ETSA Utilities

Delivering energy to South Australians

ETSA Utilities, ABN 13 332 330 749,
a partnership of:
CKI Utilities Development Limited
ABN 65 090 718 880
HEI Utilities Development Limited
ABN 82 090 718 951
CKI Utilities Holdings Limited
ABN 54 091 142 880
HEI Utilities Holdings Limited
ABN 50 091 142 362
CKI/HEI Utilities Distribution Limited
ABN 19 091 143 038
each incorporated in The Bahamas

Submission to ESCOSA's Issues Paper dated February 2006

"ETSA Utilities' Network Performance and Customer Response January 2006"

March 2006

This report contains 32 pages

EU Submission - ESCoSA (heatwave) Issues Paper Feb06.doc

Contents

Glossary

ADMD	After Diversity Maximum Demand, the maximum demand for an area after considering the diversification of peak loads which occur at different times.
BOM	Bureau of Meteorology, the government body responsible for weather forecasting and reporting in Australia (www.bom.gov.au)
CaMS	Construction and Maintenance Services – the department responsible for field crews and emergency response crews who operate, repair and maintain the network infrastructure
ESCOSA	The Essential Services Commission of South Australia, the economic regulator responsible for determination of revenues and standards for regulated businesses in South Australia including ETSA Utilities. (www.escosa.sa.gov.au)
ESIPC	The Electricity Supply Industry Planning Council, an entity responsible for various electricity planning and forecasting functions in South Australia. (www.esipc.sa.gov.au)
GSL payment	Guaranteed Service Level Payment – a payment to a customer made when the customer experiences a level of interruptions which is above a threshold limit set by ESCOSA.
GWh	Measure of energy – Gigawatt hours (=1,000,000 kilowatt hours)
Heatwave	3 consecutive days of temperatures with maximums above 40 ºC, or 5 consecutive days with maximum temperatures above 35 ºC
IVR	Interactive Voice Response – a messaging system that a caller interacts with to receive information about a particular outage.
kW	Measure of electricity load
NEMMCO	The National Electricity Market Manager, responsible for generator despatch and managing the electricity market pool for the national market incorporating Queensland, New South Wales, Victoria, South Australia and Tasmania (www.nemmco.com.au)
SAIDI	System Average Interruption Duration Index – a measure of the duration of network interruptions
SAIFI	System Average Interruption Frequency Index – a measure of the frequency if network interruptions

1 Executive Summary

1.1 Introduction

In this submission, ETSA Utilities responds to the issues associated with the severe heatwave conditions experienced across South Australia over the period 19 to 22 January 2006.

This paper details ETSA Utilities':

(a) Summary of the Heatwave, including data captured on temperature and other weather conditions, forecasting information and the electricity load experienced. [Section 4]

(b) Response in the field dealing with customers affected by outages to the Heatwave, plant failure and other causes not directly related to the Heatwave conditions [section 5];

(c) Performance outcomes during the Heatwave[section 6];

(d) Specific preparations for the January 19 to 22 Heatwave [section 3.4]

(e) Approach to planning for special events that may have a profound but short term impact on the network [section 3.3];

(f) Experiences gained from the Heatwave and resulting improvements for customer service. [section 8].

(g) Position on the regulatory arrangements that directly impact on the business and its response to Heatwave conditions [Section 7]; and

(h) Approach to planning for a network capable of meeting the needs of South Australians [section 3.1 and 3.2];

1.2 Compliance with Regulatory Obligations

ETSA Utilities has complied with its Electricity Distribution Licence, the Electricity Act, National Electricity Rules, Electricity Distribution Code and other Codes and Guidelines including:

(a) The National Electricity Rules requirement that ETSA Utilities use "Good Electricity Industry Practice" in planning and building the distribution network.

(b) The Electricity Distribution Code requirement to meet the reliability performance standards for ETSA Utilities' distribution network.

1.2.1 ETSA Utilities' regulatory compliance

National Electricity Rules

Compliance with "Good Electricity Industry Practice".

Comment - The distribution system except for a few small areas did not have any capacity related issues during the heatwave period. There were 241 (ie 0.38% of a total of 63,777) LV transformers that experienced capacity related issues during the 4 days of the most extreme heatwave for 63 years.

Compliance P

Clause 1.2.2 The ***distributor*** must use its best endeavours to achieve the following customer service standards during each year ending on 30 June.

Time to respond to telephone calls 85% within 30 seconds

Comment- This standard is calculated on an annual basis because it recognises that in certain circumstances such as during storms or other significant events ETSA Utilities will have a very large number of calls in a very short period of time which will exceed its capacity to respond but at most other times it will receive a number of calls that it should respond to quickly exceed this standard but on average should achieve the standard. In the 12 months ending 31 January 2006 ETSA Utilities answered 85% of telephone calls within 30 seconds.

Compliance – P

Clause 1.2.3.1 The ***distributor*** must use its ***best endeavours*** to achieve the following reliability standards during each year ending on 30 June:

"Time to Restore Supply" Standards

SUPPLY RESTORATION TIMES FOR:	STANDARD
Major Metropolitan Areas	80% within 2 hours 90% within 3 hours

Note: the supply restoration standards reflect unplanned interruptions to supply on the high voltage distribution network (ie does not include LV outages)

Comment- This standard also recognises in certain circumstances such as during storms or other significant events ETSA Utilities will not be able to restore all interruptions quickly because the volume of interruptions will exceed its capacity to respond but at most other times will be able to respond so that, on average, it should achieve the standard.

Even under the conditions of the heatwave ETSA Utilities restored 80% of customers within 2 hours and 94% within 3 hours for outages on the high voltage network. This standard does not include time to restore LV outages.

Compliance – P.

1.3 Summary

The relevant standards and "Good Electricity Industry Practice" acknowledge that distributors such as ETSA Utilities will not hold, on standby, the resources necessary to respond to exceptional weather and other disasters such as bushfires. Accordingly, the standards require an average level of performance and acknowledge that achieving this cannot always be assured hence the obligation is to use "best endeavours". The general requirement to use "Good Electricity Industry Practice" cannot apply a higher standard than the specific obligations in the Electricity Distribution Code.

In the case of the January Heatwave a small number of customers (0.37%) encountered what was for them an unacceptable level of customer service because of the lengthy period before service could be restored. The January Heatwave was exceptional, even by Heatwave standards. It was therefore not surprising that the people responsible for planning and operating the distribution network systems would learn important lessons about how best to use the resources available to them in such an exceptional circumstance. Those lessons have already led to ETSA Utilities initiating actions which will enable a high level of service to customers in similar future events.

With the resources available to it and given the level of performance that it has achieved over the longer term, ETSA Utilities has met the standards required. However, ETSA Utilities is committed to using the lessons learnt from the January Heatwave to ensure that the number of its customers that experience unacceptable level of customer service in respect of future like events is minimised.

