31] SAIDI - System average interruption duration index. This is the average total duration of interruptions of supply that a consumer experiences in a period.

[32] SAIFI - System average interruption frequency index. This is the average number of interruptions of supply that a consumer experiences in a period.

[33] CAIDI - Customer average interruption duration index. This is the average duration of an interruption of supply for consumers who experienced an interruption of supply in the period.

[34] Attached in Appendix 3.

110.3 major asset planning decisions are discussed in our annual report. We invite feedback from customers on these discussions. The annual report details:

(a) major network enhancements that have occurred in the last year, what our focus will be in the coming years and projected capital expenditure and maintenance budgets; and

(b) occasionally details the trade-offs we face in managing our network;

110.4 we publish a *Quality of Supply* statement and welcome comments and debate on the statement from all interested stakeholders. The *Quality of Supply* statement is available on our website[35]. It states our practices with respect to security, reliability, voltage regulation, losses and asset requirements. The statement provides the basis for optimisation when valuing our assets. We have not received any negative feedback on the content of the statement since it was first published in 2001;

110.5 in May 2004, we became the first electricity distributor in New Zealand to publicly release a *Network Quality Report*[36]. This report is updated annually and discusses our performance in providing a reliable and secure electricity network. It is targeted at people who are unfamiliar with the electricity industry. It details, in plain English language, our performance at meeting service targets, urban and rural reliability issues (including identifying the parts of our network that have the lowest reliability), how we rate against other networks both nationally and internationally and our efforts to improve reliability;

110.6 in 2005 we produced and publicly released a *Pricing Guide*[37]. This guide is also targeted at people who are unfamiliar with the electricity industry. It details, in plain English language, our pricing principles and categories. It is intended to help our customers understand our prices, how our prices compare with those of other New Zealand electricity distributors and enable

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[35] The *Quality of Supply Statement* forms part of our *Network Code*, available on our website.

[36] Attached in Appendix 1.

[37] Attached in Appendix 2.

customers to better judge our overall performance. This guide will be updated annually;

110.7 the *Network Quality Report, Pricing Guide* and *Summary Asset Management Plan* are the most comprehensive and accessible documents of their kind in New Zealand. They, together with our annual report, are sent out to approximately 400 stakeholders, interested parties, and public libraries throughout the region. They are also available on our website (www.oriongroup.co.nz). These documents allow our customers to access readily understandable information on the price/quality trade-off.

111 In response to the severe snow storm in June 2006, we also published two full-page newspaper advertisements in the rural areas worst affected by the storm, inviting comment about our performance following the storm and asking for suggested improvements. A copy of our advertisement is attached in Appendix 5.

112 Given the extent of our publications inviting comment from customers on our quality of supply, we believe the lack of feedback we receive further demonstrates our customers' satisfaction with current service levels.

Customer consultation over major projects and pricing

Major projects

113 We also engage with customers about the quality of goods and services they require and the pricing trade-offs available, through consultation over selected major projects.

114 We spend approximately $35m per annum on capital projects. Approximately $10m of this expenditure relates to major projects. Major projects are generally classed as those which have the potential to affect a large group of customers. They are typically required to reinforce the existing network or to provide additional network to supply new load. Major projects are identified in our disclosed asset management plan.

115 The Ground Fault Neutraliser project is a recent example of how we consult with customers on major projects. This technology has the potential to impact significantly on our rural customers, particularly in the Selwyn District. Before the project commenced we surveyed a representative sample of affected customers to determine their response to the price/quality trade-offs of the project (see paragraph 85.1). We also met with the Selwyn District Council to discuss the proposed improvements

and the resulting price increase. Overall, the response clearly favoured the projected slight increase in costs in return for greater reliability.

116 We have also planned extensive consultation for 2008. Our rural and urban subtransmission networks are approaching a point of strategic choice moving forward. Many of the decisions made in the next one-to-three years will influence the long-term design of these networks. We are preparing forecasts and analysing options for longer term solutions in our urban and rural areas. We will consult with stakeholders in the coming months to ensure we implement the right solutions to reflect customer preferences.

117 Note that we base our cost-benefit analysis on the monetary value that customers place on lost load. This monetary value is based on extensive research as discussed in the section on our security of supply standard, in paragraphs 42 - 74.

Specific major customer connections

118 We also consult with customers to determine their requirements for specific new connections. For example, in 2008 during the design phase for a new major customer connection, we consulted extensively with the customer to determine the right balance between reliability of supply and distribution network charges.

119 This connection, sited within our rural network, required significant capital investment because of its large size. We offered the new customer four different connection configuration options. Each option detailed estimated distribution network charges and forecasted the number and length of supply interruptions per year.

120 The customer chose an option that gave it slightly higher than normal reliability for typical rural connections, but reliability that was lower than normal for production-based businesses within our urban network. The customer also requested further reliability improvements as its load grows, and our rural network evolves, making reliability improvements more cost-effective.

121 The higher than normal level of rural reliability chosen by this customer reflects the high cost of supply interruptions to its production process. We appreciate that for large customers with dedicated assets, it is important that our network design reflects their business needs. We will continue to consult with the customer detailed above to ensure that, as its business grows, its network connection configuration keeps pace with rising

reliability expectations.

Irrigation customer price/quality consultation

122 In 2001 we consulted with irrigation customers about their reliability levels and pricing. This consultation showed that some irrigators were willing to accept a lower level of reliability in return for a lower price. We subsequently developed and implemented a pricing option to accommodate those irrigators. An emergency 'interruptibility rebate' is provided to irrigators who are willing to have their load shed in order to maintain supply to their area. Approximately 40 per cent of irrigation customers have accepted the rebate. This negotiated arrangement has worked well and typically operates once or twice a summer. The 'interruptibility rebate' is an example of how pricing can be used to enable customers to make their own price/reliability trade-off.

123 In addition, in late 2004 we met with a widespread group of irrigation customers to again seek their views on price and quality of service. We presented the following two options to irrigation customers:

Option 1

123.1 further investment by us in additional district substations and 11kV regulators (as identified in historical asset management plan investment levels), leading to:

(a) a reduction in the number and duration of electricity interruptions that irrigators' experience; and

(b) significant upward pressure on irrigation prices as a result of the new investment; or

Option 2

123.2 less additional investment by us than that contemplated in the above option, leading to:

(a) irrigators being exposed to a (conservative estimate) one-in-ten-year two day outage; and

(b) significantly less pressure on irrigator prices.

124 The preference indicated at the meeting was for option 2 above.

125 Following that meeting, we commissioned an independent report on the value of lost electricity load to irrigators[38]. That report, which indicates that our existing 'interruptibility rebate' more than compensates all types of irrigators for the risk of losing the ability to irrigate for up to two days per annum, together with further discussion over the options for future electricity reliability, was presented in July 2005[39] to a meeting with irrigation customers, including sheep and beef, dairy and arable irrigators.

126 The meeting agreed that the second option was preferable. The results of the meeting were published on our website and interested parties were invited to comment in late 2005 and 2006.

127 We also provided the following information on our website to assist irrigation customers to:

127.1 assess the likely effects of the two different options; and

127.2 determine their preferred price/quality trade-off:

Impact on irrigation prices

Orion estimates that option 1 would lead to line price increases of approximately 15 per cent for those irrigators on our transitional irrigation package, approximately 5 percent for irrigators currently receiving the 'interruptibility rebate' and 3-5 percent for all other irrigators.

Option 2 would not lead to any direct pricing changes (prices may increase or decrease for other normal business reasons). The period for the interruptibility rebate would increase from its current 8 hour basis to 48 hours.

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[38] The AgriBusiness Group, *The Value of Lost Load to Irrigators*, May 2005. (Available on request.)

[39] At the time of this meeting the results of a nationwide Consumers' Institute *Dairy Farm Electricity Supply Survey* had just been published (22 June 2005). The Consumers' Institute sent out surveys to 8,550 dairy farmers in January 2005, with a response rate of 53%. Lines businesses were ranked on providing 'trouble-free' service ('trouble' meaning power cuts, interruptions, voltage fluctuations and other supply problems) and on speed of problem resolution. Orion ranked 8th out of the 23 lines businesses included in the survey. Fifty out of 93 respondents in the Orion rural network area identified a problem with their electricity supply. These figures show the inconsistencies that can arise in survey results (see the section on customer surveys included in paragraphs 84 – 85 for comparative results) and therefore the difficulties lines businesses have in accurately assessing customers' quality issues through surveys alone.

What time of year are 48 hour outages most likely to occur?

Option 1 would reduce the duration of and, to a lesser degree, the number of interruptions irrigators would experience. Multiple major equipment failure would be required for outage lengths of more than 8 hours to occur.

However option 2 could see irrigators without power for up to 48 hours if a transformer failed completely and needed full replacement. Orion has conservatively estimated the likelihood of a 48 hour outage occurring at once every ten years.

For irrigators the effect of any 48 hour outage is greatest during the dry summer months (see The AgriBusiness Group report). In theory a piece of electrical equipment (eg. a transformer) is more likely to fail when under greatest load. In the rural area Orion's load peaks during the summer. Therefore the probability of a 48 hour outage occurring should in theory be greatest during the summer months. However offsetting this is the risk of equipment failure due to severe weather conditions.

Typically in central Canterbury inclement weather occurs either in winter (snow) or spring (lightning/high winds). Orion is therefore unable to accurately estimate what time of year a two day outage is most likely to occur, however we believe the risk is spread relatively evenly throughout the year although to be conservative we assume it is slightly higher in summer.

The only two day outages witnessed in the Orion network area in the last 15 years were due to winter weather conditions.

128 Several investments together with ongoing maintenance costs would be avoided by option 2. We calculated the net present value of the avoided costs to be approximately $11m[40]. If we did in fact go ahead and undertake the investment, the revenue required to recoup the $11m cost would be approximately $1m per annum. $1m was significant. It represented approximately 10 per cent of our distribution revenue from rural customers and one per cent of our total distribution revenue.

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[40] This $11m is significant in terms of our capital expenditure to meet load growth. Our 2006 asset management plan proposed to spend a total of $23m over the next 10 years (once the $11m above was subtracted) on rural subtransmission to meet load growth. It proposed to spend a total of $64m over the next 10 years (once the $11m was subtracted) on subtransmission to meet load growth across the entire network.

129 No comments opposing option 2 were received. Given that irrigation customers clearly indicated a preference for less additional network investment leading to slightly lower reliability and less upward pressure on prices, we proceeded with option 2. Our asset management plan published in 2006 was consequently amended to remove some investments to reflect the results of the irrigator consultation.

130 In November 2006 we ran an advertisement in *The Press*[41] and published a brochure[42] outlining the 'interruptibility rebate', including the price/quality trade-off that it offers to irrigation customers. We sent the brochure to existing irrigation customers, and we also supply it to new applicants for irrigation connections, so that they are aware of the available price/quality trade-offs. We have also distributed to the brochure and outlined the trade-offs to irrigation customers at various agricultural shows in the Selwyn District.

131 To date we have received no complaints about the quality of service that we provide to irrigation customers.

CONCLUSION

132 In making asset management decisions, we take into account the views of customers in relation to the quality of service that we provide and the price-quality trade-offs that surround the decision.

133 We endeavour to provide a quality of supply that meets customers' requirements taking into consideration the different range of customers we serve. For example, we recognise that residential customers have different requirements to business customers.

134 In determining the quality of service that our customers require we perform a number of consultation exercises. Our process of customer engagement has five elements:

134.1 customer involvement in the setting of our security of supply standard;

134.2 engagement with customers via retailers;

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[41] Attached in Appendix 6.

[42] Attached in Appendix 7.

134.3 customer surveys;

134.4 direct customer feedback; and

134.5 customer consultation over selected major projects and pricing.

135 The views we receive from customers during these consultation exercises are appropriately considered by us, and form the basis of our asset management planning. A copy of our asset management plan is located on our website (www.oriongroup.co.nz) and is available on request.

136 We will continue to consult with customers in the future. We are confident that we currently meet customers' requirements.

APPENDIX 1

Network Quality Report

NETWORK QUALITY REPORT

A report on the reliability of Orion's electricity distribution network **2007/08**

Orion
your network

About Orion

Orion New Zealand Limited owns and operates the electricity network in central Canterbury between the Waimakariri and Rakaia Rivers, and from the Canterbury coast to Arthur's Pass. Our network covers 8,000 square kilometres of diverse geography, including Christchurch city, Banks Peninsula, farming communities and high country.

We transport electricity from nine Transpower grid exit points to more than 184,000 homes and businesses. Orion charges electricity retailers for this delivery service, and electricity retailers then on-charge homes and businesses. Retailers also charge customers for the cost of generating electricity plus a retail charge.

Orion's charges typically amount to less than 30% of a household's electricity bill.

Our shareholders are:

Christchurch City Council 89.3%
Selwyn District Council 10.7%

Further information about Orion is available from our:

- Website (oriongroup.co.nz)
- Annual Report
- Asset Management Plan – a document detailing Orion's asset replacement, reinforcement and maintenance strategies over the next 10 years
- Pricing Guide – a guide to help customers understand our prices and how they compare with those of other electricity distributors.

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19 Worst feeders
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22 Reducing fault numbers
24 Risk management
26 Enhancement initiatives
28 Glossary

Introduction

It is my pleasure to introduce Orion's fourth annual Network Quality Report. The purpose of this report is to let our customers, our owners and all of our stakeholders know how well we are doing at 'keeping the lights on'. It sets out what we do to measure and improve our network performance.

Orion's primary goal has always been to provide our community with a safe and reliable supply of electricity. We take this responsibility seriously and believe it is important to build open relationships with the community we serve. This report details the activities we take to improve the reliability of our electricity supply and gives our community the opportunity to accurately examine how we are performing.

We are proud that our electricity distribution network ranks as one of the most reliable distribution networks in the country.

Like any other electricity distribution network, the reliability of our network is affected by climatic events. June 2006 brought a particularly severe snow storm that caused widespread disruption on our network and on other Canterbury networks. This snow storm, which was rated as a one-in-30-year event, cut power to over 8,000 of our customers. We restored power within five days to 99% of affected customers. This rapid work is a testament to our staff who worked long days in trying conditions.

We conducted a review of our performance following the storm. The review looked at our efforts to restore power and examined our network to see if we could make enhancements to reduce the effects of future storms. It found that overall our performance was very good. We outline the results of the review in this report.

We plan and invest in our network to meet a security of supply standard that was originally developed with customer input in 1998. We reviewed this standard in 2006 to ensure that it continues to take into account customer preferences for the quality and price of service that we provide. As a result of the review, we proposed to amend the standard and consulted with customers to gain their views about our proposals. Customers agreed with our amendments, which may result in slightly lower reliability for some urban residential customers. However the changes may also reduce the need for further price rises.

These kinds of trade-offs between price and electricity supply reliability are a key focus for Orion. We regularly consult with our customers to ensure that we get the balance right between over and under investment – we listen to our customers and respond to their views on the level of prices and reliability that they prefer. These preferences then form the basis of our asset management planning.

We hope you find this report informative and we welcome any comments you may have on it or any other aspect of Orion's performance. Comments can be emailed to comments@oriongroup.co.nz.

Roger Sutton
CHIEF EXECUTIVE OFFICER

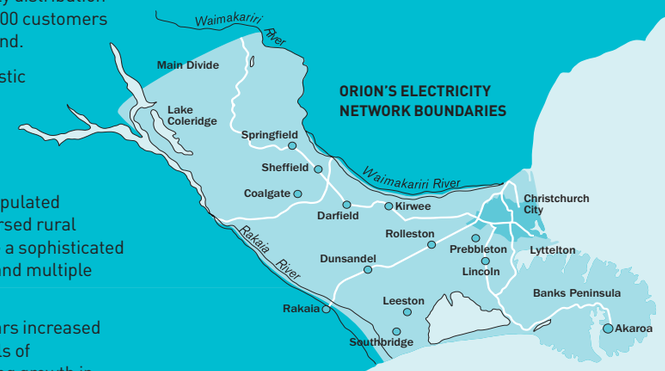
Orion network overview

Orion operates one of New Zealand's largest electricity distribution networks. We distribute electricity to more than 184,000 customers over 8,000 square kilometres in the central South Island.

The majority of our customers – over 85% – are domestic households, with the remainder being commercial or industrial premises. Business customers use around 60% of the electricity delivered via our network, while residential customers account for the other 40%.

Orion's network covers a varied area, from densely populated residential neighbourhoods through to a widely dispersed rural population. To reach all of our customers, we manage a sophisticated network of electrical assets, load control equipment and multiple computer systems.

Our network is continually growing. In the last few years increased irrigation in Canterbury's rural districts and high levels of construction activity in urban areas have created strong growth in electricity demand. Growth in electricity demand is the principal driver of Orion's network investment.



NETWORK SUMMARY AS AT 31 MARCH 2007	
Number of customer connections	184,000
Network maximum demand (MW)	630
Electricity delivered (GWh)	3,287
Total kilometres of lines and cables	14,190
Capital expenditure	$38.1m (forecast in year to 31 March 2008)
Network maintenance expenditure	$18.7m (forecast in year to 31 March 2008)
Value of network assets	$735m (as at 31 March 2006)

Over the last five years[1], our electricity distribution network has been one of the most reliable in New Zealand and our operating costs have been 20% below the New Zealand average. To ensure we remain an industry leader we continually look at ways to cost-effectively improve our network performance. This involves undertaking a range of consumer studies and holding extensive discussions with network users to define what levels of service they expect. The feedback we receive highlights the importance of 'continuity of power supply'. In particular, customers expect:

- no breaks in power supply, and
- if breaks do occur that power is quickly restored.

To help meet customer expectations we analyse the performance of our network to determine just how 'reliable' it is. This information is then used to target areas for improvement. The most important reliability performance measurements are detailed in this report.

Each year we aim to meet reliability benchmarks based on an 'average' year of weather. However in the year ended 31 March 2007 we experienced a particularly severe snow storm which caused significant outages. The storm was rated as a one-in-30-year event.

[1] To 31 March 2006. This is the latest available date to which comparisons to other networks can be made.

A summary of some of this year's performance statistics, with and without the impact of the storm, is outlined in the following table.

Key service criteria	Quality characteristic (per annum unless otherwise stated)	Target level of service	Level of service for the year ended 31 March 2007*		Outcome	New Zealand average (year ended 31 March 2006**)	Wellington and Auckland average (year ended 31 March 2006**)
			Including the June storm	Excluding the June storm			
Reliability	Faults/100km of circuit	< 11.0	8.7	6.8	Achieved	8.1	15.2
Reliability	Faults/100km of underground cable	< 3.0	2.4	2.4	Achieved	3.4	6.7
Reliability	Faults/100km of overhead line	< 13.0	12.5	9.4	Achieved	9.8	23.5
Reliability	SAIDI[2]	< 63	150	45	Not Achieved	153	117
Reliability	SAIFI[3]	< 0.76	0.68	0.59	Achieved	2.1	1.5
Reliability	CAIDI[4]	< 83	222	77	Not Achieved	75	78
Efficiency	Capacity utilisation	> 33%	38%		Achieved	32%	41%
Power quality	Verified complaints	< 70	28		Achieved	Not available	Not available

* Unless otherwise stated all level of service and reliability figures used in this Network Quality Report are based on Orion's network only. They exclude those interruptions or complaints caused by failures on the Transpower owned transmission network.

** latest available figures

We discuss the 2006 snow storm and our response to it in more detail in the next section of this report.

More information on our network can be found in our publicly released Asset Management Plan or on our website: www.oriongroup.co.nz.

[2] SAIDI - system average interruption duration index. This is the average total duration of electricity supply interruptions that a customer experiences in a year.

[3] SAIFI – system average interruption frequency index. This is the average number of electricity supply interruptions that a customer experiences in a year.

[4] CAIDI – customer average interruption duration index. This is the average duration of an electricity supply interruption for customers who experienced a supply interruption in the year.

"If a natural disaster hits it's critical that essential services have power supply. The way Orion has strengthened its network over the last 15 years to cope with such disasters is impressive. The benefits of this preparatory work were clearly demonstrated during the snow storm – Orion leads by example."