In summary, the circumstances of and ETSA Utilities' response to the heatwave are set out below, and provided in more detail in the remainder of the document:

- The January heatwave was the most significant heatwave event in South Australia in 63 years.

- The forecasts from the Bureau of Meteorology did not reflect the intensity and the duration of the heatwave subsequently experienced. This meant that ETSA Utilities prepared for a lower impact event.

- ETSA Utilities' planning was in accordance with "Good Electricity Industry Practice" ie

    - There were no capacity issues during the heatwave period on the High Voltage system (ie Transmission, Sub-transmission, Substation or Feeder);

- Our Low Voltage (LV) transformer planning was as good as the available detailed customer load information at LV Transformer level permitted ie where that information did not reflect the installation of new or increased air-conditioning or like equipment, then our planning could not anticipate likely failures of the network.

- ETSA Utilities' pre-season preparation for a heatwave included appropriate work on LV transformers, spares inventory, and escalation processes. As the event evolved, there was no shortages of spares, fuses and other materials;

- ETSA Utilities was responsive to the Media with the information it had available, and provided faxstreams, media conferences and individual responses to all media enquiries, as well as timely updates through its website;

- ETSA Utilities' prioritization system, which restores high voltage faults before LV faults, meant that 94% of customers who experienced a high voltage related outage had their supply restored within 3 hours. This complies with our regulatory obligations (see section 1.2 above) in the Electricity Distribution Code. ETSA Utilities restored supply to 86% of customers within 3 hours who experienced an outage (ie on both HV and LV network) during the heatwave.

- The current prioritization system did not escalate the priority of small numbers of customers who potentially could be without supply for longer periods or experience multiple interruptions during the event.

- The Call Centre performance was influenced by the lack of up to date job progress information on when a job would be restored eg lack of feedback from field crew, as they were focused on restoring supply.

ETSA Utilities has identified improvements resulting from a review of its response during the heatwave. These include:

- the automatic messaging system which responds to customers' calls will be improved to provide better information;

- Centralisation of the linking of customer outage notifications (ie telephone calls) into supply restoration jobs (ie many customers' calls are associated with one fault) that can be dispatched to field crews for repairs. This will release field personnel in depots, previously used to link calls, to restore supply. This centralisation will also provide improved job restoration status;

- Implementation of the Outage Management System (OMS) which commenced in late 2004 and is scheduled to be completed in early 2007. The OMS will automatically link customer outage notifications to a restoration job by determining the most likely location of the fault from the calls. The OMS will enable the efficient dispatch of restoration crews by determining the closest crew to the fault. The OMS will also be able to provide status information on the completion of tasks (eg on site, patrolling etc).

- Resourcing strategies have been implemented to increase the number of field crews available for such events.

- A revised prioritization system has been implemented to escalate response solutions for small numbers of customers who potentially could be without supply for more than 10 hours or experienced multiple outages during a single event;

- An Overflow call centre has been established at Keswick with up to 50 seats; and

- Training of back up support staff is being provided to assist the resourcing of such events.

1.3.1 Comparison with Interstate Distributors

There is limited public information available to compare ETSA Utilities' performance with interstate experience.

ETSA Utilities experienced 0.66 independent faults per 1,000 customers during the heatwave period which is almost the same as in Victoria (0.65 per 1,000 customers) during the February 2005 Storm. ETSA Utilities had an average restoration time for customers who experienced an outage of 131 minutes compared to the average Victorian restoration time for the February 2005 storms (about 4 days) of 170 minutes.

Also, based on ETSA Utilities' knowledge of other distributors' performance under similar circumstances (ie heatwaves/storms) ETSA Utilities performed acceptably. In the recent heatwave in Victoria, it has been reported that customers were without supply for up to 48 hours.

1.3.2 Comparison with previous significant events

ETSA Utilities generally measures the impact of significant events using the measure "System Average Interruption Duration Index (SAIDI)". This measures the total number of minutes on average, that a customer connected to the distribution system is without electricity in a year. The highest daily SAIDI during the Heatwave does not rank in the top 10 highest SAIDI days since 1998. The highest SAIDI day for the heatwave was about 7 minutes compared to the highest daily SAIDI in the order of 20 minutes.

1.4 Presentation of information

The material presented in this submission has been provided from ETSA Utilities' systems and from various public sources as referenced in this document. The information has been prepared and provided as ETSA Utilities' best assessment of circumstances of the January Heatwave.

2 Introduction

2.1 Background

On 31 January 2006, the Minister for Energy formally asked ESCOSA to investigate and make determinations in respect of ETSA Utilities' performance during a heatwave experienced in South Australia between 19 and 22 January 2006.

ESCOSA has commenced an investigation and has asked ETSA Utilities to provide information to ESCOSA and its consultants. ETSA Utilities has provided a significant amount of data and responded to questions prepared by ESCOSA and its consultants.

ESCOSA has also prepared an Issues Paper dated February 2006, and has sought submissions from the public in relation to the heatwave, and ETSA Utilities' performance during the period 19 to 22 January 2006. This indeed was a significant event as the ESCOSA Issues Paper noted that, "based on the occurrence of 4 successive days with maximum temperatures in excess of 40ºC, this was the most extreme heatwave event in Adelaide since 1943"[1].

This submission provides information on the issues raised in the ESCOSA Issues Paper.

2.2 Issues paper – terms of reference

The terms of Reference for the Inquiry require ESCOSA to:

- Investigate the performance of the network during 19 – 22 January
- Determine if ETSA Utilities' has complied with its regulatory obligations
- Determine if the GSL payments provide insufficient incentive to meet determined levels of service
- Determine if ETSA Utilities' performance was in accordance with "good electricity industry practice"
- Make recommendation if appropriate to any changes in the regulatory framework.

Particular issues include:

- ETSA Utilities' overall management, planning and preparation for high load events;
- Specific planning preparations for 19 to 22 January;
- Actual performance of the network;
- Impacts on customers (number and duration of outages);

[1] ESCOSA Issues Paper, page 10

- Adequacy of ETSA Utilities' response – timeliness, prioritisation, provision of information;
- Whether the location of the call centre impacted on the performance;
- Determination of ETSA Utilities' practices in relation to upgrades on LV transformers is adequate; and
- Contingency planning for extreme events.

3 Planning

3.1 The ETSA Utilities distribution system

Figure 3.1 below describes how electricity is supplied from generators to customers. ETSA Utilities is responsible for the Sub-transmission and the Distribution network depicted in Figure 3.1 below. The Distribution Network is made up of high voltage (HV) feeders which distribute electricity to transformers which change the electricity from 11,000 volts to 415/240 volts which is then distributed through the low voltage (LV) network to supply households. Most residential households are supplied by one 240 volt LV phase from a transformer.

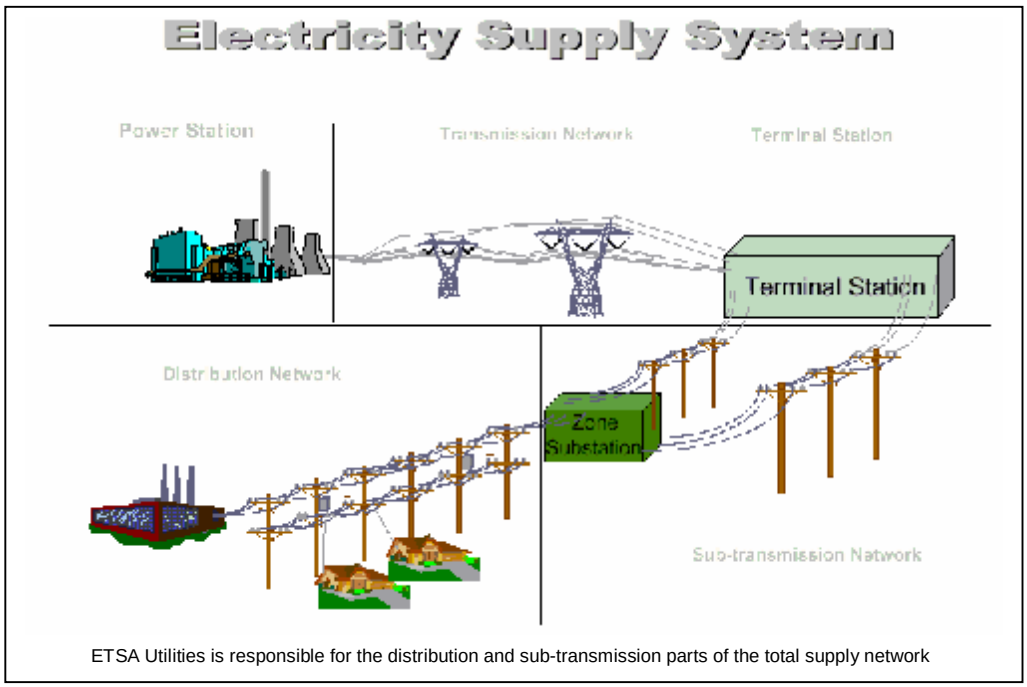


Figure 3.1: Overview of Electricity Supply System

ETSA Utilities is responsible for the distribution system which includes:

- Sub transmission powerlines (66,000 and 33,000 volts);
- Zone substations where voltage is transformed from sub-transmission voltages (eg 66,000) to high voltage (eg 11,000 volts);
- High voltage feeders which transport electricity from zone substations and other substations (approximately 300 supply the State) to transformers near customers; and
- Low voltage circuits/feeders which transport electricity at 415/240 volts along streets to customers' premises.

In summary the ETSA Utilities system has 80,645 kilometres of lines and 66,336 transformers distributing electricity to 761,000 customers.

3.2 Planning overview

ETSA Utilities' responsibilities – Distribution system

ETSA Utilities is responsible for planning the distribution system so that it complies with its regulatory obligations. These obligations include preparing the distribution system to cope with expected peak demands for electricity. These peak demands occur in summer in SA.

3.2.1 High voltage distribution network planning

ETSA Utilities plans the HV network based on:

- previous peak demand (last peak demand of 2,538 MVA occurred in February 2001);
- historic growth rates for individual zone substations (State average about 3% per annum); and
- known large customer demand for electricity (ie where customer requires more than 1MVA).

The recent peak demand experienced on Friday 20 January 2006 was 2,633MVA or 2,633,000 kVA which, once large customers' contribution has been removed equates to slightly less than 2kVA per customer on average. This 2kVA per customer is a diversified load and each customer contribution to the peak load even though individual customers load on a LV transformer can be about 8kVA. This difference is called diversity and reflects the differences when customers are actually using their electrical equipment/appliances. This diversity allows effective planning to upgrade the HV network but makes upgrading the LV network including LV transformers difficult.

There were a few zone substation and HV feeders where the actual demands for electricity during the heatwave period exceeded the expected demand forecast. There were no outages during the January 2006 heatwave period caused by overloads on the HV distribution network ie there were no outages of the HV network at feeder level and above directly related to heatwave conditions.

3.2.2 Planning – low voltage

3.2.2.1 Planning of new residential land divisions

ETSA Utilities designs its network in most new residential land divisions using a demand per customer of between 6 and 8kVA depending on the type of housing stock (eg normally based on size of dwellings) that is proposed. In some land divisions where larger houses are installed the design ADMD exceeds 8 kVA.

3.2.2.2 Upgrading of existing LV transformers

ETSA Utilities employs three methodologies for upgrading existing LV transformers and LV networks. The three methodologies are:

- Proactive testing of about 400 transformers per year based on knowledge of the local areas (eg areas where we identify growth (ie residential development or "in fill" is taking place));
- Load and voltage testing of transformer areas as a result of customer enquiries; and
- Investigating LV fuse operations.

ETSA Utilities employs three basic solutions where it determines that a LV area requires an upgrade, which are:

- Balance the load where only one phase could be potentially overloaded but the transformer capacity is adequate, and/or increase LV fuse sizes;
- Balance the load between transformers by decreasing the number of customers supplied by that transformer and increasing the numbers of customers supplied by an adjacent transformer; or
- Increase the capacity of the transformer or install an additional transformer and reduce the number of customers supplied by adjacent transformers.

Low voltage planning issues

Customers are obligated to advise ETSA Utilities when they increase the load at their premises by more than 2.5kVA (eg install a new air conditioner). However, there is no penalty associated with non-compliance with this obligation. Less than 10% of customers advise ETSA Utilities when this occurs and the customers who do advise us only appear to do so when ETSA Utilities is required to do some work to upgrade the customer's supply connection.

South Australia's growth in LV demand at a transformer level results from:

- Growth in new customers due to new land divisions and new commercial businesses. ETSA Utilities can plan for this development due to its interaction with customers at the time of establishing the new connections; and
- Growth in demand from existing customers, which is principally due to new air-conditioning equipment, and to a lesser extent other appliances.

The difficulties in meeting increasing demands from existing customers are:

- Customers are not obligated to advise ETSA Utilities of air conditioner installations unless the unit's input power exceeds 2.5kW.

- Even where they are obligated to advise ETSA Utilities, customer compliance is very low.

- Approximately 40-45% of air conditioners sold in South Australia are rated at less than 2.5kW and therefore there is no obligation to advise ETSA Utilities.

- ETSA Utilities is therefore not notified of the vast majority of air conditioner installations in the State.