John Lamb
Manager
Canterbury Engineering Lifelines Group

June 2006 snow storm

The June 2006 snow storm was the worst weather event to affect the rural Canterbury electricity network in more than three decades, causing extensive damage to our network and cutting power supplies to thousands of rural residents. However, unlike the last big snow in 1973 where some customers went without electricity for five weeks, Orion restored power across our network in less than a week.

Canterbury has had big snow storms in the past, but what made the 2006 storm particularly severe was the type of snow that fell. It was a 'wet' snow – a heavy mixture that weighed down lines, poles and trees. As a result, we had widespread faults on our system which disconnected around 8,000 rural customers on the morning of Monday 12 June. Within five days we had restored power to 99% of our customers. The remaining Orion customers had the power back on shortly after that.

When any major outage occurs we have a clear plan of action that outlines which electricity connections are restored first. Our priority is to make our network safe – to avoid any potential for electrocution. We then aim to restore power to essential services such as water and sewage connections, as well as major communications sites. Next, we restore supply to power lines that feed large numbers of customers before moving onto lines that supply fewer customers.

Following the storm we reviewed our performance at restoring power. The review also examined our network to see if we could make any enhancements to reduce the effects of future storms. In particular we looked at:

- our engineering standards – how strong we build our network
- our operational response – how effectively we mobilised people and resources
- whether our customers were satisfied with our response.

The review found that overall our performance was very good.

Engineering standards

We engaged Opus, a leading international infrastructure consultancy to review our current design standards for our overhead lines. We also asked Opus to review line construction types and network performance.

The Opus review showed that:

- overall our performance was very good
- 60% of the storm damage was directly caused by trees falling on lines
- our network design standards were close to best practice – some older designs installed decades ago could be improved however the costs of these improvements would likely outweigh the benefits
- New Zealand's current design standards do not adequately address loading issues when snow builds up on lines – it is estimated that the June snow build up on a 90 metre span of wire weighed an average of 800 kilograms. We have since reviewed our snow loading criteria and have engaged Opus (on behalf of Orion and the Electricity Engineers' Association) to supply design information for the new Australasian overhead line design standards
- we should continue to assess the risks of our older network designs and prioritise replacement with regard to snow loading standards
- we should continue to selectively apply more costly and reliable designs (e.g. covered conductors and underground cables) where specific benefits justify the investment.

We have shared the results of the Opus review with other Canterbury electricity distribution companies.

Operational response

We also conducted a comprehensive review of our operational response. Overall, we are very pleased with how we performed – restoring power ahead of schedule without needing the help of contractors from other network areas. Once power was restored our employees and contractors then helped the Ashburton and South Canterbury network areas with their ongoing restoration efforts.

In some instances power was disrupted to cell phone repeaters making it difficult for us to contact our staff and contractors in the field. We are increasing the number of our radio channels and mobile two-way radios to overcome this problem. We also plan to extend our fleet of four wheel drive vehicles so that we have greater mobility during extreme weather events.

We are examining the business case to implement improved data management systems (to manage such things as damage reports from the public) for use during extreme situations on our network.

Customer consultation

As nearly half our rural customers had their power disrupted by the storm, it was a good opportunity to survey them about our response. We were pleased to find that most people were happy with our performance, and that the survey results were similar to those of previous surveys carried out in early 2004 and late 2005 when there had been no major storm/electricity outage.

In summary, the 2007 survey found:

- most people were happy with the speed that power was restored following the storm
- the large majority of rural customers were satisfied with their power reliability
- some improvement in communication to customers during storms could be made (we are now looking at measures to improve this area of our service).

We also published a full-page open letter in rural newspapers inviting customer comment on our response to the storm. No negative comments were received. This, coupled with the survey findings and positive feedback from various stakeholders, leads us to conclude that overall our customers were happy with our efforts following the storm.

The severity and lack of advance warning of the storm showed that we need to be ready to respond quickly to any severe weather event. The lessons learnt equally apply to other natural disasters. We outline how our network is designed to cope with other high risk events on pages 24 and 25.

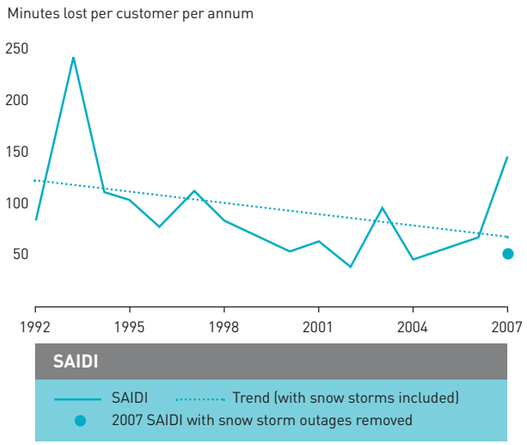
SAIDI and SAIFI

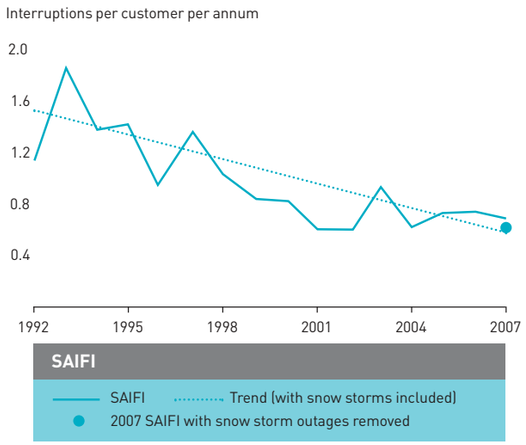
Two measures are accepted internationally as the most important indicators of electricity network reliability. These measures are known as SAIDI and SAIFI.

- SAIDI, or System Average Interruption Duration Index, measures the average number of minutes per annum that a customer is without electricity.
- SAIFI, or System Average Interruption Frequency Index, measures the average number of times per annum that a customer is without electricity.

As noted in the previous section, extreme weather events can have a major impact on an electricity network's performance. When considering performance it is therefore more meaningful to look at the long term trend in an electricity network's SAIDI and SAIFI figures, rather than look at the figures for any one year.

The trend of our network reliability performance figures since the early 1990s shows that we have improved our performance.



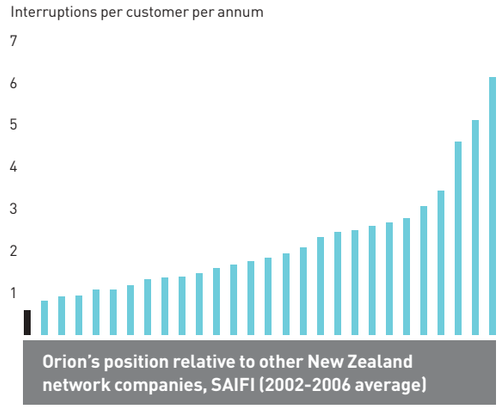


SAIDI and SAIFI comparison figures are currently only available up to 31 March 2006, that is, before the June 2006 snow storm. Based on these latest available figures, for the five years to 31 March 2006, Orion was the:

- third best performing New Zealand distribution company in terms of the duration of interruptions (SAIDI)[5]
- best performing New Zealand distribution company in terms of the lowest frequency of interruptions per customer (SAIFI).

[5] The two New Zealand network companies with superior SAIDI results to Orion's are both urban-only networks. Orion operates both an urban and a rural network. Rural networks usually have a greater number of interruptions than urban networks. There are 28 electricity distribution networks in New Zealand.

Orion's position relative to other New Zealand network companies, SAIDI (2002-2006 average)



Orion's position relative to other New Zealand network companies, SAIFI (2002-2006 average)

Internationally, Orion's network reliability also compares favourably[6].

[6] International comparisons are difficult to establish as different countries use different methods to calculate reliability data. For instance, Australia and the United Kingdom exclude extreme events (such as storms) from their statistics, while in the United Kingdom an outage does not officially occur until a customer's power has been off for three minutes (New Zealand regulations state one minute). For this reason international comparisons are not discussed in length in this Network Quality Report but are available on request.

Reliability performance by area

Orion's electricity network serves areas from high-density urban to medium-density rural and remote rural countryside. Each has a technically different type of electricity network serving it.

In urban areas, Orion's electricity network is characterised by a network of 11kV 'primary' rings. These rings of 11kV (high voltage) cables connect our district substations to several hundred network substations. Network substations in turn supply power to a 'secondary' 11kV cable network to which several thousand distribution transformers are connected. These distribution transformers supply our low voltage network to which most of our customers are connected.

This system is very secure as most of our urban network substations have at least two supply sources. If one source fails a network substation can still be fed from an alternate source without a break in electricity supply.

It is worth noting that approximately 40% of Christchurch's streets have underground electricity cables, rather than overhead lines. Overhead lines typically suffer more faults than underground cables. This is because overhead lines are exposed to weather, to tree and animal related damage and traffic accidents. However, when underground cables do have a fault, repairs can take much longer.

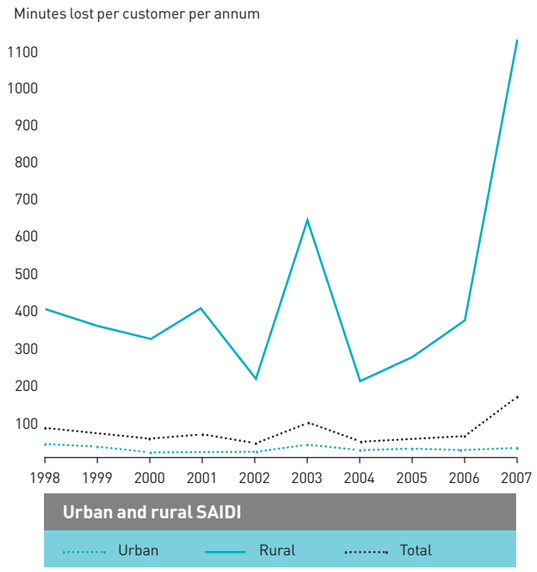
In contrast, 11kV overhead power lines make up most of Orion's rural network. These lines serve diverse geographical locations including Banks Peninsula, the central Canterbury plains and the Canterbury high country.

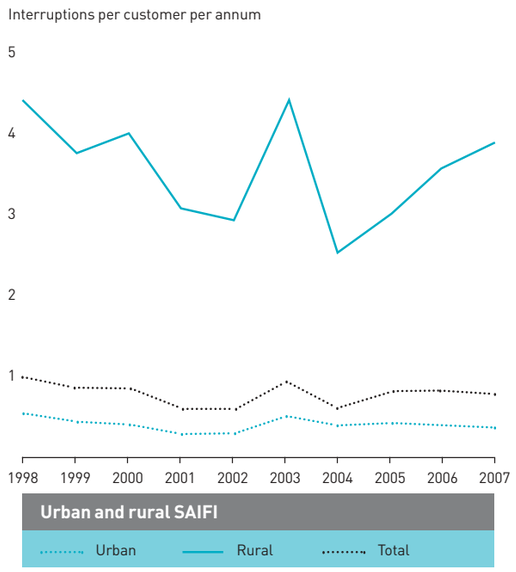
In many instances, because of the distances involved and the number of customers affected, it is not financially viable to have two sources of electricity supply serving a rural area, as we do in urban areas. This means that if supply to a rural customer fails there is no other means of getting power to that customer. Interruptions in rural areas therefore generally result in the need to isolate the portion of the network causing the interruption, and repair it, before power can be restored.

The long circuit lengths and small customer loads typical of rural networks make it uneconomic for Orion to install underground cables. Revenue from rural customers is currently approximately $14m per annum. Undergrounding Orion's rural network – at an estimated cost of approximately $500m – would result in very large price increases for our rural customers.

The overall differences in network structure mean our urban network is more reliable than our rural network. On average, rural customers experience around nine times more interruptions each year than urban customers. Each interruption typically lasts about two times the duration of an urban interruption.

In 2005 we consulted with rural customers with large irrigation connections. Feedback from these customers showed that they were prepared to accept lower reliability in return for less upward pressure on prices. Another survey undertaken shortly after the 2006 snow storm indicated that very few rural customers were willing to pay significantly more to improve reliability.





Based on national and international comparisons our urban network reliability appears to be above average while our rural network reliability appears to be slightly below average.

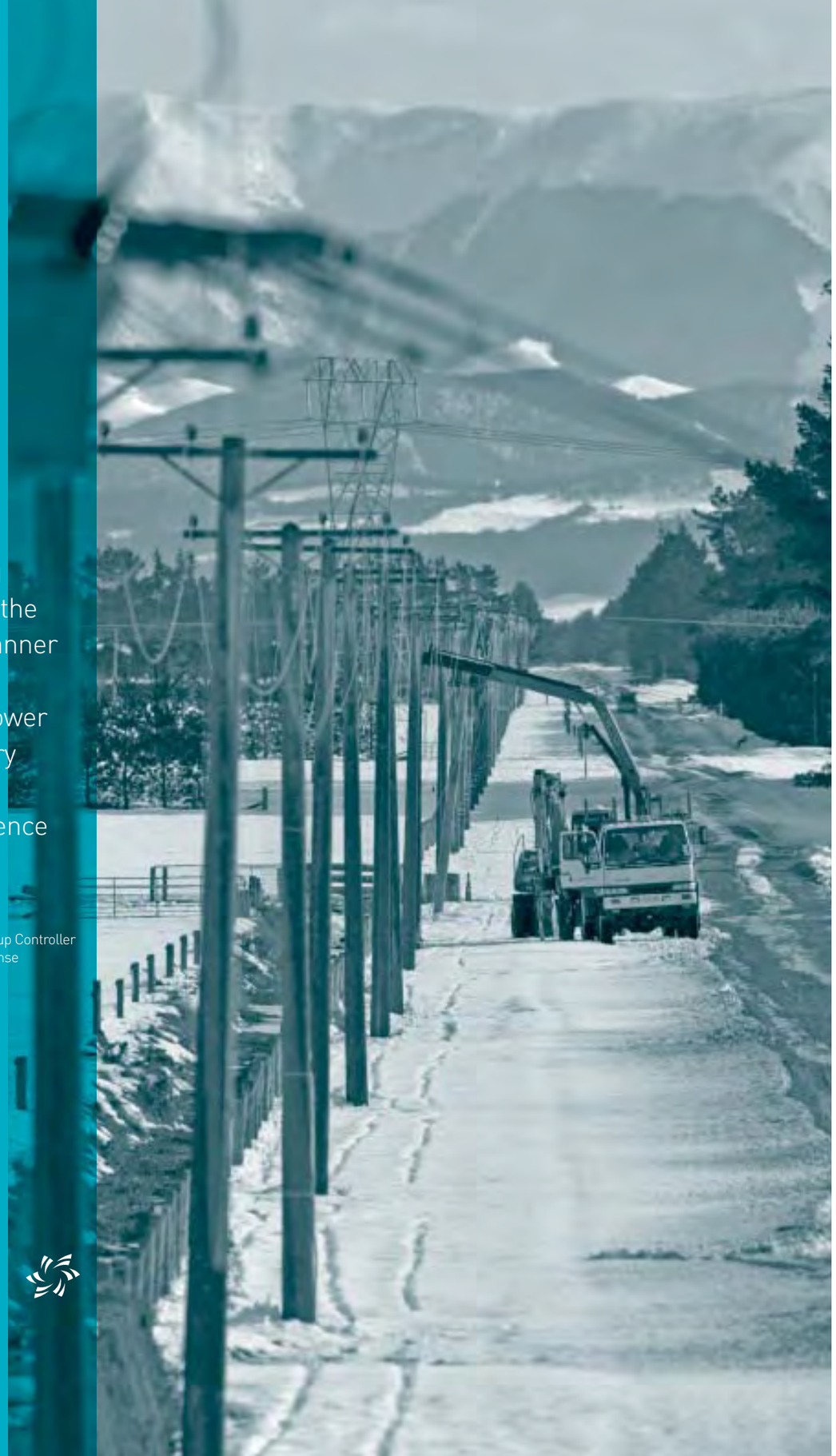
We also measure the reliability of our supply to Christchurch's central business district (CBD). A reliable electricity supply is critical to the CBD given the economic impact of any electricity outage[7]. Our network that supplies the CBD is very secure – several alternative sources can get power to the CBD if there is a fault somewhere on our system.

The level of reliability in Christchurch's CBD is in line with that of Australian cities. Unfortunately New Zealand CBD figures are not available for comparison, as to the best of our knowledge, Orion is the only New Zealand electricity distribution company that publicly discloses CBD reliability statistics.

	SAIDI*	SAIFI*
Christchurch CBD	6	0.03
Brisbane CBD	3	0.01
Hobart CBD	18	0.25
Melbourne CBD	19	0.19
Sydney CBD	13	0.20

* Based on latest available year figures (5 year averages not available). Excludes transmission outages and adjusted for extreme events in accordance with Australian reporting standards.

[7] In 1998 the Auckland CBD experienced an electricity outage that lasted for close to six weeks. Economic studies of that outage estimate the long-term economic costs to be equivalent to 0.1-0.3% of New Zealand's gross domestic product, or approximately $150-$450 million. 400 businesses are estimated to have failed as a result of the Auckland outage.



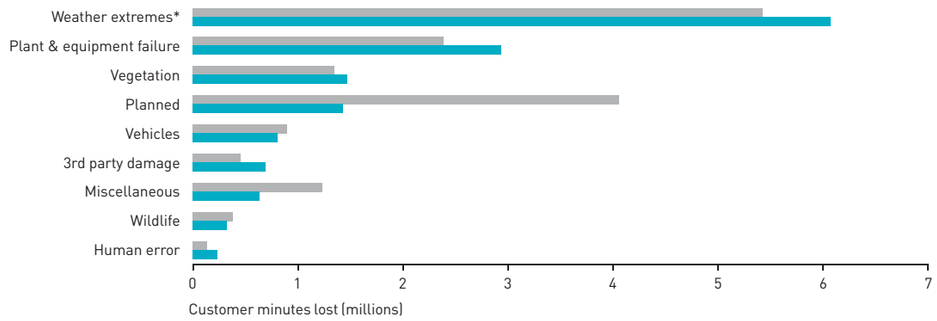
"In difficult and physically trying circumstances, the professional manner in which Orion responded to power outages was very impressive and provided confidence in their ability."

Robert Upton
Canterbury Civil Defence Emergency Management Group Controller commenting on Orion's response to the June 2006 snow storm.

Causes of supply interruptions

No electricity supply system is perfect. Periodic loss of supply can be caused by circumstances beyond a power company's control (such as wind, snow, equipment failure, traffic related or a shortfall in power generation) or by planned events when the electricity distribution company turns the power off for a purpose.

Most interruptions are caused by severe weather, plant and equipment failure and problems created by trees.



Cause of interruptions on Orion's network

1993-2002 average 2003-2007 average

* includes interruptions caused by trees that fall onto power lines due to very high winds, severe snow storms etc.

Improved maintenance techniques have reduced the impact of planned interruptions over the last decade. We have increased 'live-line' working practices and also altered our ageing equipment maintenance programme. In 2004 we introduced the use of a high technology 'corona camera' which can detect defective equipment on the network that would be missed by both the naked eye and other commonly used maintenance techniques.

Additional performance improvements have been achieved by shortening existing 'feeders' as additional district substations have been installed. Shorter feeder lines mean fewer customers are affected by any one outage unless the number of customers on that line increases dramatically.

When an interruption occurs, our website (www.oriongroup.co.nz) displays details on that interruption including what area is affected, the reason for the interruption and an estimate of the length of time before power supply will be restored. This information can also be obtained by telephoning Orion (03 363 9898).

Planned interruptions

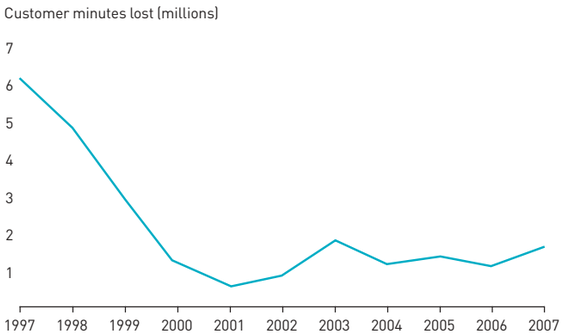
Orion determines its maintenance priorities by following the general principle that the assets supplying the greatest number of customers receive the highest priority.

As Orion's distribution network is hierarchical with the highest voltage at a few input points (Transpower grid exit points) and the lowest voltage at the many output points (customer connections), those parts of the network that operate at higher voltage are given higher maintenance priority.