- In 2000, 2001 and 2002, in an effort to increase the number of notifications, ETSA Utilities ran an Air Conditioner Installation Notification Program (AINP). Advertisements, sales channel training and a point-of-sale competition were used to encourage voluntary notifications, at significant cost.

- The AINP succeeded in driving notifications of approximately 2,100 targeted air conditioners (>2.5kW) in 2001/2002. This was approximately 3% of all refrigerative air conditioners sold that year.

- Not surprisingly, the number of notified air conditioners that could be linked to individual localised LV network assets was not a useful adjunct to conventional network monitoring processes.

In spite of its efforts in obtaining the localised load growth (that is the growth in customer loads at a street level rather than a suburb or postcode level), ETSA Utilities is forced to use alternative measures and load forecasting methodologies to manage the load at 64,000 LV transformer sites across the state.

ETSA Utilities can only make a reasonably accurate estimate of the peak demand on a transformer by measuring the load on the transformer under extreme weather conditions. This occurs during only a few days each year. Further, heatwave conditions only occur about once every five years which further compounds the issue of understanding the impact of the new loads on transformer capacities.

As part of our proactive testing program to assist in understanding the demand customers place on the LV network, ETSA Utilities undertook pro-active testing during the heatwave (19-22 Jan) on a number of street transformers. A sample of the test results show the significant variation within customer loads even within one suburb as highlighted in the table below.

Transformers tested 19-22 January 2006

Suburb	T/F Size (kVA)	# Customers	Load (kVA)	ADMD (kVA)
West Lakes	150	38	162	4.26
West Lakes	150	40	175	4.38
West Lakes	150	34	170	5.00
West Lakes	150	47	280	5.96

West Lakes' average load per customer varies between 4.3kVA and 6.0kVA per customer ie a difference of almost 40%. A typical transformer used in the LV supply to residential customers is 150kVA. There is no set formula that can be applied to determine based on customer numbers, when a transformer needs to be upgraded. For example, in one location within West

Lakes we could supply 35 customers with an average transformer in one street, and 25 customers in another location to match the transformer capacity.

3.3 Planning – operational events (heatwave and storms)

3.3.1 Types of events

ETSA Utilities is proactive in the planning for special events, in particular weather related events that may impact on the quality and reliability of supply in the distribution system. In particular, ETSA Utilities plans specifically for:

- High Fire Risk days;
- Heatwaves;
- Storms; and
- Other emergencies.

Plans are based on experiences of past events and implemented when forecast information suggests that the likelihood of the event warrants action. As the events are likely to be outside of the control of ETSA Utilities, we rely on the forecasting information provided by the Bureau of Meteorology in South Australia for weather related events, and other agencies responsible for managing and interpreting information relevant to the operation of the electricity networks.

3.3.2 ETSA Utilities' Emergency Procedures Manual

ETSA Utilities' plans for these special events are contained in the Emergency Procedures Manual, which identifies the steps to take in the event of an emergency such as a forecast major storm or heatwave.

The processes contained in the manual allow for a rapid escalation of ETSA Utilities' response capability in order to respond to issues affecting its network with the objective of:

- Rectifying network faults to reinstate supply under the following prioritisation:
  - First - Response to and making safe any network components that pose a danger to life or property;
  - Second - Restoring high voltage outages, reinstating power to large numbers of customers; and
  - Third - Restoring supply to customers affected by LV outages, ie small numbers of customers (less than 60 customers per outage).

- Configure the network (ie how customers are supplied) to reduce the impact faults may have on the environment in the event of a serious bushfire; or

- Mobilising resources within the ambit of the State Emergency Organisation for the conduct of counter-emergency and post-emergency operations under the Emergency Management Act of SA.

3.4 Preparations

ETSA Utilities also undertakes preseason readiness checks that are performed to efficiently prepare for a summer period. The readiness checks and the implementation of various procedures were in accordance with the Emergency Procedure Manual for the 19-22 January period are set out below.

3.4.1 Pre season preparations

ETSA Utilities undertook the following activities for the 2005/06 summer period:

- Prepared the HV and LV network for a summer heatwave (in particular, 537 transformers were specifically addressed for the summer period to ensure they were capable of handling a new summer peak load);

- Performed an exercise for a heatwave or fire ban event in accordance with the Emergency Procedures Manual; and

- Ensured stock availability, including emergency spares, was appropriate for the summer.

3.4.2 Preparations for the January 19-22 heatwave

In accordance with the Emergency Response Manual, ETSA Utilities made preparations for the period 19-22 January, where temperatures were forecast to be above 35 degrees for 3 or more days. The preparation included:

a) **place additional personnel on paid availability**

ETSA Utilities initiated the availability procedures to double the emergency response crews in metro areas and additional crews in country areas were available to deal with forecast heat based on a Bureau of Meteorology forecast of 35 degrees. Additional field supervisory personnel were also placed on paid availability duty for Saturday 21st and Sunday 22nd January.

b) **check vehicles are fuelled and stocked**

In preparation for the heatwave, emergency response vehicles were checked and fully stocked.

c) confirm availability of fuses, transformers and other materials stored in the depot

Depots were checked to ensure that they were fully stocked with fuses, transformers and other materials. Stores Supply Officers were also placed on after hours availability to enable them to arrange delivery of materials from the Central Warehouse to depots.

e) pre-placement of transformers

Additional arrangements were made to deliver additional transformers to certain metropolitan depots in readiness should any failures occur. Hanging kits, eg brackets, were also delivered with the transformers.

f) identify planned work that can be rescheduled

Any works that could be delayed were rescheduled, releasing additional resources for emergency response.

ETSA Utilities considers that its preparations for the forecasted heatwave event were appropriate and in line with the careful planning for summer heatwave conditions experienced in South Australia. See section 4.2 below for a description of the forecasts, and the actual temperatures observed. ETSA Utilities' preparations would have been different (in nature and extent) if the forecast had predicted 3 consecutive days of greater than 40ºC and the high night time temperatures.

4 January 2006 heatwave

4.1 Definition of a heatwave

For the purposes of this submission, ETSA Utilities has adopted a definition of a heatwave consistent with that used by the Bureau of Meteorology. A heatwave is therefore defined as:

- 3 consecutive days with temperatures ≥ 40ºC; or
- 5 consecutive days with temperatures ≥ 35 ºC.

As the temperatures were above 40ºC for three consecutive days, the 19-22 January event is a heatwave under the definition used by Bureau of Meteorology (BOM).

A heatwave that produces high overnight temperatures (as that which occurred in January 2006) as well as high day time temperatures results in high peak electricity loads, and places more stress on electricity network components, than a sustained period of high daytime temperatures with cooler nights (eg less than 25 ºC minimums).

4.2 Forecasts for 19-22 January 2006

The temperature forecasts prepared by the BOM are presented in this section. Whilst it is not expected that actual observations will always agree with forecasts due to the inherent complexities of their determination, these forecasts are the only source of guidance available to ETSA Utilities upon which to base preparations for heatwave conditions.

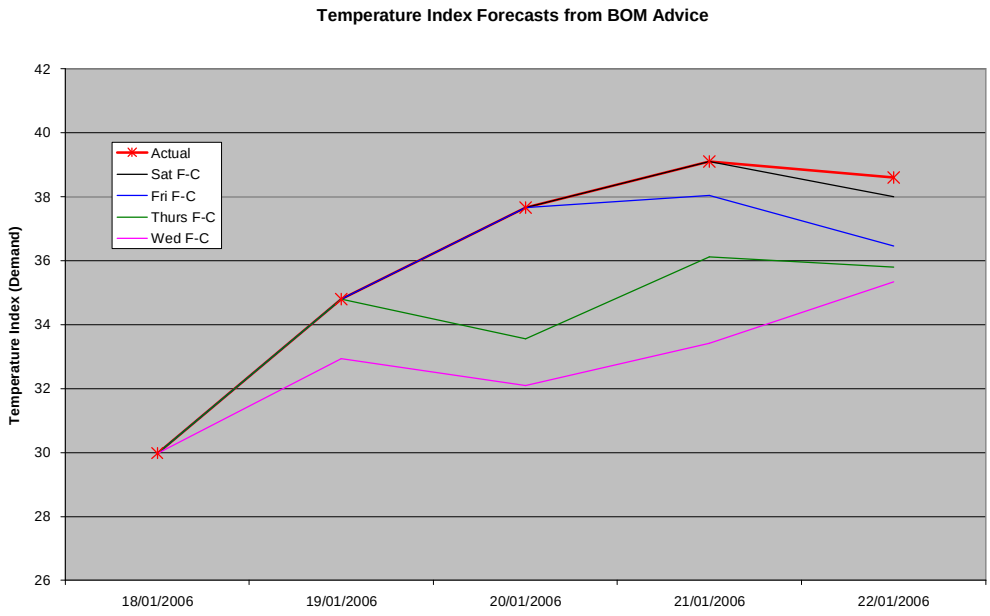
In January 2006 however, ETSA Utilities had prepared for hot weather (temperatures in excess of 35 ºC) as opposed to a heatwave (temperatures in excess of 40 ºC), and escalated the hot weather preparations after two days of extreme heat (greater than 40 ºC). Receiving temperature forecasts that were substantially below that finally observed delayed seeking additional resources to respond to the heatwave.

The following chart shows the difference between the forecast maximum temperatures, and the actual observations.

The chart demonstrates that after two days of climbing maximums, the BOM's predictions continued to underestimate the temperatures finally observed. ETSA Utilities' preparations had therefore been based on a lower impact event, based on the best available data at that time.

The under estimation of the network impact is amplified by the forecasting of lower over-night minimums than was actually experienced during this event. This is discussed later in this section.

Chart 4.1 Temperature forecasting and comparison with actual maximums – Kent Town



4.2.1 Forecasting difficulty

The BOM's own data supports this forecasting anomaly. From the data obtained from the BOM, the Adelaide forecast temperature for example was as much as 6.8 degrees understated.

Adelaide City forecast for Day 2 and Day 1 versus actual are presented below.

Day 2

		Day 2		Actual		Difference	
Date of issue	Forecast for	Max	Min	Max	Min	Max	Min
17-Jan-06	19-Jan-06	35	21	40.2	21.5	5.2	0.5
18-Jan-06	20-Jan-06	35	23	41.8	27.9	**6.8**	**4.9**
19-Jan-06	21-Jan-06	41	23	43.1	27.7	2.1	4.7
20-Jan-06	22-Jan-06	39	29	40.8	33.1	1.8	4.1

Day 1

		Day 1		Actual		Difference	
Date of issue	Forecast for	Max	Min	Max	Min	Max	Min
18-Jan-06	19-Jan-06	37	23	40.2	21.5	3.2	-1.5
19-Jan-06	20-Jan-06	37	23	41.8	27.9	4.8	**4.9**
20-Jan-06	21-Jan-06	42	26	43.1	27.7	1.1	1.7
21-Jan-06	22-Jan-06	41	29	40.8	33.1	-0.2	4.1

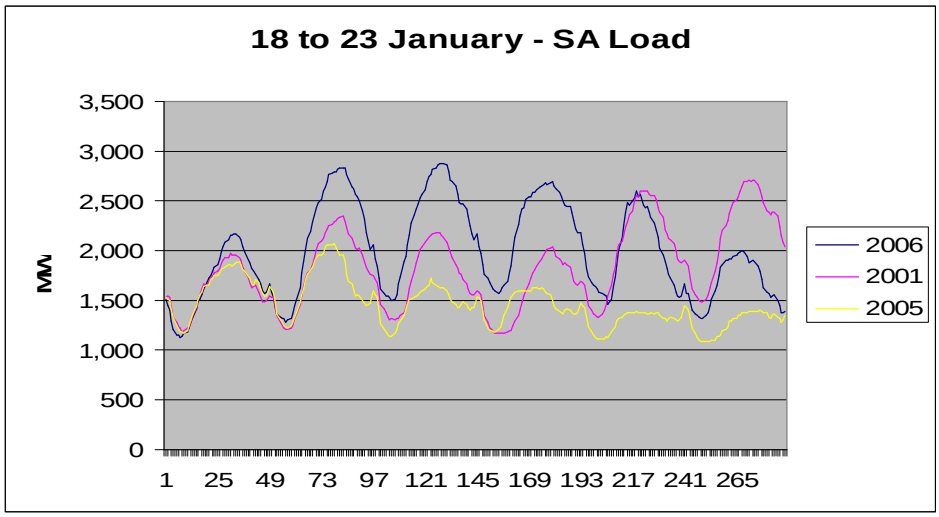
4.3 Observations

4.3.1 Weather observations

The January 2006 heatwave recorded the hottest 4 consecutive days for 63 years with maximum temperatures exceeding 40°C on each day and minimum temperatures exceeding 27°C degrees (with the highest being 33°C). ESCOSA recognised this by stating in its Issues Paper that "this was the most extreme heatwave event in Adelaide since 1943"[2].

During this period ETSA Utilities recorded its highest ever total network demand of 2,633 MVA[3].

4.3.2 Load comparison (NEMMCO data)



The above chart demonstrates that the peak load for South Australia was approaching 3,000 MW (including transmission direct connected customers) on Friday 20 January 2006. Of more importance is the fact that the heatwave conditions of 2006 were higher than that experienced in 2001. By way of comparison in the 2006 heatwave, the daily peak load for January 21 and 22 in 2005 was less than the overnight offpeak load for the same period in 2006. Examination of the chart will show that the 2005 loads were substantially less than that experienced in the extraordinarily hot conditions of 2006.