We typically schedule around 70% of our annual network maintenance expenditure in advance. This is known as 'planned' work. Another 10-15% of maintenance is not planned for but is required to be done, such as pole relocation for roadworks. The balance of our maintenance expenditure is allocated to emergency work to keep the network in service.

Orion or an Orion authorised contractor gives affected customers at least four days notice of planned interruptions. This allows households and businesses time to prepare for loss of power supply. Often these planned interruptions are necessary to allow us to connect new customers to our network or carry out expansion work in response to growth in electricity demand.

During the year to March 2007 there were 319 planned interruptions to our network. Of these, the top ten interruptions accounted for 34% of the total number of customer minutes lost through planned interruptions. The longest any customer was without power was just over 27 hours; an unusually long outage that affected only 27 customers.



Total minutes lost through planned interruptions

The five largest planned interruptions on the Orion network in the year to 31 March 2007

Date	Area affected	Reason for interruption	Total customer minutes lost*	Number of customers affected	Interruption duration
21 March 2007	Arthur's Pass	Assets relocated to construct a new community building	54,972	159	9 hrs 15 mins
21 Sept 2006	Hororata	Network reconfiguration to construct a 66kV line	107,940	210	8 hrs 35 mins
2 Oct 2006	West Melton	Safety dictated shutdown of overhead lines while trees were cut	55,372	127	7 hrs 15 mins
30 May 2006	Burnham	Assets replaced due to age	103,660	284	6 hrs 5 mins
2 Sept 2006	Darfield	Assets installed and relocated due to housing development	55,311	179	5 hrs 10 mins

* The 'total customer minutes lost' calculation assumes that all customers whose supply of electricity is affected by the interruption are actually affected. In reality some homes and businesses (such as farm buildings) will not be using electricity at the time of these interruptions, some people may be at work or the dwellings may be holiday homes. The total customer minutes lost figure therefore overstates the actual number of minutes lost.

Unplanned faults

Electricity supply outages that cannot be predicted account for approximately 15-20% of Orion's annual maintenance expenditure. These 'unplanned faults' generally result from plant and equipment failure, severe weather and trees hitting lines.

When unplanned faults occur, we aim to get the power back on as soon as possible. Orion's customer surveys show that approximately 85% of our customers consider that rapid restoration of power is important. While we appreciate that very short outages can be inconvenient, in most cases a short outage is less problematic to customers than a long supply failure.

In recent years Orion has substantially increased the number of line circuit breakers on our rural overhead lines. Line circuit breakers help reduce the disruption caused by lightning and other transient events, like branches hitting wires.

When these events occur line circuit breakers quickly cut off the power so that no permanent damage is caused to the line. After a few seconds, when the lightning has ended or the branch falls away, the circuit breakers switch back on and power is automatically restored. If the cause of the fault remains, the line circuit breaker 'locks-out', cutting off the supply until the cause is found and rectified.

Orion's use of technology, such as line circuit breakers, and advanced network planning over the last ten years has considerably reduced the effect of unpredictable events on our network.

We have also improved our approach to tree maintenance. Trees account for approximately 10% of all unplanned faults and our annual spend on tree maintenance is around $1.9 million. Cutting trees and branches in advance reduces the probability of tree debris causing faults during storms.

In the year ended 31 March 2007, excluding the snow storm, 64% of customers who experienced a fault had their power supply restored within one hour. Ninety four percent were restored within three hours.

The following tables show the five largest unplanned faults that occurred on the Orion urban and rural networks respectively, in the year ended 31 March 2007, excluding the snow storm.

The five largest unplanned faults on the Orion urban network in the year to 31 March 2007, excluding snow storm faults

Date	Area affected	Reason for fault	Total customer minutes lost*	Number of customers affected	Fault duration
17 Nov 2006	Burwood	High winds caused a tree to fall on an 11kV line	150,687	822	4 hrs 45 mins
15 Oct 2006	Islington	Independent 3rd party damaged an 11kV cable while constructing a new fence	99,146	942	3 hrs 55 mins
16 Nov 2006	Shirley	High winds caused a tree to fall on an 11kV line	95,215	1,013	3 hrs 20 mins
14 Nov 2006	Marshlands	High winds caused a tree to fall on an 11kV line	111,620	802	3 hrs 15 mins
7 Dec 2006	Marshlands	Tree in line	82,228	947	2 hrs 10 mins

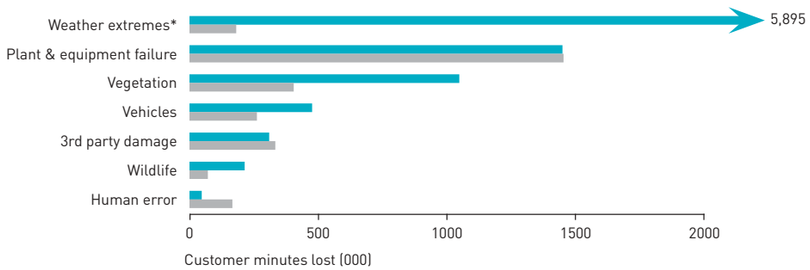
* The 'total customer minutes lost' calculation assumes that all customers whose supply of electricity is affected by the fault are actually affected. In reality some homes and businesses will not be using electricity at the time of these faults, some people may be at work or the dwellings may be holiday homes. The total customer minutes lost figure therefore overstates the actual number of minutes lost.

The five largest unplanned faults on the Orion rural network in the year to 31 March 2007, excluding snow storm faults

Date	Area affected	Reason for fault	Total customer minutes lost*	Number of customers affected	Fault duration
12 May 2006	Rolleston	Rain storm brought down an 11kV line	91,446	952	4 hrs 30 mins
30 Oct 2006	Motukarara	Insulation failure caused a crossarm to catch fire	120,420	4,785	3 hrs 40 mins
24 March 2007	Diamond Harbour	Line circuit breaker tripped during the night	123,728	675	3 hrs 30 mins
8 Oct 2006	Hororata	High wind	104,586	685	3 hrs
24 Oct 2006	Darfield	Bird's nest on a transformer	115,003	1,715	1 hr 15 mins

* The 'total customer minutes lost' calculation assumes that all customers whose supply of electricity is affected by the fault are actually affected. In reality some homes and businesses (such as farm buildings) will not be using electricity at the time of these faults, some people may be at work or the dwellings may be holiday homes. The total customer minutes lost figure therefore overstates the actual number of minutes lost.

The following chart shows the causes of unplanned faults on Orion's rural and urban networks in the year ended 31 March 2007. It shows that weather, trees and vehicles have a significantly greater effect on the rural network than the urban network. This reflects the higher proportion of overhead lines in Orion's rural network.



Cause of unplanned faults (2003 – 2007 average)

Rural Urban

* includes interruptions caused by trees that fall onto power lines due to very high winds, severe snow storms etc.

Faults per 100km of circuit

Orion uses 'faults per 100km of circuit' statistics to help determine which areas of our network require maintenance or upgrades.

We gather these statistics each year across the following asset categories:

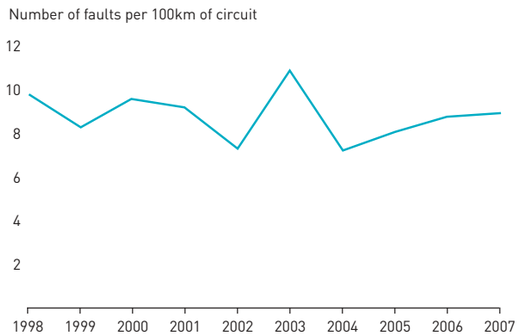
- 66kV, 33kV and 11kV
- line and cable
- urban and rural.

In the year ended 31 March 2007 Orion achieved the following faults per 100km of circuit results.

Faults per 100km of circuit

Voltage	Category	Length (km)	Approx % urban/rural	Urban	Rural	Total
66kV	Line	120	50/50	0.0	1.7	0.8
	Cable	63	100/0	0.0	0.0	0.0
33kV	Line	319	13/87	2.4	3.2	3.1
	Cable	28	92/8	3.9	0.0	3.6
11kV	Line	3,255	10/90	17.8	13.4	13.8
	Cable	2,103	99/1	2.2	23.8	2.4

The chart below shows Orion's performance over the last ten years with regard to the number of faults per 100km of circuit.



Total number of faults per 100km of circuit

Comparisons with other New Zealand network companies (with broadly similar types of network to Orion) show that we currently perform to average on this statistic[8].

[8] Orion has a customer density ratio of approximately 13 customers per kilometre of circuit. Eight other New Zealand network companies have a customer density ratio of between 10 and 20 customers per kilometre of circuit. Of those eight companies, four had better interruption per 100km of circuit records than Orion in the year ended 31 March 2006 (latest available figures).

Worst feeders

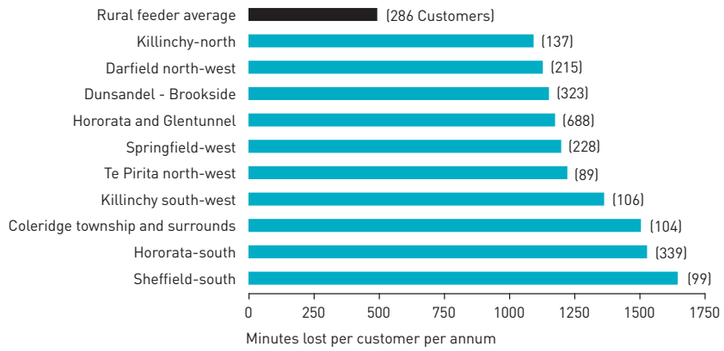
Generally speaking, a feeder is defined as a circuit that originates at a district substation and supplies several hundred households or businesses.

Orion's network has both 11kV feeders and 400 volt feeders. An 11kV feeder typically serves more customers than a 400 volt feeder. Our network has 79 rural 11kV feeders and 336 urban 11kV feeders that originate at our district substations.

The 11kV feeders on our urban network perform differently from year to year. For instance, in one year an 11kV feeder in Hoon Hay may have the lowest performance, while the following year an 11kV feeder in Brighton may take its place. These changes reflect that one-off incidents, generally caused by equipment failure, dictate our urban network's performance.

In regular customer surveys of urban and rural customers undertaken by Orion, approximately 95% of urban customers and approximately 80% of rural customers express satisfaction with the reliability of their power supply.

The ten worst performing feeders on our rural network are shown below. Typically they are the rural feeders which are most adversely affected by storm damage. These figures are much higher than usual because of the impact of the June snow storm.



Orion's 10 least reliable rural feeders (SAIDI)
– 2003-2007 average (unplanned interruptions only)

Energy delivery performance

Line losses

As electricity passes through lines, cables and transformers it creates a small amount of heat which is then 'lost' into the surrounding air. Such 'losses' are natural physical phenomena and are experienced in all electricity distribution networks. They cannot be avoided completely and mean that electricity retailers must purchase more energy from generators than is actually delivered to households and businesses.

Orion's policy is to maintain what is termed a 'low loss network', where overall losses are estimated at below 5% of energy delivered. We achieve this by following good industry practice with sound network design principles. These principles are laid out in our Asset Management Plan.

For instance, when deciding which transformer to purchase, we take into account the 'loss factors' of the different transformers available, as well as their price.

We also control operational voltage levels on our rural network to limit line losses. We choose transmission and distribution voltages and conductor sizes that best suit the load density, as overloaded conductors produce more line losses.

Orion's extensive urban cable network is inherently a low loss system.

Load factor

The amount of electricity passing through an electricity network is not always constant. In Christchurch for instance, electricity demand is higher on cold winter days than on warm summer days. The average load that passes through a network divided by the maximum load the network experiences that year produces a statistical measure called a network's 'load factor'. Load factor measures the constancy of load on an electricity network throughout a year.

Load factors always vary across different networks. This results from varying weather conditions and networks having different mixes of industrial, residential and rural customers. For instance, a network in an area with an even climate will typically have a higher load factor than networks in areas with large temperature variances.

Nevertheless, all networks seek to maximise their load factor. This is because a high load factor indicates better use of network assets (i.e. assets are more frequently used up to their electrical rating).

For the year ended 31 March 2007 Orion's load factor was approximately 60%, slightly lower than usual due to the very cold winter. The average load factor of New Zealand's electricity distribution companies was 65% in the year to 31 March 2006 (the latest available comparable figure). We have improved our load factor by around 10% in the last two decades, up from about 50%.

Capacity utilisation

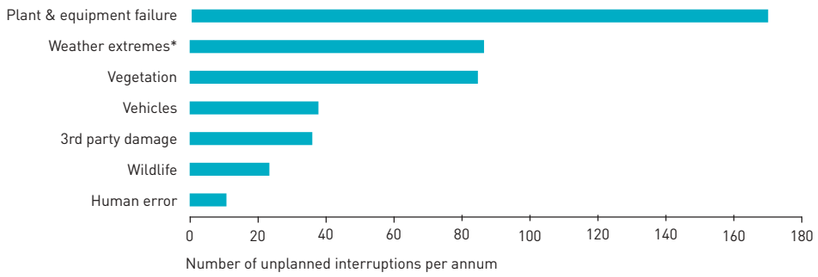
Capacity utilisation is a measure of how well a network's transformers are utilised. It is calculated as the maximum demand experienced on an electricity network in a year divided by the transformer capacity on that network.

In the year ended 31 March 2007 our capacity utilisation factor was 38%. The average capacity utilisation factor of New Zealand's electricity distribution companies was 32% in the year to 31 March 2006 (the latest available comparable figure).

"When the recent snowstorm caused large scale power outages in Canterbury I was most impressed with how Orion's management and staff put their resources into quickly and efficiently restoring power supplies within Selwyn and assisted other essential service providers in Canterbury. I am proud of the standard and example they have set."

Michael McEvedy
Mayor of the Selwyn District

Reducing fault numbers



Cause of unplanned interruptions (faults) – 2003-2007 average

* includes interruptions caused by trees that fall onto power lines due to very high winds, severe snow storms etc.

Three factors cause approximately 75% of Orion's faults; plant and equipment failure, weather and trees.

Plant and equipment failure

Plant failure is always going to happen. However certain actions can be taken to reduce the frequency of the failure.

Orion's policy is to buy reliable equipment rather than the cheapest equipment. Effective maintenance regimes are also very important.

Regular monitoring allows us to prioritise replacement and refurbishment based on the actual condition of equipment rather than just its age.

In addition to maintenance, Orion also continues to investigate how equipment is used and installed. We continually look for ways to improve our plant reliability. For example, Orion carries out thermal engineering checks of underground cables and has several initiatives to reduce problems experienced with metal-clad switchgear and associated terminations. Our approach to improving plant and equipment reliability also includes inspecting overhead lines and substations using state-of-the-art technology such as partial discharge tests, corona camera visual checks and infrared camera checks.

Sub-transmission 66kV oil filled cables create the most significant potential for catastrophic plant failure. Orion has identified that these cables have unsatisfactory joint systems and we have prioritised replacing the joints with ones which withstand greater buckling forces. This programme is 30% complete. Joints are being replaced as quickly as is practicable, given available resources and the need to avoid undue stress on neighbouring cables during the relatively long outages for the joint renewal work. The project is scheduled for completion by 2012.

Weather

Strong wind, heavy rain and lightning can damage equipment and interrupt power supply. Orion ensures it selects plant and equipment that can withstand most of the vagaries of our local climate.

Unlike overhead lines, underground cables are not usually affected by weather and other environmental factors. This is why, in partnership with our local councils, Orion spent approximately $2 million in the last year on putting cables underground. As more overhead lines are replaced by underground cables, fault rates from weather and the environment will fall. While desirable, it is unlikely that the rate of 'undergrounding' in urban areas will increase above current levels as it is very expensive and local councils must also consider other community projects that could utilise this money.

Orion also installs more line circuit breakers, continues to shorten feeder lengths and replaces existing bare conductors with covered conductors to reduce the effects of weather on its network.

As travelling time has a significant impact on the time it takes to repair faults, particularly in rural areas, we continue to expand our network's remote control capabilities. These allow us to restore electricity supply to customers at a quicker rate.

Trees

Keeping tree branches at a safe distance from overhead lines effectively reduces the number of faults on lines.

In 2005 new tree trimming legislation came into effect that established safe distances between trees and lines, established land owner's responsibilities for keeping their trees clear of lines and clarified network companies' rights to trim trees. We expanded our tree trimming programme following this much needed law change and currently spend around $1.9m each year on tree trimming.

Orion uses the services of qualified arborists to ensure that we carry out tree trimming in an environmentally responsible and safe manner.

Other

Approximately 25% of unplanned interruptions are due to causes other than those described above. Causes include vehicle accidents, wildlife and human error. Orion continues to examine the reasons for these interruptions and look for ways to reduce future incidences.

Risk management

Risk management is integral to how we manage our electricity distribution network – we have designed our network to cope with a range of potentially damaging effects, such as:

- natural disaster
- earthquakes
- storms
- network asset failure
- contaminants entering the environment.

We recognise that risk cannot always be eliminated, as natural disasters can take various forms and differ in severity. Where risk cannot be eliminated, we use emergency training, staff competency, safe work practices, planning and network design to control the level of risk. Detailed information on our risk management is contained in our published Asset Management Plan.

Primary risk for major assets

	ASSET	MAIN RISK
Cables	Subtransmission	Earthquake
	High voltage distribution	Earthquake
	Low voltage distribution	Earthquake
	Communication cables	Earthquake
Lines	Subtransmission	Storm
	High voltage distribution	Storm
	Low voltage distribution	Storm
Switchgear	Circuit breaker	Earthquake
	All insulated unit	Earthquake
	Oil switch	Earthquake
	Outdoor oil switch	Earthquake
Transformers	Ground mounted	Earthquake
	Pole mounted	Lightning
	With auto tapchanger	Earthquake
	Regulator	Earthquake
Arcillary equipment	Protection	Flooding

During the mid-1990s our network was part of a 'lifelines' study into how natural disasters would affect Christchurch. The study concluded that communication systems were important, and the airport and port needed to be available after the event. Electricity supply was deemed essential for almost all service authorities after a natural disaster, with most service authorities' head offices located in the central city area. A separate study on earthquake risk identified that older electrical substations (built prior to 1965) were particularly vulnerable to earthquake.

Since these studies we have:

- addressed communications risk at the two main communication sites serving Christchurch and surrounds – Sugarloaf and Marleys Hill. Generators now backup the primary network feed to these sites and we have replaced 'high risk' overhead supply lines with underground cable
- located an 800kVA generator in Lyttleton to mitigate any loss of power to the port
- improved security of power supply to the airport by installing a cable to allow power supply from both Harewood and Hawthornden district substations. Backup generation is also located on-site
- spent approximately $13m to install additional 66kV transmission capacity from a second point of supply, Bromley, to the central city. This cable, combined with numerous diesel generators around the city, gives the Christchurch CBD a more secure power supply than equivalent CBDs in Auckland and Wellington
- spent approximately $4.5m on earthquake strengthening for bridges, cable supports and buildings. All of our district substations and all major 33kV and 66kV cables now meet seismic structural standards. Around 98% of Orion owned network and district substations also meet the standards.

We continue to undertake regular risk studies to ensure that we remain well positioned for any disaster. We regularly contribute to emergency readiness programmes and our backup control centre is located off-site so we can continue to function if anything happens to our primary control centre (located in the first floor of our head office, to avoid flood risk).

In recent years, Orion has reduced the risk of a major asset failure through periodic in-the-field electrical testing of equipment (partial discharge testing), replacing joints between 66kV cables (to prevent the mechanical problems that can occur when cables expand as they warm up) and introducing more ripple injection plant around the network.

Enhancement initiatives

Orion's network enhancement initiatives are driven by three aims – to improve reliability, improve security of supply and reduce the risk of catastrophe.

Several major projects have been identified as necessary expenditure in the next year. The five largest projects (by expenditure) are explained below. More information on each can be found in Orion's Asset Management Plan, available on our website: www.oriongroup.co.nz.

The five largest (by expenditure) projects in the year to 31 March 2008

	$000
Middleton 33kV to 66kV conversion – convert the Middleton substation from 33kV to 66kV and increase capacity from 38MVA to 75MVA to meet load growth in Middleton and Sockburn. Shorten the existing 33kV feeder and redirect it to the Sockburn district substation.	4,800
Dunsandel substation – construct a new 66/11kV 10MVA substation near Dunsandel to provide additional capacity for the new Synlait milk powder plant. Final commissioning will occur next year with full operation of the milk powder plant expected in August 2008.	4,000
Brookside to Springston 66kV line – install a 66kV line from Brookside substation to Springston GXP. This line will increase security of supply for customers between Hororata and Springston GXPs to the south of the Selwyn River.	2,800
Motukarara 33kV upgrade – install a new 33kV bus and switchgear at Motukarara district substation as Banks Peninsula load during the holiday season and long weekends has now exceeded the firm capacity of the 33kV loop supply.	1,000
Belfast, Marshlands and Walters Road reinforcement – install additional 11kV feeders between McFaddens district substation and the general Belfast region to meet increased load growth in the short term and defer major investment in Belfast district substation.	1,054
	13,654

In addition, Orion will spend a further $24.5m in the next year on other capital expenditure projects that connect new customers, reinforce the network and replace ageing equipment. We will also spend over $18.5m on maintenance. More information on our capital expenditure and maintenance plans can be found in our Asset Management Plan.

A summary of the expenditure forecast to be spent on capital and maintenance over the next five years is shown below. No provision for inflation has been made in the figures.

	2008	2009	2011	2011	2012
Capital expenditure ($m)	38.1	31.7	31.1	29.4	44.2
Maintenance expenses ($m)	18.7	19.1	19.0	19.2	18.3

Orion's investment and maintenance expenditure is characterised by:

- increased expenditure in Christchurch city – due to urban growth/infill and Environment Canterbury's impending Clean Air Plan
- steady medium term investment in rural areas – to meet increasing irrigation load and housing developments in Rolleston and Lincoln
- increased capital expenditure in the longer term – to replace assets installed during the growth bulge of the 1960s which are now reaching the end of their service life
- general increase in the cost of maintenance (often above the rate of inflation) – mostly due to increasing compliance costs (particularly in relation to working on roads and safety) and increased consultation requirements (in relation to land access and equipment location)
- specific maintenance provisions for the replacement of older oil-filled cable joints
- increased building substation maintenance costs – due to rises in insurance premiums, graffiti removal and other items.

Orion's highest priority remains the continued cost-effective improvement of our network performance.

Glossary

CAIDI: an index which measures the average duration of interruptions to supply for customers that have experienced an interruption to supply, in a year.

Capacity utilisation: a ratio which measures the utilisation of transformers in the system. Calculated as the maximum demand experienced on an electricity network in a year divided by the transformer capacity on that network.

Conductor: includes overhead lines which can be covered (insulated) or bare (not insulated), and underground cables which are insulated.

Distribution transformer: a device that changes voltage up to a higher voltage or down to a lower voltage.

District substation: a major building substation and/or switchyard with associated high voltage structure where voltage is transformed from 66 or 33kV to 11kV, two or more incoming 11kV feeders from a grid exit point are redistributed or a ripple injection plant is installed.

Fault: an electricity supply outage caused by an unplanned event (eg. weather, trees). Faults do not include electricity supply outages caused by planned events (eg. planned maintenance).

Feeder: a physical grouping of conductors that originate at a district substation and supply a number of customers.

Grid exit point: a point where Orion's network is connected to Transpower's transmission network.

Interruption: an electricity supply outage caused by either an unplanned event (eg. weather, trees) or a planned event (eg. planned maintenance).

High voltage: voltage exceeding 1,000 volts, generally 11,000 volts (known as 11kV).

Line circuit breaker: a device which quickly cuts off power to a line after a fault so that no permanent damage is caused to the line. It switches power back on to the line after a few seconds if the cause of the fault has gone (eg. a branch has blown off a line).

Low voltage: voltage not exceeding 1,000 volts, generally 230 or 400 volts.

Maximum demand: the maximum demand for electricity during the course of the year.

Network deliveries: total energy supplied to our network through Transpower's grid exit points. Usually measured as energy supplied over the course of a year.

Network substation: a building substation which is part of the 11kV network and provides protection to connected cables and overhead lines.

Outage: when supply of electricity fails.

Ripple control system: a system used to control the electrical load on the network by, for example, switching load such as domestic water heaters off, or signalling to large users that they are in a high price period (thereby encouraging them to use as little power as possible during that time).

Rural: the rural network covers all areas other than Christchurch city and includes rural towns.

SAIDI: an index which measures the average duration of interruptions to supply that connected customers experience in a year.

SAIFI: an index which measures the average number of interruptions to supply that connected customers experience in a year.

Transpower: the state owned enterprise that operates New Zealand's transmission network. Transpower delivers electricity from generators to various networks around the country.

Urban: the urban network largely covers Christchurch city.

Verified voltage complaint: a complaint from a customer concerning a disturbance to the voltage of their supply which has been proven to be caused by the distribution company.

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DEPUTY CHAIRMAN

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Don Elder

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Bill Heaps

Gail Sheriff

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GENERAL MANAGER COMMERCIAL

Craig Kerr
GENERAL MANAGER INFORMATION SERVICES

John O'Donnell
GENERAL MANAGER INFRASTRUCTURE

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APPENDIX 2

Pricing Guide

PRICING GUIDE

A guide to Orion's pricing for **2007/08**

Orion
your NETwork

About Orion

Orion New Zealand Limited owns and operates the electricity network in central Canterbury between the Waimakariri and Rakaia rivers, and from the Canterbury coast to Arthur's Pass. Our network covers 8,000 square kilometres of diverse geography, including Christchurch city, Banks Peninsula, farming communities and high country.

Our shareholders are:

Christchurch City Council 89.3%
Selwyn District Council 10.7%

Further information on Orion is available from our:

- Website (oriongroup.co.nz)
- Annual Report
- Asset Management Plan – a document detailing Orion's asset replacement, reinforcement and maintenance strategies over the next 10 years
- Network Quality Report – a report that examines Orion's performance at providing a reliable electricity distribution system.

Network summary for year ended 31 March 2007	
Number of customer connections	184,000
Network maximum demand (MW)	630
Electricity delivered (GWh)	3,287
Total kilometres of lines and cables	14,190
Asset value (as at 31 March 2006)	$735m

2 Introduction

3 Pricing highlights

5 The electricity industry

7 Our pricing philosophy

8 How we price

10 Residential and small business pricing

12 Irrigation pricing

14 Major customer pricing

15 Retailer pricing options

16 Payment for embedded generation

Introduction

Welcome to the third edition of Orion's Pricing Guide. We publish this guide each year to help our customers understand our prices and compare our prices with those of other electricity distributors in New Zealand. We hope this guide will also help you to better judge our overall performance.

Extensive consultation tells us that customers want us to deliver electricity reliably and keep prices down. In order to meet this expectation, we need to find the right balance between costs for customers and network investment. Our success in achieving this balance is reflected in our prices, which are below average, and in our ranking as one of the most reliable electricity networks in the country.

This guide only describes Orion's prices – we do not attempt to describe the pricing of other industry participants such as electricity generators, Transpower or electricity retailers. Orion's prices typically amount to around 30% of a household's electricity bill.

As this guide is a plain English attempt to explain our pricing methodology, some technicalities are not covered. A fuller explanation can be found on our website: www.oriongroup.co.nz.

We hope you find this report of interest and we welcome any comments you may have on it or any other aspect of Orion's performance. Comments can be emailed to comments@oriongroup.co.nz.

Roger Sutton
CHIEF EXECUTIVE OFFICER

Pricing highlights

Five key principles guide us in our pricing:

- We aim to make a rate of return that is appropriate for the commercial risk of our business.

  Our rate of return typically results in Orion's prices being below average (compared with other New Zealand electricity distributors) even though we provide one of the most reliable electricity networks in the country.

- We try to let customers know what it costs to deliver electricity to them at different times of the day and year.

  For example, we believe customers should be aware that it typically costs more to deliver electricity to them at 5pm on a winter evening than at midday on a summer day.

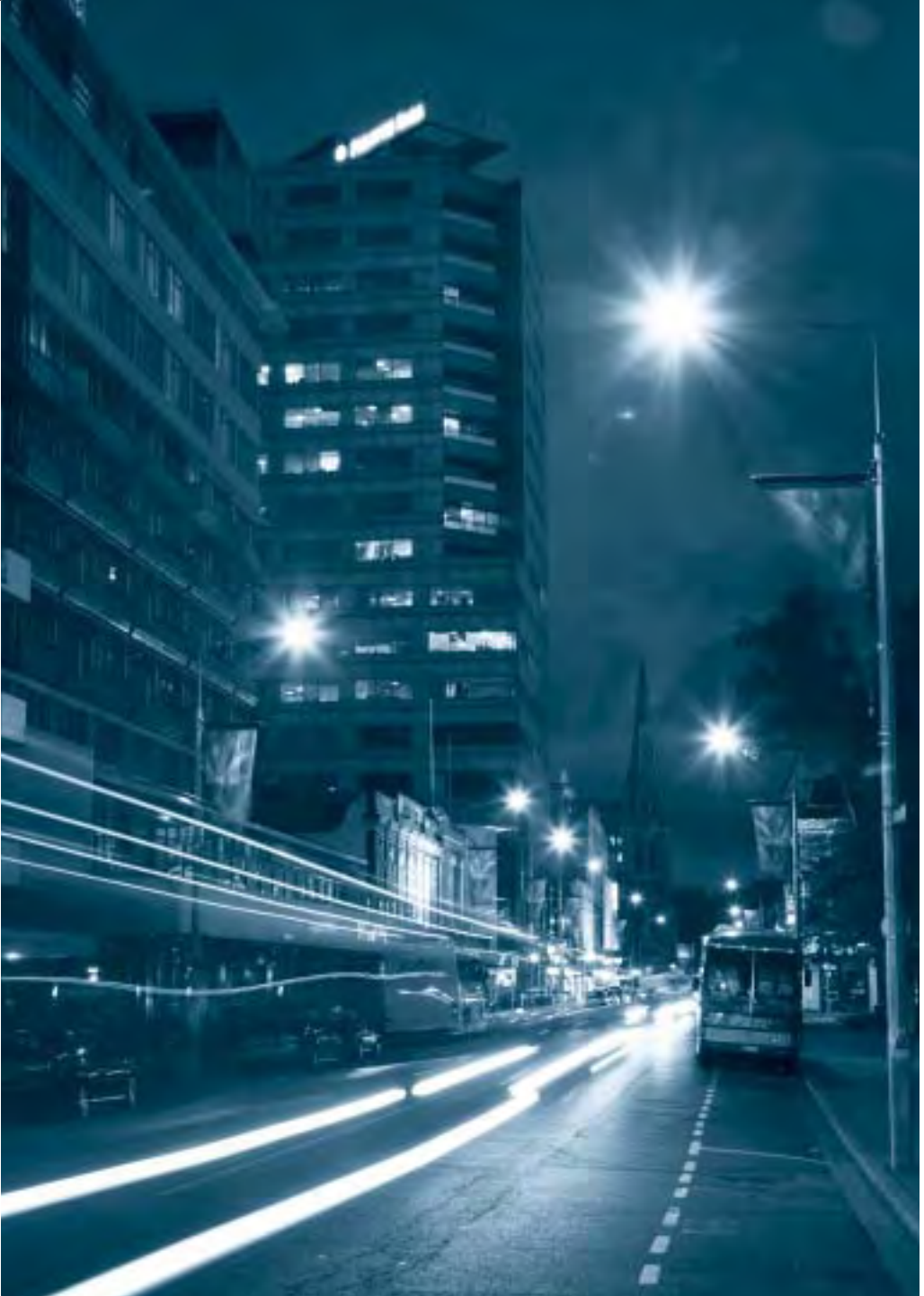
- We give customers the opportunity to significantly reduce their electricity costs, if they reduce their electricity usage when our costs are high.

  We send a 'signal' to customers to let them know when it costs us more to deliver electricity, providing the opportunity for customers to reduce the amount of power they use, if they wish. By doing so, customers can save money and help the environment.

- Unlike many electricity distribution companies, we do not include a fixed per day charge in our pricing to customers[1].

- Our pricing does not differentiate between rural and urban customers.

[1] Except in our pricing to major customers, who do have a fixed charge per day. Of the 184,000 connections on our network, approximately 400 are classified as major customer connections. Major customer pricing is explained in more detail on page 14.



The electricity industry

A basic understanding of New Zealand's electricity industry is required to understand how we set our prices. Power usually moves through five steps to get from where it's generated to where it's needed. The steps below show how electricity is moved through the various stages to get to you.

Generators

Generators produce electricity. All electricity generated for retail purposes in New Zealand is sold into the wholesale electricity market for supply to electricity retailers. Several private and government owned companies are generators – they include Contact Energy, Genesis Power, Meridian Energy, Mighty River Power, Todd Energy and TrustPower. Most generators are also electricity retailers.

Transpower

Transpower is the state-owned enterprise responsible for transmitting the electricity produced by generators. It operates the national grid of high voltage power lines and tall pylons that connects to the power stations to send electricity around the country.

Distributors

Also called lines companies or network companies, distributors own the lower voltage power lines and distribution networks in local areas. These connect to the national grid to deliver power to businesses and homes.

Orion is one of 28 electricity distributors in New Zealand.

Retailers

Sometimes referred to as power companies, electricity retailers purchase electricity from the wholesale market to sell to residential and business users.

Six electricity retailers operate in central Canterbury – Contact Energy, Genesis Power, Meridian Energy, Mighty River Power, Simply Energy and TrustPower.

Customer usage

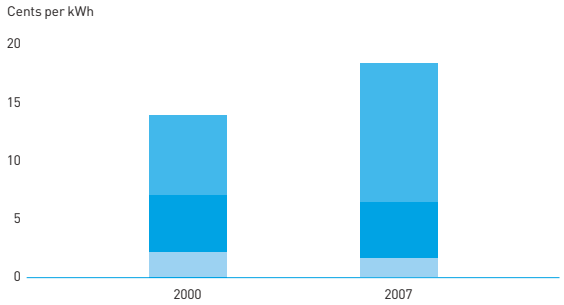
The last step in the process is providing power to your home or business. You can buy electricity from any retailer in your area.

Aviemore Power Station pictured above, image provided by Meridian Energy.

The electricity bill you receive each month covers the cost of:

- generating the electricity
- transmitting the electricity
- distributing the electricity
- retailing services, including metering costs.

This Pricing Guide details how we determine Orion's charges for distributing electricity via our network (the third bullet point above). It does not discuss the charges of other industry participants. In particular, it does not detail Transpower's charges for transmitting electricity (the second bullet point above), which are charged to Orion and are then passed on to customers in a different form.



Breakdown of the 2000 and 2007 residential electricity price

Retail and generation Orion Transpower

Source: Schedule of Domestic Electricity Prices, Ministry of Economic Development

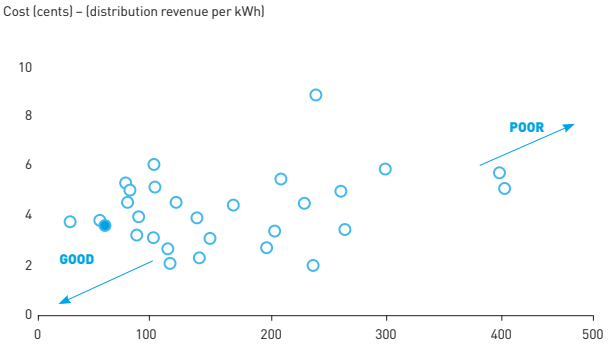
Our pricing philosophy

Like roads, electricity networks have limited capacity. Orion's 'rush hour' typically occurs on very cold winter evenings when people arrive home from work and turn on their lights and heaters. If electricity demand gets too high during this period we run the risk of power cuts.

One solution is to expand our network's capacity – much like making roads bigger to handle the traffic. But this is very expensive and we would have to increase our prices to cover the cost. We think it makes better sense to promote other cheaper options – for example, during periods of high or 'peak' electrical demand, we use 'ripple control' to turn off household electric hot water cylinders automatically. Turning the cylinders off reduces the congestion on our network.

We also use 'price signals' that reflect the significant investment that would be required to expand our network's capacity. By price signals we mean charging higher prices during periods of high electricity demand and lower prices during low demand periods. This approach leads electricity retailers to encourage their household and business customers to turn off non-essential appliances while the network is heavily loaded.

Our pricing structure is designed to reflect the actual cost of delivering electricity across our network. This structure results in savings to end users who reduce their load during peak demand periods, encourages greater energy efficiency and minimises environmental effects[2]. Our primary business objective is to keep prices low for customers while still providing our community with the quality of electricity supply it requires. Our pricing philosophy of charging higher prices during periods of high electrical demand helps us to achieve that goal.



How we perform at delivering a reliable supply of electricity at low cost

Orion Other New Zealand electricity distribution companies

Source: New Zealand Gazette notices, information disclosures for line businesses.

[2] As a result of our efforts to reduce peak electricity demand in our network over the last 15 years, Orion has won numerous environmental awards, including New Zealand's highest environmental award for businesses – the Green Ribbon 'Business Caring for the Environment Award'. By reducing peak demand we have saved the use of many thousands of tonnes of aluminium, steel and copper.

How we price

Orion's approach to pricing is that if customers choose to use electricity when the network is heavily loaded, then they should pay a premium over and above the normal price. We can then use this premium, or extra revenue, to upgrade our network.

However, if a customer avoids using electricity during peak demand times, we receive no additional revenue and we don't have to spend millions of dollars expanding our network's capacity unnecessarily. The customer could also save money by not using higher priced electricity.

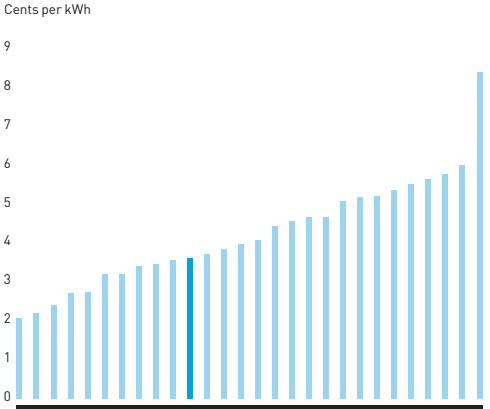
Working out how much extra to charge customers during periods of high electricity demand is quite complicated. Some parts of our network cost more than others, and varying parts are used to deliver electricity to each of our more than 184,000 individual customer connections. Individual customer pricing is therefore not feasible.

To recognise the key differences in the use and cost of our network, we separate customer connections into various categories for pricing as follows:

- residential and smaller business connections in areas where maximum electricity use is in winter – these areas are classified 'Zone A' and include Christchurch city
- residential and smaller business connections in areas where maximum electricity use is in summer – primarily rural areas where summer irrigation occurs, classified 'Zone B'
- major customers – businesses that are major electricity consumers; Orion has lower prices for these companies because it costs less to deliver lots of energy to one place than it does to deliver the same amount of energy to hundreds of places
- farms with large irrigation requirements
- outside lighting – a price for district and city councils for the cost of delivering electricity to their thousands of street lights[3].

[3] As street lighting is a unique type of electricity connection we do not discuss its pricing elsewhere in this guide.

It is very difficult to compare our prices with other New Zealand electricity distribution companies because they use different customer price groupings to ours. One of the best price indicators available is shown in the graph below.



Orion's position relative to other New Zealand network companies – distribution revenue per unit (kWh) 2006

Source: New Zealand Gazette notices, information disclosures for line businesses 31 March 2006.

Considering our proven track record in delivering electricity consistently and reliably (see our Network Quality Report which shows Orion's performance in this area ranks among the best in the country), we believe our pricing compares very favourably with other New Zealand electricity distributors.

Furthermore, our pricing covers a cost that, to the best of our knowledge, no other electricity distributor incurs. Most other distributors maintain electrical equipment up to the boundary of a property – beyond the boundary it is the property owner's responsibility. Orion however commits to maintaining the lines, poles and all other electrical equipment right up to the point of entry to a house or business building[4]. We do this regardless of whether the electrical equipment between the boundary of the property and the building is owned by Orion, the property owner or some other third party. Orion maintains this policy as we wish to provide our community with the best possible service. This policy helped us to restore power quickly after the severe snow storm that hit Canterbury in June 2006. Power was restored to the 8,000 affected rural customers within five days, and our staff and contractors could then help neighbouring electricity networks with their ongoing restoration efforts.