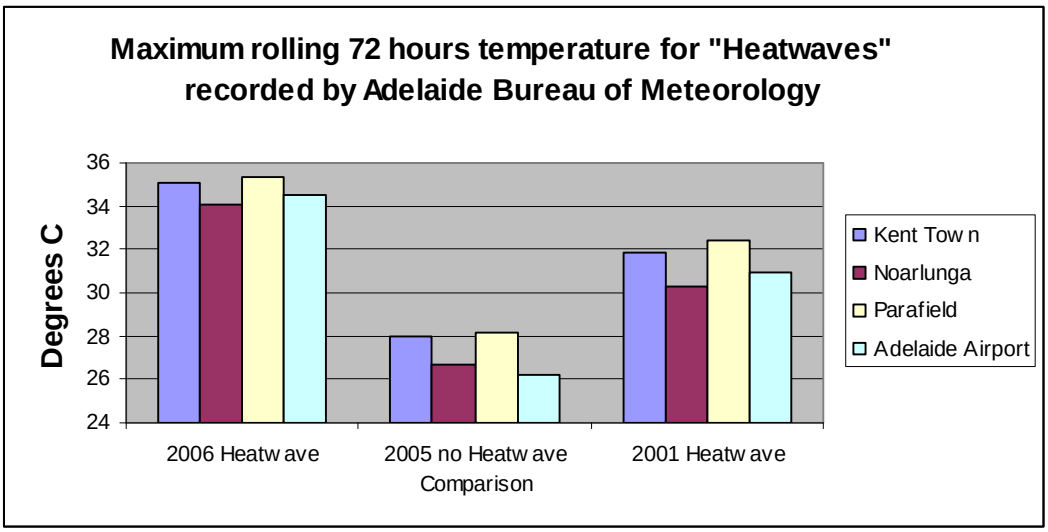
[2] ESCOSA Issues Paper, page 10
[3] The ETSA Utilities' maximum is less than the total for South Australia as this excludes the direct connected customers of ElectraNet SA.

4.4 Comparisons with other heatwaves

4.4.1 Heatwaves of 2006 and 2001

The BOM have provided analysis which compares the heatwaves experienced in Adelaide in 2006 and 2001 (the 2001 heatwave caused the previous highest peak load). In making this comparison, the BOM have used a rolling 72 hour period to provide a measure of the heatwave. The results of the comparison are presented below:

Chart 5.1 – BOM prepared data – rolling 72 hour maximum temperatures



From the above chart, it shows that the 2006 heatwave was longer and more consistent across the Adelaide metropolitan region than 2001, with all areas experiencing heatwave conditions.

BOM data shows that the number of hours that the 72 hour rolling temperature was greater than or equal to 30°C for the 2006 event was 70.3, averaged across all four sites. This is 18.8 hours higher (36%) than the previous highest average duration of 51.5 hours in 2001.

4.4.2 Ability to effectively predict next peak demand

Based on the above information ETSA Utilities' is only able to test the maximum demand on the distribution system every time there is extreme hot weather, normally associated with a heatwave, which on past experience is every 5 years. This limits ETSA Utilities' ability to focus its resources in upgrading the capacity in its distribution system in the intervening years with out effective tests. This is particularly true for local areas where customers' new demands are as a result of the purchase of equipment during the intervening 5 years.

5 ETSA Utilities' Response

In this section, ETSA Utilities describes what was done in response to the heatwave conditions.

It should be remembered that ETSA Utilities' initial response was based on the original four day weather and temperature forecasts rather than the conditions that were experienced. During the four days ETSA Utilities' response was escalated in response to the actual conditions presenting at the time.

5.1 Operation event plan - preparations

Preparations for the 19-22 January are summarised as follows:

- The number of after hours emergency response crews in the metropolitan area was nearly doubled, and increased in country areas;
- The number of after hours supervisory personnel was increased;
- Warehouse and stores supervisors staffed depots and the central store to increase the flow of materials to response crews;
- Replacement transformers were pre-placed at strategic locations for quick response;
- Response vehicles were fuelled and response trucks fully stocked with fuses and other materials;
- Remaining skilled electrical workers were requested to indicate their availability for the weekend if difficulties were to be experienced; and
- The Call Centre was informed of the pending hot conditions.

5.2 Response during the heatwave

All available crews were employed in responding to outages and restoring customers' supply in accordance with the Emergency Procedures Manual and within the Occupational Health and Safety Guidelines which allow crews to work for extended periods of time but at a maximum of 16 hours within any one 24 hour period.

As the heatwave progressed, ETSA Utilities experienced a rise in the number of faults coincident with an increase in the temperatures above that forecast by the BOM. ETSA Utilities commenced a process of increasing the number of crews available for restoration work and doubled the number of people managing restoration work from the Network Operations Centre.

Specifically ETSA Utilities:

- Contacted employees not already deployed in the response, to arrange additional crews to respond to the increasing backlog of faults. This was only partially successful due to the late notifications and the ongoing failure to predict the increasing temperatures;

- Doubled the number of network operations centre staff to manage restoration work and coordinate information back to the IVR at the call centre;

- Called in stores and warehouse personnel to the man depots and central warehouse to manage the deployment of replacement fuses and other materials used in the emergency response;

- Established the emergency control room next to the network operations centre to manage ETSA Utilities' response to the emergency and to provide information to media liaison through designated media contacts;

- Decentralised some response coordination to local depots who had established a response coordination process for their local area using local knowledge of the network infrastructure;

- Arranged for contractors to assist in the restoration efforts resulting in 2 to 3 additional crews. These additional requests were made late on Friday, and the effectiveness of this process was adversely affected by contractors ability to respond to such a late request for the after-hours work;

- Mobilised special equipment to assist in temporary restoration of supply including:

    - Deployment of a mobile substation;

    - Deployment and connection of mobile generators to supplement supply; and

    - Connection of mobile transformers to bypass or supplement transformers in the network.

- Called in additional call centre staff during the event to handle the influx of calls.

Media liaison was also enhanced as the impact of the heatwave escalated. The Marketing Communications Manager personally handled each media enquiry with relevant available information about customers affected, and provided additional updates on an ETSA Utilities website established for notification of outages.

Media conferences were held on Saturday and Sunday, and included statements from the CEO of ETSA Utilities. At these conferences, all media questions were answered. In addition to the conferences, press releases were provided to all media outlets registered on the media Faxstream.