[4] This service covers fair wear and tear, including storm damage, but does not cover damage caused by the customer or a third party. Further information on this service can be found in section 4.7 of our Network Code which is available on our website: www.oriongroup.co.nz.

Residential and small business pricing

Two features make our pricing for residential and small business customers (Orion calls these customers 'general connections') quite different to that of other electricity network companies:

- In 2001, we became the first distribution company in New Zealand to remove fixed 'per day' charges for general connections. While retailers still charge residential and small business customers a 'per day' charge, this is not a result of Orion's pricing structure.
- We do not charge each home or business individually. Instead, we charge retailers for the total electricity used by all their residential and small business customers combined.

  We do this by charging retailers for the:

  - total amount of electricity that comes into our network from the Transpower grid[5] and from embedded generation[6]
  - less the amount of electricity our major customers use.[7]

  The result represents the total electricity consumed by homes and small businesses.

Charging retailers for their customers' combined electricity use, rather than charging each home and business separately, has several advantages:

- Instead of calculating charges for approximately 184,000 individual connections on Orion's network, we only have to invoice the six electricity retailers operating in our region – Contact Energy, Genesis Power, Meridian Energy, Mighty River Power, Simply Energy and TrustPower. This process is considerably cheaper and therefore results in lower costs for the customer.
- The majority of households and small businesses have a one or two-register electricity meter. One-register meters record the total electricity use at that connection, while two-register meters record day-use on one register and night-use on another register.

  Because these meters have limited recording abilities, only limited pricing information can be passed on to the majority of customers. A customer can't be charged one price at 3pm, then another price at 5pm and a third price at say 7pm.

  In contrast, the meter systems at Transpower grid exit points (where electricity is transferred from the national transmission grid to Orion's distribution network) measure electricity throughput every half hour. This allows Orion to charge retailers different prices every half hour. We utilise this facility to charge retailers a higher price during high electricity demand periods.

  This encourages retailers to install more sophisticated meters at homes and businesses so that they can pass on to their customers the higher prices they incur at peak times as well as the lower prices available during non-peak times.

We are pleased to see that Arc Innovations Limited (a subsidiary of Meridian Energy) plans to roll-out up to 120,000 new 'smart meters' to Christchurch households. These meters could lead to 'time-of-use' pricing for domestic customers as smart meters can identify electricity consumption in more detail than conventional meters. Smart meters provide an economical way of measuring when energy is used, allowing different prices for consumption based on the time of day and the season. Customers can be better informed about their energy use, and can alter their patterns of use to take advantage of cheaper prices at different times of the day and night.

[5] The points where electricity leaves the Transpower transmission grid and enters the Orion distribution network are known as 'grid exit points' (GXPs). There are 14 GXPs on Orion's network.

[6] Generators located at a home or business which are capable of generating electricity for use at that home or business, and which may also be capable of putting surplus electricity back into our network, are known as 'embedded generation'. Embedded generation is outlined in more detail on page 16.

[7] Including electrical losses associated with delivering electricity from the GXP to these customers.

Our pricing structure for general connections has two components – a 'capacity price' and a 'peak price' – each of which we charge to retailers.

Orion's general connection distribution prices as at 1 April 2007 (excluding GST)

Capacity price	
For general connections in Zone A (urban)	
7am to 9pm on working weekdays	4.494 cents/kWh
9pm to 7am and on weekends or public holidays	0.532 cents/kWh
For general connections in Zone B (rural)	
During winter (Apr to Sept)	
– 7am to 9pm on working weekdays	4.494 cents/kWh
– 9pm to 7am and on weekends or public holidays	0.532 cents/kWh
During summer (Oct to Mar)	2.117 cents/kWh
Peak price – both zones	$100.53 per kVA per annum
Note: These prices exclude Transpower's charge for transmission.	

The capacity price component is simply a price for the amount of electricity used, but is charged at differing 'cents per kWh'[8] depending on the 'zone', month and time of day. We generally charge less at night to encourage retailers to, in turn, encourage households and businesses to use their appliances at night when our network has lighter loads.

The revenue received by Orion from the capacity component covers many of the costs that we incur regardless of how much electricity is being used at any particular time.

The peak price component recovers our load dependent costs and also lets retailers know the expense we will incur (which will ultimately be passed onto homes and businesses) if we need to expand our network's capacity. This price is only charged during periods of high load on our network. We call these periods 'peak periods'[9]. On average, peak periods occur for around 150 hours during winter in Zone A (urban) and during summer in Zone B (rural). The peak charge is based on the average demand during peak periods.

During a peak period, a customer's electricity use effectively costs around 80 cents/kWh. This compares to a cost of around 0.5-4.5 cents/kWh during non-peak period times.

Charging high prices during peak periods encourages retailers to persuade their customers to reduce their electricity consumption during electrical 'rush hours'. This reduces the need for us to expand our network's capacity through building extra power lines.

[8] The kilowatt-hour (kWh) is a unit of energy equivalent to one kilowatt of power expended for one hour of time. The kWh is commonly used in electrical applications.

[9] Just when a peak period occurs is determined by the 'load threshold setting' in our ripple control system, which is determined in consultation with retailers. Please refer to our website: www.oriongroup.co.nz for more information on how a peak period is determined.

Irrigation pricing

Irrigation connections are a subset of general connections in Zone B (rural), where there is an irrigation pump motor with a rating of at least 5kW which is only used for pumping water. Some special pricing arrangements apply for irrigation connections:

1 A rebate for 'capacitors'

The overhead power lines that are typical in rural electricity networks cause voltages to drop – principally because of the long lengths of these wires. If voltages drop too low, the quality of electricity supplied to rural homes and businesses can suffer. To reduce the impact of irrigation loads on this voltage drop, farmers must install capacitors[10] on their pump motors. Orion credits the irrigation customer's retailer with a rebate for the installation of these capacitors.

2 A charge based on the 'nameplate rating' of pump motors

Some irrigation connections that have been on our network for a number of years have an alternative price whereby they are charged according to the nameplate rating of their pump motors[11]. This pricing arrangement is not available to new irrigation customers.

3 A rebate if we can interrupt the power supply

Orion will credit a rebate to the retailers of irrigators who are prepared to accept occasional interruptions to their power supply in the event of an emergency.

Examples of emergencies include:

- a car hitting a pole causing a fault on our network
- failure due to an overheated transformer
- a capacity shortage on Transpower's grid that affects Orion's ability to supply power.

The rebate is designed to reduce the need for Orion to invest in additional and costly back-up systems. It means that, in the event of a fault, Orion can interrupt the supply of electricity to irrigation systems and divert any available power to more essential electrical loads such as dairy sheds and rural homes.

Irrigators are otherwise charged the same prices as general connections. Further details of irrigation prices can be found on our website: www.oriongroup.co.nz.

[10] A capacitor is a device that is fitted to improve the power factor of an installation and reduce voltage drop.

[11] Nameplate rating is the output of the pump motor as specified by the manufacturer.

Major customer pricing

Of the 184,000 connections on our network, approximately 400 are categorised as major customer connections. While major customers make up only 0.2% of our customers by number, they use around 25% of the total electricity that we deliver over our network.

To qualify as a major customer, a business needs to have a maximum demand for electricity of at least 250kVA[12]. This total compares to the maximum electricity demand of a typical house of about 10kVA.

These large customers can choose between Orion's general connection pricing and major customer pricing.

Major customer pricing has four components:

- a customer-specific charge for Orion's equipment that is dedicated to delivering their electricity
- a fixed per annum price for their connection(s)
- a 'control period demand' price of $83.26 (excl GST) per kVA of demand they incur during control periods[13]
- an 'assessed capacity' price of $25.50 (excl GST) per kVA of their assessed capacity[14].

We do not charge major customers a 'cents per kWh' charge. Instead we have two charges – the control period demand charge and the assessed capacity charge. These 'peak charges' are based on the major customer's contribution to our peak network loads and their own maximum power demands in the previous 12 months. This provides major customers with some cost certainty and Orion with some revenue certainty.

During periods of high electricity demand, Orion uses ripple control signals to communicate to major customers that they are in a high price period.

These signals give them the opportunity to reduce their electrical use through such means as turning off boilers, turning off freezers and running generators. This in turn reduces their following year's chargeable kVA demands and minimises their future power bills.

If a major customer responded to Orion's pricing signals by turning off their entire electrical load during control periods it would reduce their following year's charges from Orion by around 75%. Even modest efforts to reduce electrical load during control periods can result in significant savings for major customers.

Many of Orion's major customers respond to our pricing signals. A good example is a local hotel which has, as a result of our control period pricing, invested over $150,000 in an energy management system and a diesel generator. Its investment in this technology was paid back in around three years through savings in ongoing electricity purchase costs, as a result of Orion's pricing.

[12] A kilovolt-amp (kVA) is 1,000 volt-amps. A volt-amp is the measurement of electrical power that is computed by multiplying volts by amps.

[13] Control periods are similar in concept to general connection peak periods, with control periods being those hours with the very highest demand on our network. There are typically about 80-100 hours of control period per annum.

[14] Assessed capacity is calculated annually for each major customer as the average of their 12 highest kVA demands during the previous 12 months on working days between 7.30am and 8.30pm.

Retailer pricing options

Orion's charges for distributing electricity to homes or businesses are just one of many costs retailers pass on in their bills to customers. The other costs are:

- the cost of generating the electricity
- Transpower's cost for transmitting the electricity
- the retailer's own costs to produce each electricity bill, process money received and communicate with existing and potential customers.

Retailers look at all of these costs, and return on investment requirements, and 'rebundle' them into various pricing plans, which they then use to charge residential and business customers.

Six retailers supply customers on Orion's network. Because they have different pricing plans it is not always easy to know which retailer's plan is best in the individual circumstances.

One way of saving money is to consider whether you would be prepared to accept the occasional interruption to part of your electricity supply. For example, retailers usually offer cheaper prices if you are willing to accept interruptions to electricity powering your hot water cylinder.

Cheaper pricing plans are also often available if you:

- do not use much electricity (less than 8,000kWh per annum)
- are willing to have a two-register meter and do some household activities after 9.00pm (such as clothes washing, running the dishwasher or water heating).

Not only do these measures deliver savings to households, they also help Orion. They transfer demand for electricity to times of the day or night when our network load is lighter and reduce the need for us to expand our network's capacity.

For detailed information about retail pricing, including how to work out which retailer's pricing plan is the cheapest for your home or business, we recommend you visit the Consumers' Institute website: www.consumer.org.nz.

Payment for embedded generation

As well as encouraging electricity users to use less electricity during peak demand periods, our prices also encourage reliable 'embedded generation' within our network.

Embedded generators, also known as 'distributed generators', are generators located at a home or business which are capable of generating electricity for that home or business's own use. They may also be capable of putting surplus electricity back into our network. These generators can take many forms; diesel generators, wind turbines and solar panels are the most common.

Embedded generators that reliably and consistently respond when Orion's network is heavily loaded assist Orion in two main ways:

- they add security to our community's electricity supply
- they delay the need for us to expand our network capacity by supplying electricity close to where the power is consumed.

Orion passes on to retailers the financial benefits of pre-approved small scale reliable embedded generators (less than a 5kVA rating) that generate electricity during our periods of high network loading. Retailers can then pass on these Orion savings to the owners of the generators. Other benefits apply for medium and large scale reliable embedded generators.

Not all network companies in New Zealand pay for embedded generation. However we believe reliable embedded generation should be encouraged as it makes our community's electricity supply more secure.

While we encourage embedded generation, one of our key pricing principles is to ensure that one group of customers does not subsidise any other group of customers. Consequently, if an embedded generator imposes costs on Orion – for instance a wind turbine is erected away from our existing network and we need to build new lines to connect the turbine to our network – then we will seek to recover those extra costs from the customer who owns the turbine. This practice ensures that established customers do not cross-subsidise new customers.

Orion also credits customers who run their generators in response to an 'emergency signal' from Orion. This arrangement is separate from our other pricing arrangements, and is used sparingly in emergencies or in extreme weather conditions to lessen interruption to hot water supply.

Further information on embedded generation can be found on our website: www.oriongroup.co.nz.

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Craig Kerr
GENERAL MANAGER INFORMATION SERVICES

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APPENDIX 3

Summary Asset Management Plan

ASSET MANAGEMENT PLAN

Summary of a 10 year management plan for Orion's electricity network
from 1 April **2007** to 31 March **2017**

Orion
your NETwork

About Orion

Orion New Zealand Limited owns and operates the electricity network in central Canterbury between the Waimakariri and Rakaia Rivers, and from the Canterbury coast to Arthur's Pass. Our network covers 8,000 square kilometres of diverse geography, including Christchurch city, Banks Peninsula, farming communities and high country.

We transport electricity from nine Transpower grid exit points to more than 184,000 homes and businesses. Orion charges electricity retailers for this delivery service, and electricity retailers then on-charge homes and businesses. Retailers also charge customers for the cost of generating electricity plus a retail charge.

Orion's charges typically amount to less than 30% of a household's electricity bill.

Our shareholders are:

- Christchurch City Council 89.3%
- Selwyn District Council 10.7%

Further information about Orion is available from our:

- Website (www.oriongroup.co.nz)
- Annual Report
- Network Quality Report – a report that examines Orion's performance at providing a reliable electricity distribution system
- Pricing Guide – a guide to help customers understand our prices and how they compare with those of other electricity distributors

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4 Our network
5 Asset management process
6 Optimal asset management
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Introduction

Welcome to this summary of Orion's asset management plan (AMP). Our AMP is fundamental to how we operate. It details how we plan to build, maintain and reinforce our electricity distribution network over the next 10 years. Our full AMP is available on our website: www.oriongroup.co.nz.

The foundation of our AMP is our customers' views on the quality of service that they prefer. Extensive consultation tells us that customers want us to deliver electricity reliably and keep prices down. To meet this expectation we need to find the right balance between costs for customers and network investment. Our success in achieving this balance is reflected in our prices, which are below average, and in our ranking as one of the most reliable electricity networks in the country.

Our AMP also takes into account current service levels and the valuable insights of our experienced employees. Our people know our network and are central to effective planning.

We were very pleased with the results of a 2006 Commerce Commission review which rated our AMP as one of the best in the country. The Commission's report was prepared by Australian consultants Farrier Swier and ranked our AMP highly in terms of regulatory compliance and overall asset management planning best practice. This result reflects our continual focus on improvement. Several suggestions from the review were implemented in our AMP commencing 1 April 2006 and we incorporate further improvements in this year's AMP.

This summary identifies some of our main considerations as we manage and plan the future of our electricity network. We hope you find it informative and we welcome your comments on our AMP or any other aspect of our performance. Comments can be emailed to comments@oriongroup.co.nz.

Roger Sutton
CHIEF EXECUTIVE OFFICER

Purpose of our AMP

The overall objective of our AMP is to provide, maintain and operate our electricity network while meeting agreed levels of service, quality, safety and profitability.

This year's AMP looks ahead for 10 years from 1 April 2007, with the main focus on the first three to five years – for this period most specific projects have been identified. Beyond this period, analysis is more indicative.

We created our first AMP in 1994 and have since developed it to comply with the Electricity Information Disclosure Requirements 2004[1]. Our AMP is also a technical tool that goes beyond our regulatory requirements. The extensive detail in our AMP is used on a day-to-day basis by our employees and demonstrates responsible stewardship of our network assets on behalf of our community.

Our AMP focuses on 'optimising the lifecycle costs' for network assets (including construction, operation, maintenance, renewal and disposal of assets) to meet agreed service levels and future electricity demand. In other words, we consider all costs throughout the life of a network asset (including upfront and maintenance costs as well as indirect costs such as electrical losses[2]) and aim to maintain and operate a cost-effective network to meet our customers' needs.

Each year we aim to improve our AMP to take advantage of new information and changing technology. Our continued innovations help us to maintain our ranking as one of the most reliable and efficient electricity networks in the country.

In this summary we outline the main considerations, principles and strategies that influence how we manage our electricity network. We also list the major capital expenditure projects which we plan to complete over the next 10 years. The detail behind this summary can be found in our full AMP, available on our website: www.oriongroup.co.nz.

[1] A summary of the links between these regulatory requirements and our AMP is shown in Appendix B of our full AMP.

[2] See page 21 of this summary for more information on electrical losses.

Our network

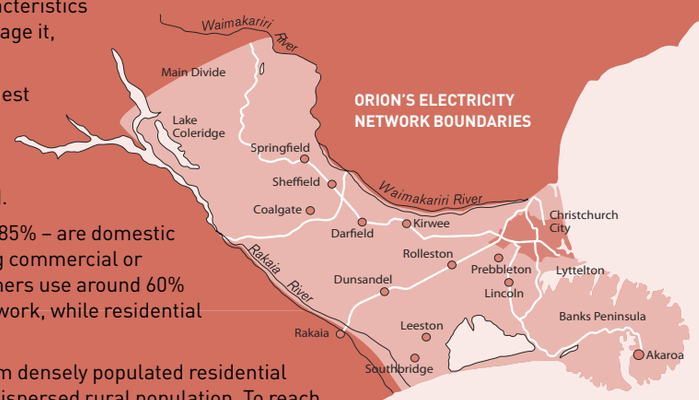
The geographical and historical characteristics of our network influence how we manage it, as does growth in electricity demand.

We operate one of New Zealand's largest electricity distribution networks. We distribute electricity to more than 184,000 customers over 8,000 square kilometres in the central South Island.

The majority of our customers – over 85% – are domestic households, with the remainder being commercial or industrial premises. Business customers use around 60% of the electricity delivered via our network, while residential customers account for the other 40%.

Our network covers a varied area, from densely populated residential neighbourhoods through to a widely dispersed rural population. To reach all of our customers, we manage a sophisticated network of electrical assets, load control equipment and computer systems.

Our network is continually growing. In the last few years increased irrigation in Canterbury's rural districts and high levels of construction activity in urban areas have created strong growth in electricity demand. Growth in maximum electricity demand is the principal driver of our network investment.



NETWORK SUMMARY AS AT 31 MARCH 2007	
Number of customer connections	184,000
Network maximum demand (MW)	630
Electricity delivered (GWh)	3,281
Total kilometres of lines and cables	14,190
District/zone substations	49
Distribution/network substations	10,254
Capital expenditure	$40.0m (forecast in year to 31 March 2008)
Network maintenance expenditure	$18.7m (forecast in year to 31 March 2008)
Value of network assets	$900m

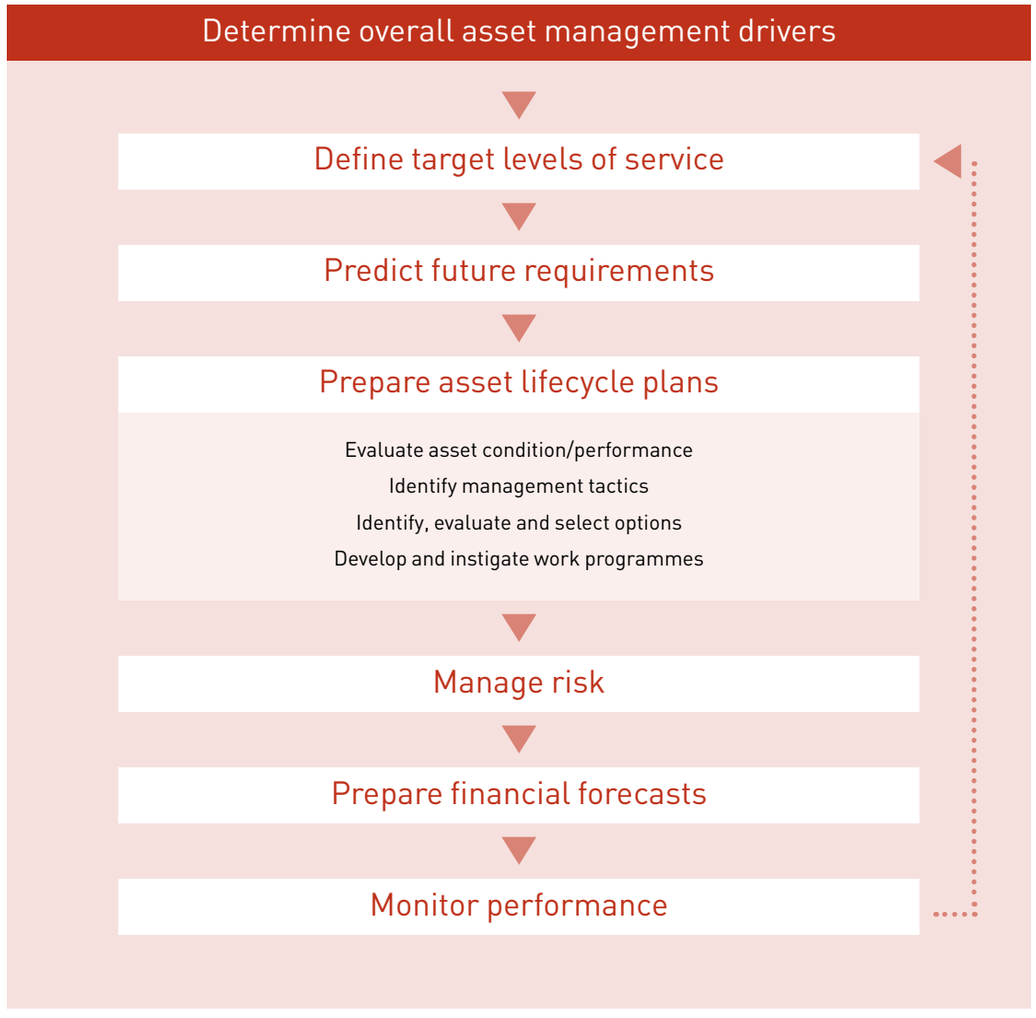
Over the last five years[3], our electricity distribution network has been one of the most reliable in New Zealand and our operating costs have been 20% below the New Zealand average. To ensure we remain an industry leader we continually look at ways to cost-effectively improve our network performance.

A comprehensive list of our asset quantities is available in section 1.8 of the background and objectives section of our full AMP. Section 4 of our full AMP gives more detail about various network components.

[3] To 31 March 2006. This is the latest available date to which comparisons to other networks can be made.

Asset management process

The following diagram illustrates our asset management process:

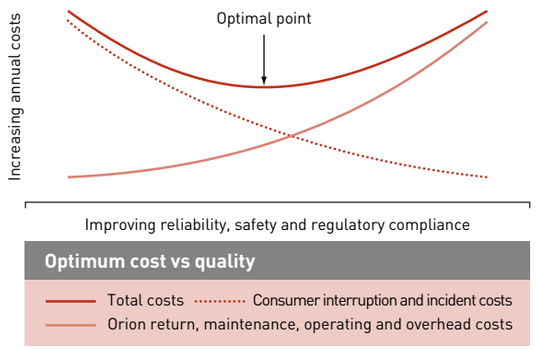


Optimal asset management

We aim to manage our network assets to the best of our ability to achieve excellent outcomes for our community. Our AMP outlines how we plan to accomplish optimal results.

Optimal investment

Our underlying asset management principle is that the 'optimum point of investment' is achieved when the value of spending more on our network would exceed the value of benefits to customers. This concept is illustrated in the following diagram.



Put simply, we need to find the right balance between costs and the standard of our electricity delivery service. We seek to achieve this optimal point by applying economic analysis when we develop and review our asset management practices.

Optimal regulation

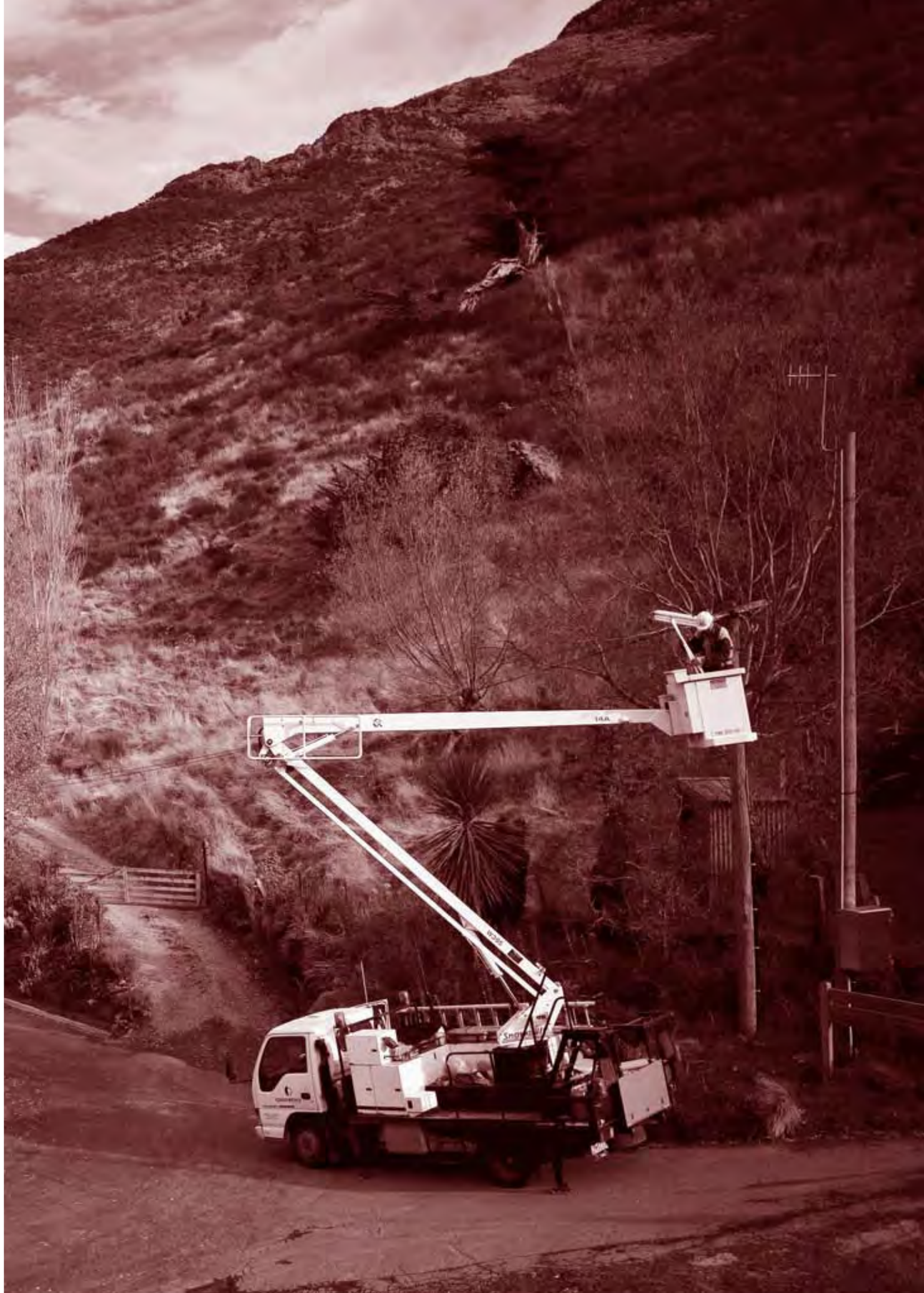
To achieve optimal outcomes, we also commit significant resources to participate actively in the consultation phase of national rules and regulations. It is important that rules and regulations that affect our industry are well-informed, principled and practical.

Optimal technologies

The speed at which new asset and systems technologies become available has increased in the last decade. We welcome these new initiatives and are committed to keeping up-to-date with technological advancements. In line with our 'optimal point' approach above, we introduce new technology only when it results in an economic balance of cost and network performance.

The following technologies are being assessed or have been introduced to our network recently:

- a 'resonant earthing system' to improve the safety and reliability of our rural network
- 'corona' and 'thermal imaging' cameras to identify the need for preventative maintenance
- a sophisticated outage management system to improve our planning and real-time response to power outages
- a new geographical information system to improve planning and operational efficiencies.



Key targets and performance measures

Feedback from our customers and stakeholders helps us to determine how well we manage our network to meet agreed levels of service and quality. Regular price/quality surveys and consultation show our customers are generally happy with our service.

We also measure our asset management against 'key asset management drivers' – a series of important factors that influence how we manage our network and plan for the future. The table below shows these key targets (safety, customer service, environmental responsibility and economic efficiency) and how we measure our performance against them. We explain these targets in more detail below.

Key asset management driver	Measure (per annum unless otherwise stated)	Target level of service	Level of service for the year ended 31 March 2007*	Performance indicator	Performance measurement procedure
Safety	Safety of network assets	Zero	Zero	Number of injuries/ accidents	Accident/incident reports
Customer service	SAIDI[4]	<63	150	Figures published in accordance with the Electricity Information Disclosure Requirements 2004	Faults statistics exclude low voltage faults and faults with a duration of less than one minute.
	SAIFI[5]	<0.76	0.68		
	CAIDI[6]	<83	222		
	Faults/100km of circuit	<11	8.7		
	Voltage complaints (proven)	<70	28	Non compliances	Tracking of all enquiries
	Harmonics (wave form) complaints (proven)	<2	Zero	Non compliances	Checks performed using an harmonic analyser
Environmental responsibility	PCBs (persistent organic pollutants)	Zero	Zero	Not applicable	Not applicable
	SF_6 gas	<1% loss	<1% loss	Identification of environmental problems	Environmental spill/loss report
	Oil spills (uncontained)	Zero	Zero		
Economic efficiency	Capacity utilisation	<33%	38%	% utilised	Maximum demand/ transformer capacity
	Load factor		60%	% utilised	Average load/peak load

* Unless otherwise stated all level of service and reliability figures used in this summary are based on Orion's network only. They exclude those interruptions or complaints caused by failures on the Transpower owned transmission network.

[4] SAIDI – system average interruption duration index. This is the average total duration of electricity supply interruptions that a customer experiences in a year.

[5] SAIFI – system average interruption frequency index. This is the average number of electricity supply interruptions that a customer experiences in a year.

[6] CAIDI – customer average interruption duration index. This is the average duration of an electricity supply interruption for customers who experienced a supply interruption in the year.

Safety

As a responsible electricity network company, 'zero' is the only prudent injury/accident target we can have – we are committed to keeping people safe around our network.

Customer service

As discussed in the 'service levels' section on page 11, SAIDI[4] and SAIFI[5] are accepted internationally as the most important indicators of electricity network reliability. We use these indicators to measure our reliability.

We also measure 'power quality', voltage and 'harmonics' to assess customer service levels. By 'proven', we mean that investigation shows that the non-complying voltage or harmonic originated in our network.

Environmental responsibility

Our target for the level of sulfur hexafluoride (SF_6) gas emissions from our electricity network reflects the "Memorandum of Understanding Relating to Management of Emissions of Sulphur Hexafluoride to the Atmosphere"[7]. We do not purchase equipment containing SF_6 if a technically and economically acceptable alternative exists.

For oil spills, our target of zero is the only prudent goal. We operate oil containment facilities and implement oil spill mitigation procedures and training. Reported 'uncontained' oil spills relate to incidents that fall outside these precautions.

Economic efficiency

We measure how 'efficient' our assets are by monitoring the capacity utilisation of our distribution transformers and our 'load factor'.

Capacity utilisation

Capacity utilisation is a measure of how well a network's transformers are utilised. It is calculated as the maximum demand experienced on an electricity network in a year divided by the transformer capacity on that network. Our target of 33% capacity utilisation is about the New Zealand average. In the year ended 31 March 2007 our capacity utilisation factor was 38%. The average capacity utilisation factor of New Zealand's electricity distribution companies was 32% in the year to 31 March 2006 (the latest available comparable figure).

Load factor

The amount of electricity passing through an electricity network is not always constant. In Christchurch for instance, electricity demand is higher on cold winter days than on warm summer days. The average load that passes through a network divided by the maximum load the network experiences that year produces a statistical measure called a network's 'load factor'. Load factor measures the constancy of load on an electricity network throughout a year.

Load factors always vary across different networks. This results from varying weather conditions and networks having different mixes of industrial, residential and rural customers. For instance, a network in an area with an even climate will typically have a higher load factor than networks in areas with large temperature variances.

Nevertheless, all networks seek to maximise their load factor. This is because a high load factor indicates better use of network assets (i.e. assets are more frequently used up to their electrical rating).

For the year ended 31 March 2007 Orion's load factor was approximately 60%, slightly lower than usual due to the very cold winter. The average load factor of New Zealand's electricity distribution companies was 65% in the year to 31 March 2006 (the latest available comparable figure). We have improved our load factor by around 10% in the last two decades, up from about 50%.

More detail on economic efficiency is available in section 2.5.1 of our full AMP.

[7] Developed and signed by the Government and major users in the electricity distribution industry.

Security of supply standard

We plan and invest in our network to meet a 'security of supply standard' that was originally developed with customer input in 1998. 'Security of supply' is the ability of our network to meet demand for electricity in certain circumstances when electrical equipment fails. The more 'secure' an electricity network, the greater its ability to continue to perform or the quicker it can recover from a fault or a series of faults.

Our original security of supply standard was based on the United Kingdom's P2/6, the regulated standard for distribution supply security in the UK.

Currently only one industry supply security guide is published in New Zealand (by the Electricity Engineers' Association of New Zealand) and no regulated national standard is in force.

The guiding principle of our security standard is that the greater the size or economic importance of the electricity demand served, the shorter the interruption to electricity supply that can be tolerated.

As nine years had passed since we started using the standard, we reviewed it in 2006 to ensure it continued to take into account current customer preferences for the quality and price of service that we provide. As a result of the review, our standard has been improved to better reflect the current needs of our customers. The revised standard may result in slightly lower reliability for our outer-urban customers but this will also reduce the need for future price rises.

More information on our security of supply standard is available in section 3.3.1 of our full AMP.

Levels of service

Our principal business is to deliver electricity to more than 184,000 customers in four different customer groups – residential, rural, irrigation and business. Each of these groups has different needs for quality and service. This affects how we manage our electricity network and plan for the future.

Our key focus is to provide a service that, as far as practicable, meets all of our customers' requirements. To achieve this outcome, we undertake customer studies and hold extensive discussions with network users to define what levels of service they expect. Feedback received highlights the importance of 'continuity of power supply'. In particular, customers expect:

- no breaks in power supply, and
- if breaks do occur that power is quickly restored.

To help meet customer expectations we analyse the performance of our network to determine how 'reliable' it is. This information is then used to target areas for improvement in our asset management planning. We aim to meet customer preferences by providing one of the most reliable and cost-effective networks in New Zealand.

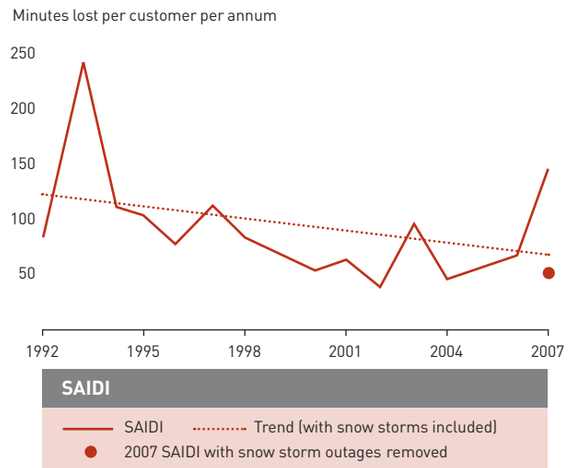
Reliability trends – SAIDI and SAIFI

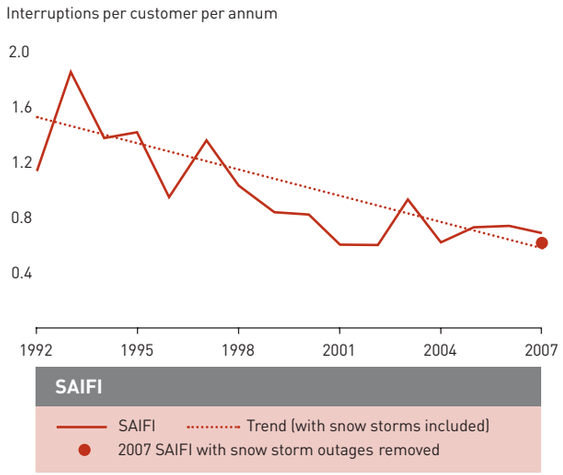
Two measures are accepted internationally as the most important indicators of electricity network reliability. These measures are known as SAIDI and SAIFI.

- SAIDI, or System Average Interruption Duration Index, measures the average number of minutes per annum that a customer is without electricity.
- SAIFI, or System Average Interruption Frequency Index, measures the average number of times per annum that a customer is without electricity.

Extreme weather events can have a major impact on an electricity network's performance. When considering performance it is therefore more meaningful to look at the long term trend in an electricity network's SAIDI and SAIFI figures, rather than look at the figures for any one year.

The trend of our network reliability performance figures since the early 1990s shows that we have improved our performance.

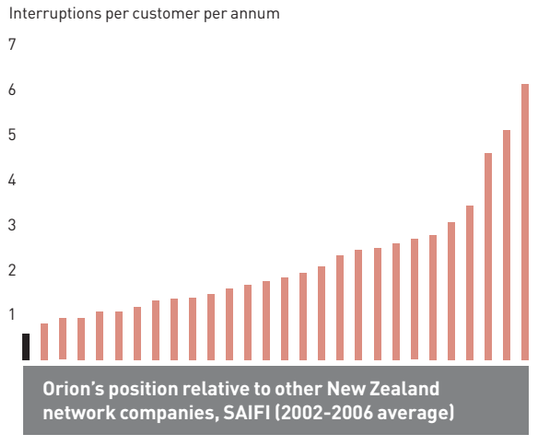




SAIDI and SAIFI comparison figures are currently only available up to 31 March 2006; i.e. before the severe snow storm in June 2006 that caused major disruption to our rural network. Based on these latest available figures, for the five years to 31 March 2006 Orion was the:

- third best performing New Zealand distribution company in terms of the duration of interruptions (SAIDI)[8]
- best performing New Zealand distribution company in terms of the frequency of interruptions per customer (SAIFI).

[8] The two New Zealand network companies with superior SAIDI results to ours are both urban-only networks. We operate both an urban and a rural network. Rural networks usually have a greater number of interruptions than urban networks. There are 28 electricity distribution networks in New Zealand.



While an overall improvement in network reliability (with the exception of severe storms) has been the trend over the last 15 years, we recognise it is unrealistic to expect to improve every year. There comes a point where the added costs of improvements outweigh the added benefits, particularly with an overhead rural network.

Any major improvement in rural reliability would require large capital investment and correspondingly large increases in line charges. We are committed to examining other options to see if lower cost alternatives exist to increase rural reliability. We are very optimistic about the potential of an earthing technique known as 'resonant earthing'[9] , which offers significant improvement in rural reliability at an economic cost. We will be the first to trial this technique in New Zealand over the next 18 months. This, and other improvement initiatives, are discussed in more detail in section 2.6 of our full AMP.

Compared with similar networks overseas and in New Zealand, our urban network performs at world class levels and our rural network is about average. Overall our electricity distribution network is one of the most reliable in the country and our operating costs are amongst the lowest.

[9] The resonant earthing technique reduces the effects of 'earth faults', which are generally caused when a tree or other object touches a power line.


River
Drive
Finish
Orion

Meeting electrical demand

Developing our network to meet future demand growth requires significant capital expenditure. This expenditure is coming under increasing scrutiny.

Before we invest capital in our network, we consider the following:

- uneconomic customer connections on our network
- 'demand side management' options
- 'distributed generation' options.

The amount we spend on our network is influenced by existing and forecast customer demand for electricity and the number of new customer connections to our network. Other significant demands on capital include:

- meeting safety and environmental compliance requirements
- meeting and maintaining our security of supply standard (see page 10)
- meeting shareholder desires to place existing overhead wires underground.