6 Performance Outcomes

6.1 Network performance

ETSA Utilities calculate the impact of all events over the four day heatwave period (those due to both heatwave and other causes such as vegetation and lightning, for country and metropolitan areas) as:

- Approximately 84,000 customers or 11% of customers were affected by high voltage interruptions in the hottest heatwave in 63 years and the following storms on Sunday afternoon, with 94% restored within 3 hours. This is better than the regulatory restoration standard as defined in the Distribution Code[4].

- Approximately 12,600 customers were affected by low voltage outages, representing 1.6% of customers.

- 87.4% of the customer base did not experience an outage during the heatwave.

- 241 LV transformers either experienced fuse operations or failures (27), out of 63,777 transformers connected to the network. Therefore 99.6% of the transformers connected to the network did not experience a fault during the heatwave.

- The average restoration time for all outages during this heatwave was 131 minutes compared to a normal average for a year of 100 minutes;

- Customers with less than acceptable outage restoration times qualified for a Guaranteed Service Level (GSL) Payment. The GSL payment was made or is in the process of being paid to 0.37% (2,850) of customers. The total of the GSL payments is expected to be in the order of $350,000.

- Customers that incurred loss due to power supply interruptions have been compensated for the loss which is in addition to any GSL payment.

6.2 Call Centre answering performance

The Call Centre manages the receipt of calls from customers and utilises an IVR (Interactive Voice Recording) system to assist in answering calls and providing information to callers.

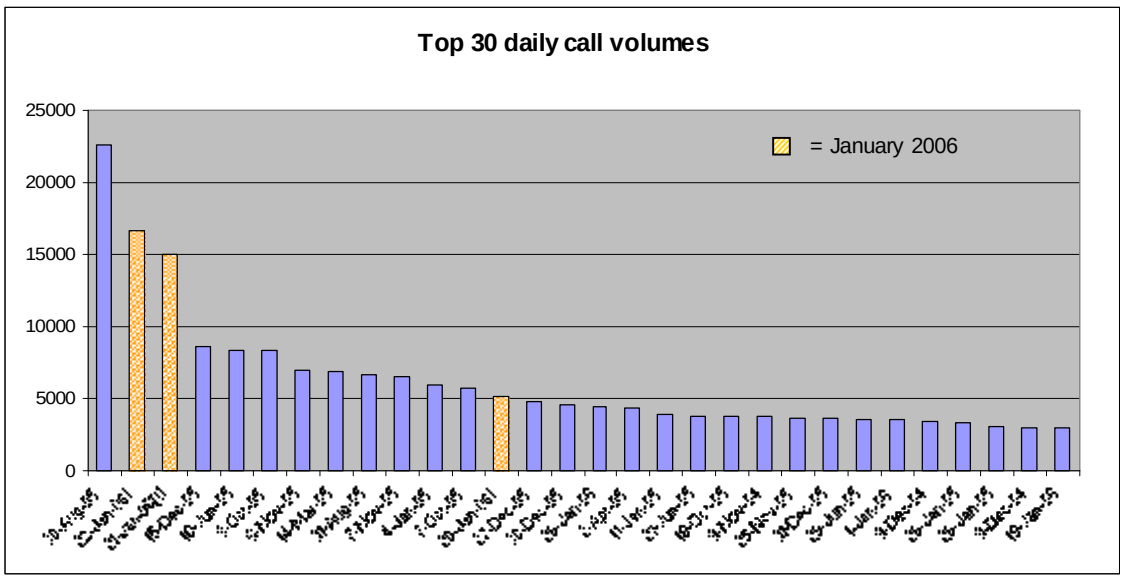
The IVR system usually provides sufficient information to a caller, and is set up to handle 270 incoming calls at any one time. This has proven to be an efficient mechanism to handle large volumes of calls which has been adopted as best practice by the industry. In addition to the IVR, the call centre has the ability for up to 50 calls to be answered by trained operators at any time.

[4] Electricity Distribution Code – Clause 1.2.3.1 – All regions

Typically, the Call Centre handles approximately 900 calls per day either personally or via the IVR.

6.2.1 Call Centre volumes

The following chart compares the highest 30 call volume days with those recorded for January 2006.



Note that three out of the four heatwave days are included in the top 30 call days. This is the first time that three consecutive days have been included in the 30 highest telephone call days since 2000.

6.2.2 Call Centre operations

ETSA Utilities shares its call centre with Powercor and Citipower in Victoria. The sharing of the Call Centre allows for higher average Call Centre staffing, increasing the ability to deal with higher volumes of emergency calls. Call Centre staff and the IVR can provide indicative information on restoration times based on information sourced from field response crews and network operations staff. During the January heatwave, efforts were directed to restoration rather than providing the status of the restoration progress to the Call Centre, which resulted in more, and longer duration calls to staff at the Call Centre. This resulted in longer wait times in the call queue.

The Call Centre statistics are shown in the table below. The Call Centre had all available resources working throughout the weekend including staff in the back-up Call Centre in Melbourne. Staffing levels were 2.5 times that of the normal level as additional call centre staff were brought in or volunteered to assist during the escalation of the heatwave.

The Call Centre was also dealing with high call volumes for Powercor and Citipower because of the bushfires in Western Victoria, and their own heatwave problems. The Call Centre did not give priority to Victorian customers.

6.2.3 Statistics

The following table shows the Call Centre statistics for SA callers for the period:

January 2006	Thursday 19	Friday 20	Saturday 21	Sunday 22	Total
Number of calls received	2,990	5,113	15,059	16,593	39,755
Number of calls answered by IVR	1,859	2,975	8,749	10,329	23,909
Number of calls answered by call centre operator	1,051	1,647	2,337	2,175	7,210
Average wait time for an operator (min:sec)	0:58	2:59	13:29	11:56	

It is worth noting that on Saturday, between the hours of 8.00pm and 11.00pm, the call volumes averaged 1,400 calls per hour with a peak volume of 1,656 calls between 9.00pm and 10.00pm compared to an average hourly rate per annum of 35.

Of particular importance is that any call that related to a life threatening emergency was answered on average within 30 seconds, with the longest wait time during the period for these calls being 1 minute. These calls typically relate to live wires in a dangerous position or other emergency that requires a higher priority of response.

ETSA Utilities' telephone responsiveness significantly improved as a result of learnings from the August storms in 2005, and 26,239 calls were answered within 30 seconds.

Even with significant improvement in performance, the wait time for customers to talk to an operator became extended due to the imprecision of the available information. ETSA Utilities recognises the importance of trying to provide timely information on the status of outages and expected time of restoration.

ETSA Utilities has now established additional call centre facilities to handle high volume call centre activity in the future. This backup Call Centre in Adelaide can be made available at short notice and is outlined in Chapter 8 below.

7 Regulatory arrangements

7.1 Service standard framework

ETSA Utilities earns revenue in accordance with the recent regulatory price determination prepared by ESCOSA in 2005. A key aspect of the price determination is the new service standard framework established for the period 2005 to 2010.