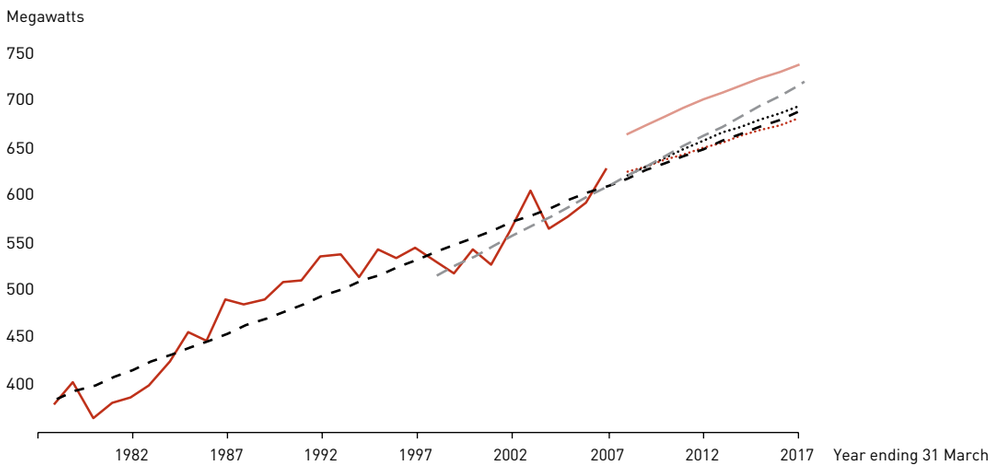
The growth rate in overall maximum network system demand (measured in megawatts) traditionally drives our capital investment. Maximum demand is strongly influenced in the short-term by climatic variations (specifically the severity of our winter conditions). In the medium-term it is influenced by growth factors such as underlying population trends, growth in the commercial/industrial sector, and changes in rural land use.

Overall maximum demand

As mentioned above, maximum demand is the major driver for our network investment. This measure is very volatile and varies substantially in Canterbury depending on the vagaries of winter weather.

Network maximum demand for the year ending 31 March 2007 was 632MW, up 40MW on the 2006 year; but only up 30MW on the 2002 year. Trends suggest a medium-term demand growth rate of 1-2% per annum.

In the short-term Environment Canterbury's Clean Air Plan is driving higher demand growth (at 2% per annum), as the plan encourages customers to install electric heat pumps. We expect annual peak demand growth to fall to 1% towards the end of the 10 year period covered by our AMP.



Overall maximum demand trends on Orion's network

- Actual Orion network maximum demand
- Projected demand from 30 years' history (at 1.28%pa)
- Projected demand from 10 years' history (at 1.73%pa)
- Potential cold snap peak
- Expected demand to comply with clean air plan
- Expected demand excluding clean air plan

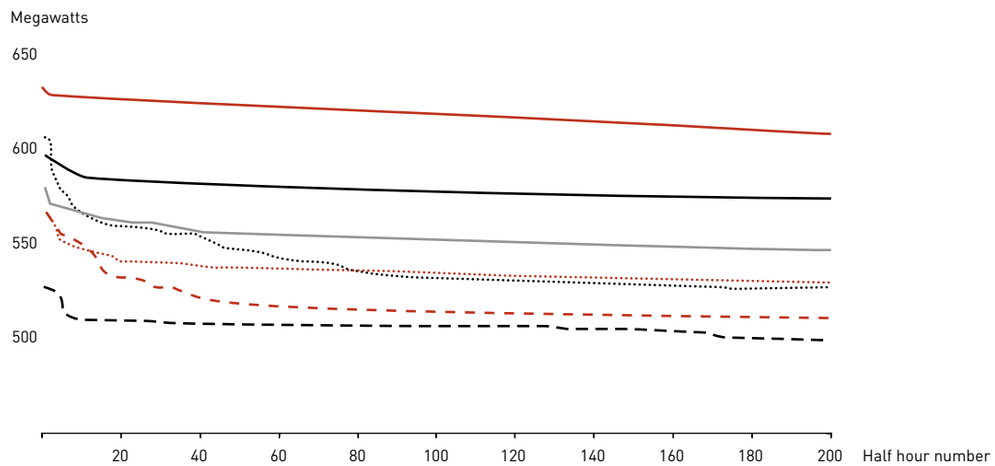
Load duration

Maximum demand on our network sets the network capacity that we need, but generally maximum demand only happens for very short periods.

We do what we can to manage load to lessen maximum demand. For example, we routinely manage load by using 'ripple control' to automatically turn household electric hot water cylinders off. We aim to turn cylinders off for short periods only, to prevent any noticeable effects on customers' hot water supply. Turning off the cylinders reduces the congestion on our network.

We also manage load indirectly through pricing incentives that reward retailers' customers who reduce the amount of electricity they use during our high priced 'peak period'. We provide a 'ripple signal' to tell customers that it is a peak period so that they can reduce their load and reduce their charges. This arrangement is more useful for larger business connections which have special half-hour interval metering that records the reduced loading level during the peak period.

A load duration curve shows the amount of time a load exceeds a given value. The following graph shows our load duration curves. In the year ending March 2007, load exceeded 623MW for only 18 half hours and the highest net demand was about 628MW. In the 2002 winter, if 'peaking generation' of 30MW had operated for only four hours on our network, our urban network maximum demand would have reduced by about 30MW.



Christchurch urban area network – load duration curves

- Year to 31 March 2007
- Year to 31 March 2006
- Year to 31 March 2005
- Year to 31 March 2004
- Year to 31 March 2003
- Year to 31 March 2002
- Year to 31 March 2001

We note that peaking generation could help to delay the need to increase the capacity of Transpower's network. This generation would usually operate for only a few hours over the largest peak demand times to avoid Transpower network constraints. In unusually prolonged cold conditions, longer hours of operation could be needed.

Control of winter maximum demand depends heavily on suitable price signals and customer response to price signals. To create and maintain appropriate price signals, it is vital that electricity retailers continue to support demand side management initiatives. Night rate tariffs are particularly important, as is load control via 'ripple receivers'.

Rural maximum demand

Irrigation load creates high electricity demand on our rural network in summer. Growth rates for these summer peaking areas have been high for the last decade, and were very high from 2000 to 2005. When the rural electrical load was still relatively low, the annual growth rate reached an exceptional 20%. The summer of 2003/04 was particularly significant, with an increase of 7MW across Transpower's Hororata and Springston GXPs. We expect that irrigation and dairy farming loads will continue to grow at a steady rate. The following graph shows recent load growth in our rural areas. Note the effects of planned load transfers from Hororata GXP to Springston GXP in 2009.

As electrical load on our urban and rural networks grows, we continue to focus on innovative solutions and appropriate network investment to meet our customers' needs.

Lifecycle asset management

We determine our maintenance priorities by following the general principle that the assets supplying the greatest number of customers receive the highest priority. As our distribution network is hierarchical with the highest voltage at a few input points (Transpower GXPs) and the lowest voltage at the many output points (customer connections), those parts of the network that operate at higher voltage are given higher maintenance priority. Our operating voltages are 66kV, 33kV, 11kV, 400V and 230V.

Generally assets are not replaced on age alone, but are kept in service until their continued maintenance is uneconomic or until they pose a safety, environmental or reliability risk.

Reliability performance is measured and used to identify areas where further maintenance is needed to improve our delivery service or where maintenance may be reduced without reducing service.

We typically schedule around 70% of our annual network maintenance expenditure in advance. This is known as 'planned' work. Another 10-15% of maintenance is not planned for but is required to be done, such as pole relocation or for road works. The balance of our maintenance expenditure is allocated to emergency work to keep the network in service.

Limiting electrical losses

Another key planning focus is how to manage and reduce 'electrical losses'. As electricity passes through lines, cables and transformers it creates a small amount of heat which is then 'lost' into the surrounding air. Such 'losses' are natural physical phenomena and are experienced in all electricity distribution networks. They cannot be avoided completely and mean that electricity retailers must purchase more energy from generators than is actually delivered to households and businesses.

Our policy is to maintain what is termed a 'low loss network', where overall losses are estimated at below 5% of energy delivered. We achieve this by following good industry practice with sound network design principles.

For instance, when deciding which transformer to purchase, we take into account the 'loss factors' of the different transformers available, as well as their price.

We also control operational voltage levels on our rural network to limit line losses. We choose transmission and distribution voltages and conductor sizes that best suit the load density, as overloaded conductors produce more line losses.

Our extensive urban cable network is inherently a low loss system.

Risk management

We manage four main areas of risk on our electricity network:

- health and safety
- environmental
- natural events
- asset failure.

We outline each of these areas in more detail below. External consultants have advised on our risk assessment processes.

Health and safety management

It is not possible to entirely eliminate all hazards as we operate and maintain our electricity network. However we are committed to providing a safe, reliable network and a healthy work environment – we take all practical steps to ensure that our staff, the community and the environment are not at risk. We control hazards through training, guidelines and standards. Potential hazards, in particular electrical hazards, must also be considered when new network installations are designed and constructed.

We monitor concerns about health and electrical fields and run community education courses teaching children to stay safe around electricity. We also run an ongoing advertising campaign to promote public safety around our electricity network.

Environmental management

We follow a policy of environmental sustainability, initiate energy efficiency programmes and work to minimise electrical losses on our network wherever possible.

Our environmental sustainability policy covers protection of the biosphere, sustainable use of natural resources, reduction and disposal of waste, wise use of energy, risk reduction, restoration of environment, disclosure, commitment of management resources, stakeholder consultation, assessment and annual audit.

We instigated oil spill management systems several years ago and have successfully managed any significant spills.

Impact of natural events

Earthquakes and storms are our major natural event risks. We continue to invest significant time and money to ensure our network is protected against such events. During the mid-1990s our network was part of an 'engineering lifelines' study into how natural disasters would affect Christchurch. The study concluded that electricity supply would be essential for almost all service authorities after a natural disaster, with most service authorities' head offices located in the central city area.

Since this study we have made the following improvements:

- spent $13m to secure power supply to the central city via a second point of supply. This, combined with numerous diesel generators around the city, gives the Christchurch central business district (CBD) a more secure power supply than equivalent CBDs in Auckland and Wellington
- strengthened power supply to the port, airport and main communications sites
- spent $4.5m on earthquake strengthening for bridges, cable supports and buildings. All of our district substations and all major 33kV and 66kV cables now meet the seismic structural standard
- undertaken regular risk assessment and response studies to ensure we are well prepared for any disaster.

We have also reviewed how susceptible Transpower's GXP substations are to liquefaction. Our reviews show that Addington, Papanui and Bromley GXPs could be subject to uneven settlement in an earthquake. Due to differing soil types, settlement should not occur at all three GXPs during a single event.

Transpower is reviewing its Papanui and Addington GXPs in detail to determine the remedial work necessary to increase seismic security.

We note that emergency fuel storage has become a problem due to fewer private fuel tanks in our network area. There are also fewer commercial fuel stations and these all rely on electricity to pump fuel.

Plant and equipment failure

Plant failure is always going to happen. However certain actions can be taken to reduce the frequency of failure. Our policy is to buy reliable equipment rather than the cheapest equipment. Effective maintenance regimes are also very important.

Regular monitoring allows us to prioritise replacement and refurbishment based on the actual condition of equipment rather than just its age.

In addition to maintenance, we also continue to investigate how equipment is used and installed. We continually look for ways to improve our plant reliability. For example, we carry out thermal engineering checks of underground cables and have several initiatives to reduce problems experienced with metal-clad switchgear and associated terminations. Our approach to improving plant and equipment reliability also includes inspecting overhead lines and substations using state-of-the-art technology such as partial discharge tests, corona camera visual checks and infrared camera checks.

Sub-transmission 66kV oil filled cables create the most significant potential for catastrophic plant failure. We have identified that these cables have unsatisfactory joint systems and we have prioritised replacing the joints with ones which withstand greater buckling forces. This programme is 65% complete. Joints are being replaced as quickly as is practicable, given available resources and the need to avoid undue stress on neighbouring cables during the relatively long outages for the joint renewal work.

Comprehensive half-life maintenance of all major district substation transformers has been coordinated with our 66kV joint replacement programme.

Asset management systems

We use a wide range of asset management information systems and applications to record and analyse the nature, condition and location of our network assets.

Our main applications are:

- mapping geographic information system (GIS)
- asset management system (AMS) and several linked asset registers
- valuation model
- a centralised real time monitoring and control system for our network (including load management software)
- work management documents, i.e. specifications and standards for operation and construction
- connection database
- network loading database
- power system modelling
- works order financial management system
- Microsoft PC inter-office network
- incident/accident reporting system.

Our current priority is to integrate the various asset databases and build potential links to other systems. In particular we aim to update our GIS system with new technology.

Summary of forecast expenditure

A summary of our forecast capital and maintenance expenditure over the next 10 years is shown in the table below. No provision for inflation has been made in these figures.

Summary of forecast expenditure ($000) Year ending 31 March	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Capital expenditure	39,973	33,200	32,465	32,663	41,602	35,447	42,083	41,501	46,891	38,864
Maintenance expenses	18,607	21,092	21,285	21,250	20,675	20,690	20,530	20,530	19,710	19,710

The capital and maintenance budgets include a contingency of $1.5m per annum each, to reflect the historic shortfall of budgets to meet unforeseen expenditure on large customer projects (such as the new four megawatt Synlait dairy plant near Dunsandel) and changing regulations (such as tree trimming regulations).

More detail on our forecast capital expenditure is shown in the table below.

Summary of forecast capital expenditure ($000) Year ending 31 March	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Customer connections to our network	4,200	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
Network extensions	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600
Network reinforcement	4,615	4,510	4,580	4,500	4,500	4,500	4,500	4,500	4,500	4,500
Conversion of overhead lines to underground cables	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700
Major projects	16,520	8,060	6,000	5,915	14,745	8,400	11,200	9,720	16,600	7,800
Asset replacement	10,338	10,330	11,585	11,948	12,057	12,247	16,083	16,981	15,491	16,264
Contingency		1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Total capital expenditure	**39,973**	**33,200**	**32,465**	**32,663**	**41,602**	**35,447**	**42,083**	**41,501**	**46,891**	**38,864**

Our planned capital expenditure on major projects is detailed in the following section.

Summary of major projects

Over the next 10 years we plan to spend more than $100 million on major projects to strengthen and expand our electricity network. We outline these planned projects in the tables below – more detail is available in our full AMP.

Planned major projects on our urban network ($000)										
Year ending 31 March	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Convert Middleton substation from 33kV to 66kV	4,500									
Install a third transformer at Sockburn substation (stage 1)	300									
Install 11kV ripple plant for Islington 33kV substation	100									
Purchase land for Belfast substation	500									
Develop site for Belfast substation	600									
Purchase land for Prebbleton substation	150									
Install a third transformer at Sockburn substation (stage 2)		250								
Replace 11kV switchgear at Papanui substation		4,000								
Purchase land for Awatea substation		250								
Upgrade 33kV feeder at Hornby substation			400							
Build Prebbleton substation				2,900						
Install 66kV cable from Papanui substation to Belfast substation					10,500					
Build Yaldhurst substation						4,500				

Planned major projects on our urban network ($000) (continued)										
Year ending 31 March	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Install two 11kV feeder cables to Ilam substation						2,400				
Reinforce 33kV circuit to Shands Road substation						250				
Build Richmond substation							3,600			
Install 66kV cable from Richmond substation to Papanui substation							6,100			
Install 66kV cable from Richmond substation to Dallington substation								4,500		
Install 66kV bus and switchgear at Dallington substation								2,200		
Install a second transformer at Prebbleton substation								520		
Install 33kV cable from Shands-Rolleston line to Prebbleton substation								800		
Install 66kV cable from Armagh substation to Richmond substation									3,800	
Build Belfast substation									6,800	
Replace 33kV feeders at Moffett substation										100
Total capital expenditure on major urban projects	**6,150**	**4,500**	**400**	**2,900**	**10,500**	**7,150**	**9,700**	**8,020**	**10,600**	**100**

Planned major projects on our rural network ($000)										
Year ending 31 March	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Build Larcomb substation (stage 1)	600									
Install resonant earthing system	200									
Upgrade transformer at Little River substation	300									
Build Dunsandel substation (stage 1)	4,000									
Build 66kV line from Brookside substation to Springston substation (stage 2)	3,600									
Install 33kV switchgear and upgrade transformer at Motukarara substation	1,000									
Install a line circuit breaker at Killinchy substation	350									
Build 66kV line from Pound Road substation to Hasketts Road substation	320									
Install resonant earthing systems		460								
Install 33kV switchgear and upgrade transformer at Lincoln substation (stage 1)		400								
Build Dunsandel substation (stage 2)		500								
Build Larcomb substation (stage 2)		2,200								
Install resonant earthing systems			1,150							
Build Windwhistle substation			2,800							
Upgrade transformer at Teddington substation			350							
Upgrade conductor from Springston substation to Larcomb substation			800							
Install 33kV switchgear and upgrade transformer at Lincoln substation (stage 2)			500							
Build line from Windwhistle substation to Te Pirita substation				1,500						

Planned major projects on our rural network ($000) (continued)										
Year ending 31 March	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Install resonant earthing system				1,265						
Install 33kV switchgear at Darfield substation				250						
Build 66kV line from Islington substation to Weedons substation					2,300					
Install resonant earthing systems					345					
Convert Weedons substation from 33kV to 66kV					1,600					
Upgrade transformer at Annat substation						300				
Convert Springston substation from 33kV to 66kV						950				
Convert Larcomb to Weedons line from 33kV to 66kV							400			
Convert Larcomb substation from 33kV to 66kV							1,100			
Install a 66/11kV transformer at Highfield substation								950		
Convert Weedons to Highfield line from 33kV to 66kV								750		
Build 66kV line from Greendale substation to Highfield substation									3,100	
Install 33kV cable from Springston substation to Rolleston line									1,100	
Install a second transformer at Larcomb substation									1,800	
Install 33kV line breakers at Teddington substation										500
Build Kirwee substation										3,000
Convert Springston to Brookside line from 33kV to 66kV										2,400
Install a 66kV bay and 66/11kV transformer at Brookside substation										1,800
Total capital expenditure on major rural projects	**10,370**	**3,560**	**5,600**	**3,015**	**4,245**	**1,250**	**1,500**	**1,700**	**6,000**	**7,700**

AMP outcome

One of the major outcomes we seek to achieve from our AMP is a 10 year capital investment and maintenance forecast. This year's AMP expenditure forecast is characterised by:

- Steady investment in the urban network to meet strong regional growth and the effects of the impending Environment Canterbury clean air plan.
- Continued investment in rural areas to meet strong residential growth at Rolleston and Lincoln and dairy farming loads between the Selwyn and Rakaia rivers.
- A steady overall increase in capital expenditure in the longer term to replace network assets installed in the high electricity growth years of the 1960s which are now reaching the end of their service life. The forecast cost of this replacement may change if we adopt future monitoring and risk assessment strategies across all asset classes.
- Relatively constant investment in new connections and extensions to our network. This forecast is based on overall modest growth with pockets of higher growth in specific areas.
- The additional cost of complying with regulations.
- Material and contractor cost increases that affect our construction costs.

Summary of key issues

The key issues in our AMP are:

- Peak demand growth – we expect winter peak demand on our total network to grow by an average of 1.3% per annum over the next 10 years, while summer peak demand on our rural network will grow by around 4% per annum.
- Asset replacement – we expect the annual cost to replace assets at the end of their useful lives to increase from $10m in 2008 to $16m in 2017.
- 66kV subtransmission review – we are reviewing our proposal to invest $37.5m in our 66kV subtransmission network between 2012 and 2016. As part of this review we plan to consult with stakeholders to ensure our proposal best meets customer needs.
- Major outage mitigation – we are investigating how to further prevent and mitigate major outages. Our network security and reliability is very high compared with that of other New Zealand and overseas electricity distribution networks; however we continue to look for innovative ways to improve our performance.
- Our security of supply standard – we have reviewed our standard to ensure it continues to take into account customer preferences for the price and quality of service that we provide.
- Compliance/risk mitigation – we continue our focus on public and employee safety.
- Use of innovative technology – we continue our investment in technology to better understand, monitor and control the condition and capability of our network.

Glossary

CAIDI: an index which measures the average duration of interruptions to supply for customers that have experienced an interruption to supply, in a year.

Capacity utilisation: a ratio which measures the utilisation of transformers in the system. Calculated as the maximum demand experienced on an electricity network in a year divided by the transformer capacity on that network.

Conductor: includes overhead lines which can be covered (insulated) or bare (not insulated), and underground cables which are insulated.

Demand side management: control of electricity demand. It includes a broad range of tools for changing electricity load shape. Demand side measures fall into roughly two categories – those that reduce total load, and those that change load shape by shifting demand into other periods throughout the day.

Distributed generators: generators located at a home or business which are capable of generating electricity for that home or business's own use. They may also be capable of putting surplus energy back into our network.

District substation: a major building substation and/or switchyard with associated high voltage structure where voltage is transformed from 66 or 33kV to 11kV, two or more incoming 11kV feeders from a grid exit point are redistributed or a ripple injection plant is installed.

Fault: an asset failure on our network which, depending on network configuration, may cause an outage. Faults do not include electricity supply outages caused by planned events (eg. planned maintenance).

Grid exit point (GXP): a point where Orion's network is connected to Transpower's transmission network.

Harmonics (wave form distortion): a distortion to the supply voltage which can be caused by network equipment and equipment owned by customers including electric motors or even computer equipment.

High voltage: voltage exceeding 1,000 volts, generally 11,000 volts (known as 11kV).

Interruption: an electricity supply outage caused by either an unplanned event (eg. weather, trees) or a planned event (eg. planned maintenance).

Load factor: the measure of annual load factor is calculated as the average load that passes through a network divided by the maximum load experienced in a given year.

Low voltage: voltage not exceeding 1,000 volts, generally 230 or 400 volts.

Maximum demand (peak demand): the maximum demand for electricity during the course of the year.

Network substation: a building substation which is part of the 11kV network and provides protection to connected cables and overhead lines.

Outage: when supply of electricity fails.

Peak period: the ripple signalled high pricing period for general network connections, when our network is heavily loaded.

Proven voltage complaint: a complaint from a customer concerning a disturbance to the voltage of their supply which has been proven to be caused by the distribution company.

Ripple control system: a system used to control the electrical load on the network by, for example, switching load such as domestic water heaters off, or signalling to large users that they are in a high price period (thereby encouraging them to use as little power as possible during that time).

Ripple signal: a signal injected into an electricity distribution network which a receiver can pick up and which does not affect customers' other appliances.

Rural: the rural network covers all areas other than Christchurch city and includes rural towns.

SAIDI: an index which measures the average duration of interruptions to supply that connected customers experience in a year.

SAIFI: an index which measures the average number of interruptions to supply that connected customers experience in a year.

Transformer: a device that changes voltage up to a higher voltage or down to a lower voltage.

Transpower: the state owned enterprise that operates New Zealand's transmission network. Transpower delivers electricity from generators to various networks around the country.

Urban: the urban network largely covers Christchurch city.

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APPENDIX 4

Security of Supply Standard

Class	Description	Load Size	N-1 Cable, line or transformer contingency	N-2 Cable. Line or transformer contingency	Bus fault or switchgear failure
Urban Transpower GXPs					
A1	Lines, buses and supply banks	15 to 200MW	No interruption	Restore within 2hrs	No interruption for 50% and restore rest within 2hrs
Rural – Transpower GXPs					
B1	Lines, buses and supply banks	15 to 60MW	No interruption (1)	Restore within 4hrs (1)	No interruption for 50% and restore rest within 4hrs (1)
B2	Supply banks	0 to 1MW	Restore in repair time	Restore in repair time	Restore in repair time
Urban – Orion network					
C1	DS with CBD or special industrial load, etc	15 to 40MW	No interruption	Restore within 1hr	No interruption for 50% and restore rest within 2hrs
C2	DS without CBD or special industrial load, etc	15 to 40MW	No interruption	Restore within 2hrs	No interruption for 50% and restore rest within 2hrs
C3	DS or 11kV ring with CBD or inner urban load, etc	2 to 15MW	Restore within ½ an hr	Restore 75% within 2hrs and the rest in repair time	Restore within 2hrs
C4	Outer, mainly residential district substations	4 to 15MW	Restore within 2hrs	Restore 75% within 2hrs and the rest in repair time	Restore within 2hrs
C5	Inner 11kV distribution feeder	0.5 to 2MW	Restore within 1hr	Restore in repair time	Restore 90% within 1hr and the rest in 4hrs (use generator)
C6	Outer, mainly residential 11kV distribution feeder	0.5 to 4MW	Restore within 1hr	Restore in repair time	Restore 90% within 1hr and the rest in 4hrs (use generator)
C7	11kV distribution spurs	0 to 0.5MW	Use generator to restore within 4hrs	Restore in repair time	Use generator to restore within 4hrs
Rural – Orion network					
D1	Subtransmission feeders	15 to 60MW	No interruption	Restore within 4hrs (1)	No interruption for 50% and restore rest within 4hrs (1)
D2	DS's and subtransmission feeders	4 to 15MW	Restore within 4hrs (1)	Restore 50% within 4 hrs and the rest in repair time (1)	Restore within 4hrs (1)
D3	Small DS and 11kV distribution feeders	1 to 4MW	Restore within 4hrs (1)	Restore in repair time	Restore 75% within 4hrs and the rest in repair time (1)
D4	11kV distribution spurs	0 to 1MW	Restore in repair time	Restore in repair time	Restore in repair time

APPENDIX 5

Snowstorm Advertisement

Orion
your NETwork

11 July 2006

Dear Customer

THANK YOU FROM ORION

On behalf of all of us at Orion I'd like to thank you for your understanding and assistance during the recent snow storm that severely affected our network area in central Canterbury between the Rakaia and Waimakariri rivers.

I'd particularly like to thank those people who made life that little bit easier for our staff and contractors who were out in the snow restoring power to our customers. Whether it was providing transport, clearing snow or supplying cups of tea, your help was greatly appreciated.

Also thanks to the Civil Defence and other aid organisations for their coordinated and professional response to the storm.

I'd also like to say a big public thank you to our staff and contractors who worked up to 14 hour days in freezing conditions to get the power back on.

Canterbury has had big snow storms in the past, but what made this storm particularly severe was the type of snow that fell. It was a 'wet' snow – a heavy mixture that weighed down lines, poles and trees. As a result, we had widespread faults on our system and around 8000 rural customers were disconnected on the morning of Monday 12 June.

By Wednesday our staff had managed to reduce this number to 2000 and power was restored to all but 200 customers within four days. The remaining Orion customers had the power back on shortly after that.

Our staff and contractors then helped the Ashburton and South Canterbury network areas with their ongoing restoration efforts.

When any major outage occurs we have a clear plan of action which outlines which electricity connections are restored first. Our priority is to make our network safe, to avoid any potential for electrocution. We then aim to restore power to essential services such as water and sewage connections, as well as major communications sites. Next, we restore supply to power lines that feed multiple customers before moving on to lines that supply individual customers.

We are now conducting a review of our performance following the storm that not only looks at our efforts to restore power but also examines our network to see if we can make any enhancements to reduce the effects of further storms.

We welcome your comments on our performance and suggestions on what we or others could improve upon in the future. We are undertaking a telephone survey but if you are not contacted and would like to have a say, please email Gina Clarke, our Communication and Policy Manager: gina.clarke@oriongroup.co.nz or post your comments to Gina at Orion, PO Box 13896, Christchurch.

One thing you can do to help us minimise the effects of storm damage on your power supply is to ensure you keep any trees on your property a safe distance away from power lines. Many outages during the storm were caused by branches snapping or trees falling over due to the weight of snow. Excessive wind was also a contributing factor. So if you have trees located close to power lines please contact our call centre on 363 9898 to find out what can be done to reduce the chance of them causing problems to the power supply.

Thank you again for your understanding and assistance.

Yours sincerely

Roger Sutton
Chief Executive Officer

Orion owns and operates the electricity distribution network in central Canterbury between the Waimakariri and Rakaia rivers. Our shareholders are the Christchurch City and Selwyn District councils.

APPENDIX 6

Price Rebate Advertisement

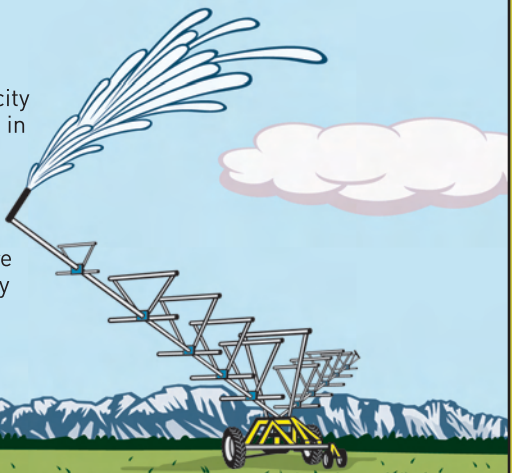
WANT CHEAPER IRRIGATION?

Orion offers a rebate of $6.10 per kilowatt per year to customers who agree to accept occasional power cuts to their irrigators in an emergency.

For a 100 kilowatt irrigation pump, that's a saving of $610 per year. The estimated number of power cuts is, at most, one every five years of up to eight hours and one every 10 years of up to 48 hours (except in extreme conditions).

To find out more about this popular rebate and how you can save, call Orion on 03 363 9898 or email info@oriongroup.co.nz

Orion New Zealand Limited owns and operates the electricity distribution network in central Canterbury between the Waimakariri and Rakaia rivers. Our shareholders are the Christchurch City and Selwyn District councils.



Orion
your NETwork

APPENDIX 7

Price Rebate Brochure

Irrigator 'interruptibility' rebate – Am I eligible?

To check whether or not you're eligible for the irrigator 'interruptibility' rebate, complete and return this form to Orion. We will advise you either way and, if you're eligible, we'll send you an application form with sections for you, your electrician and your metering contractor to complete.

My details

Name .....

Postal address .....

.....

.....

Phone .....

Mobile .....

Email .....

Irrigation Connection 1

ICP: .....

Site address: .....

.....

Motor kW: .....

Irrigation Connection 2

ICP: .....

Site address: .....

.....

Motor kW: .....

I confirm that the above irrigators are used to irrigate commercial farmland.

Signed .....

Date .....

Detach and return to:

Orion New Zealand Ltd
PO Box 13 896
Christchurch
Attn: Distribution Services
Fax 03 363 9723

How do I check if I'm eligible for the irrigator price rebate?

You're likely to be eligible for the rebate if your irrigation pump is larger than 5 kW and you use it to irrigate commercial farmland.* To check whether you're eligible, complete the tear-off form attached to this brochure and send it to us. If you're eligible, we'll send you an application form with sections for you, your electrician and a metering contractor to complete (you will need to arrange for them to install control wiring and a ripple relay). The application form will set out the steps you need to take.

* Conditions apply

Want to know more?

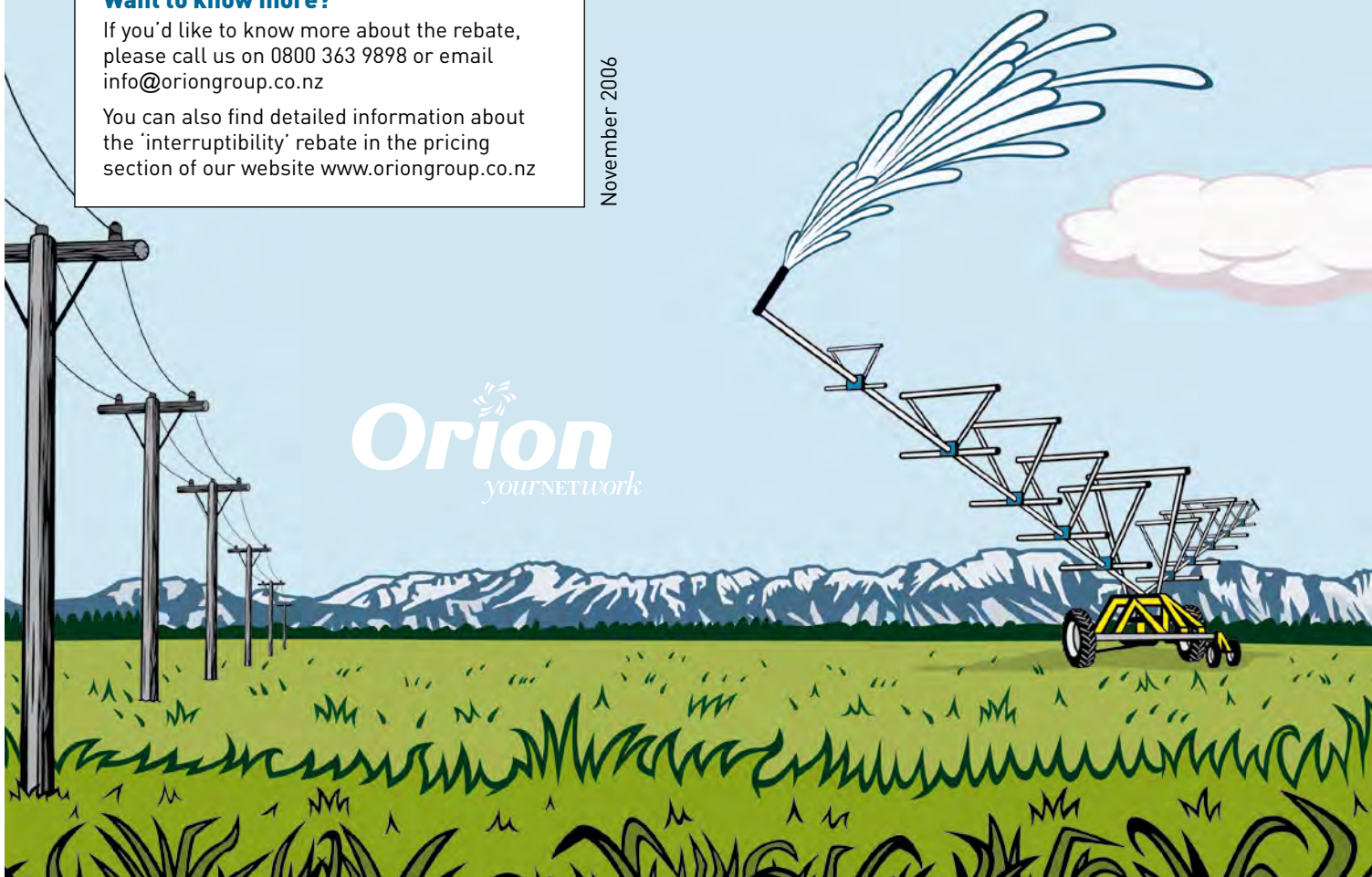
If you'd like to know more about the rebate, please call us on 0800 363 9898 or email info@oriongroup.co.nz

You can also find detailed information about the 'interruptibility' rebate in the pricing section of our website www.oriongroup.co.nz

November 2006

PRICE REBATE

WANT CHEAPER IRRIGATION?



Rebate for possible power cuts to your irrigator

This brochure outlines the monthly irrigator price rebate which Orion offers when irrigation customers are prepared to accept occasional interruptions to their power supply in an emergency.* The rebate has proved very popular with irrigation customers as it reduces their overall power bill.

Who is Orion?

Orion New Zealand Limited owns and operates the electricity distribution network in central Canterbury between the Waimakariri and Rakaia rivers. We transport electricity from nine Transpower grid exit points to more than 180,000 homes, farms and businesses. Our shareholders are the Christchurch City and Selwyn District Councils.

What is the irrigator price rebate?

Orion offers a special 'interruptibility' rebate to irrigation customers who agree to accept occasional interruptions to their power supply in an emergency.*

Examples of emergencies include:

- a fault on our network caused by a car hitting a pole
- a fault in a transformer at a district substation
- a capacity shortage on Transpower's grid that affects Orion's ability to deliver electricity
- a line failure caused by severe weather, such as high winds.

Because we don't charge you directly, Orion credits the rebate to your electricity retailer who can then pass it on to you in your monthly power bill.

How is the irrigator price rebate calculated?

The irrigation 'interruptibility' rebate is based on the kilowatt (kW) rating of the irrigation pump motor, currently $6.10 per kW per year. For example, the annual rebate for a 100 kW pump would be $610, based on April 2006 prices.

If I sign up for the irrigator price rebate, how often will power be cut to my irrigation pump?

We expect the maximum number of power cuts to an irrigation pump to be one every five years of up to eight hours and one every ten years of up to 48 hours (except in extreme conditions).

When can I apply for an irrigator price rebate?

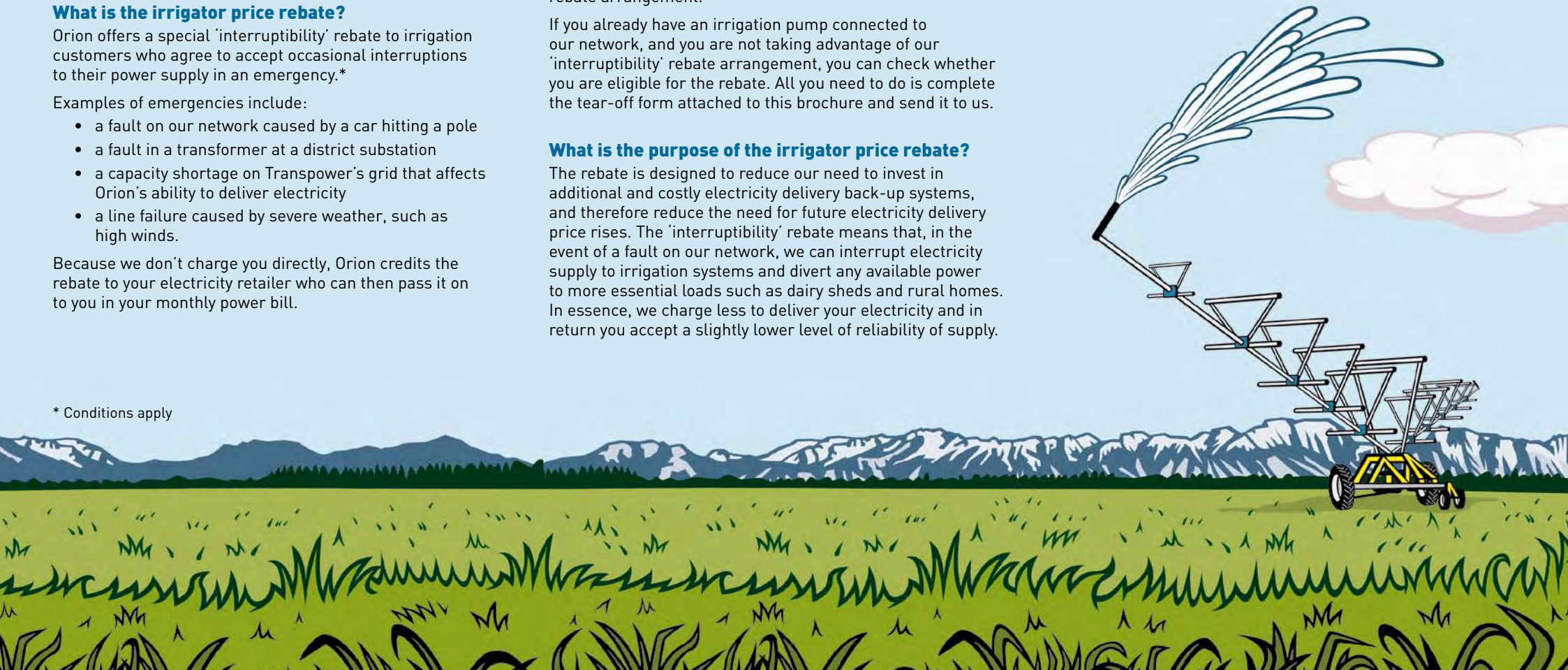
When you apply to have your irrigation pump connected to our network you have the opportunity to choose the 'interruptibility' rebate arrangement.*

If you already have an irrigation pump connected to our network, and you are not taking advantage of our 'interruptibility' rebate arrangement, you can check whether you are eligible for the rebate. All you need to do is complete the tear-off form attached to this brochure and send it to us.

What is the purpose of the irrigator price rebate?

The rebate is designed to reduce our need to invest in additional and costly electricity delivery back-up systems, and therefore reduce the need for future electricity delivery price rises. The 'interruptibility' rebate means that, in the event of a fault on our network, we can interrupt electricity supply to irrigation systems and divert any available power to more essential loads such as dairy sheds and rural homes. In essence, we charge less to deliver your electricity and in return you accept a slightly lower level of reliability of supply.

Orion
your NETwork



* Conditions apply