The service standard framework consists of:

- Average service standards which incorporate average minutes lost per customer, number of interruptions recorded in a period and percentage restoration times (eg metro 90% customers restored within 3 hours). These standards are set for seven geographic regions in the state;

- A service incentive scheme which provides rewards and penalties which focus on the worst served 15% of customers and the call centre performance. These incentives provide a maximum penalty or reward of $2.1million per annum for 5 years; and

- Reliability Guaranteed Service Level (GSL) payments which are paid for either long duration interruptions (longer than 12 hours) or number of interruptions per financial year.

- Telephone response where ETSA Utilities must use its "best endeavours" to answer 85% of telephone calls within 30 seconds. Previously (2005-2010), the service standard framework that applied excluded calls after a major outage (eg previously the heatwave period would have been excluded).

ETSA Utilities considers that the incentives/penalties provided in these schemes are sufficient to drive the business to maintain or improve performance to its customers.

ESCOSA established the service incentive framework based on customers' willingness to pay for improved reliability performance. The GSL payments/penalties were based on interstate practices but incorporated stiffer penalties and no excluded events. Therefore, ETSA Utilities considers that the incentives/penalties provided in these schemes are sufficient to drive the business to maintain or improve performance to its customers.

ESCoSA made the following statement in their 2004/05 Annual Report on "Performance of South Australian Energy Distributors":

> "…, the SSF (added *Service Standard Framework*) for the 2005-2010 period will be more aligned to the needs of customers, particularly those currently receiving poor levels of service."

7.2 Heatwave outcomes

In relation to the January heatwave, ETSA Utilities can report that it has paid or is in the process of paying some $350,000 in GSL payments to customers affected by long duration outages. These payments are made automatically, without requiring the customer to make a claim. If 1%

of the customer base was affected by a long duration outage, ETSA Utilities would suffer a penalty in excess of $1million in GSL payments plus potentially increased GSL frequency payments at a later date.

In addition to the GSL payments, ETSA Utilities has paid compensation to customers who have suffered a loss (eg food stuffs) due to extended power outages. This compensation provides a further incentive to improve performance in the network and compensation payments associated with the heatwave exceed the GSL penalty.

8 Results of a review of the Heatwave response

8.1 Meeting expectations

The heatwave conditions experienced in January 2006 were extreme, in a number of key aspects namely, the temperature maximums achieved in the State, the night time temperatures and the duration of the extreme temperatures. The heatwave had a greater effect on ETSA Utilities due to the fact that the temperatures experienced were well in excess of those forecast by the BOM. This exceptional combination of circumstances meant that some customers experienced poor service outcomes. ETSA Utilities using the resources available to it nevertheless satisfied "Good Electricity Industry Practice", in that:

- 94% of customers affected by high voltage outages during the heatwave period had their supply restored within 3 hours which is better than our regulatory obligations and 86% of customers who experienced outages (both HV and LV) had their supply restored with 3 hours;

- In the 12 months to 31 January 2006, ETSA Utilities achieved the standard of answering 85% of customer calls within 30 seconds.

- ETSA Utilities was able to maintain field personnel in emergency response conditions for extended periods of time in temperatures in excess of 40ºC in the shade, whilst still maintaining safe work practices. There were no staff safety incidents during the heatwave period.

- There were no materials shortages of any significance showing that ETSA Utilities' stocking program for summer extremes was appropriate.

- ETSA Utilities was able to provide depot based supervisory and administration personnel, and head office based personnel on overtime shifts to support the field restoration efforts.

- There was good adherence to ETSA Utilities' "Working Hours and Rest Periods Instruction" and "Working in Hot Conditions Instruction" to ensure the health and welfare of our field crews was maintained which allowed for maximum crewing over the four days from the available resources.

- There were no public safety incidents attributable to the network faults.

- The preparation of the High Voltage network for peak load conditions worked extremely well with no overload of Connection Points, Zone-Substations, Sub-transmission lines or HV feeders during the heatwave thereby significantly reducing the numbers of customers affected by the extreme weather.

- The work completed on more than 500 LV transformers during the lead up to the 2005/06 summer reduced the number of LV fuse operations compared to previous peak loads. This was effective in reducing the impact of the January 2006 heatwave.

- The general requirement to use "Good Electricity Industry Practice" in the National Electricity Rules must be read in conjunction with the specific standards in the Electricity Distribution Code. The general requirement in the National Electricity Rules cannot apply a higher standard than the specific obligation to use best endeavours to meet certain performance standards established by Electricity Distribution Code.

8.2 Improvements

ETSA Utilities acknowledges that a small number of customers (0.37%) encountered what was an unacceptable level of customer service because of the lengthy period before supply could be restored. ETSA Utilities has learnt from the heatwave. Those lessons have already led to ETSA Utilities initiating actions which will enable a higher level of service to customers in similar future events. These include:

- Provide wider dissemination of "Emergency Response Level" Procedures to all relevant operational personnel and issue ETSA Utilities wide alerts to forewarn relevant personnel of forecast emergency conditions, eg. pager messages, two way radio announcements.

- Develop new arrangements for field and depot based personnel to maximise the number of personnel likely to make themselves available out of hours under such circumstances in the future. Improve procedures for listing all employee contact details on the intranet and improved procedures for calling in "off duty" personnel. New procedures to determine staffing level "quotas" for emergency conditions will be implemented.

- Develop new improved procedures for sorting, managing and dispatching customer outage notifications through centralisation of this function in the Network Operations Centre. This will maximise the number of field personnel available to respond to calls and provide a central point for status reporting to update the Interactive Voice Response system and call centre operators.

- Implementation of the Outage Management System (OMS) which commenced in late 2004 and scheduled to be completed in early 2007. The OMS will automatically link customer outage notifications to a restoration job by determining the most likely location of the fault from the calls. The OMS will enable the efficient dispatch of restoration crews by determining the closest crew to the fault. The OMS will also be able to provide status information on the completion of tasks (eg on site, patrolling etc).

- Implement a Maximum Restoration Time Policy - modifying the existing Emergency Procedures Manual priorities for restoration of supply, ie. "for significant emergency situations faults will be prioritised by the number of customers affected (eg 10,000 before, 1,000 before 100 etc)", but the policy will now include an outage time component when prioritising the restoration of single customers outages and outages affecting small groups of customers to ensure that all customers are reconnected within an acceptable time.

- Improvements to our call handling capability through:

  - A Keswick Overflow Call Centre with 50 seats has been established and will be staffed by trained staff. Training of more than 120 staff has been completed so far.

  - Transferring calls directly to the Keswick Overflow Call Centre once the ETSA Utilities staff are available.

  - A review of the IVR messaging and the Operational Contingency Plan has been completed, and will be updated following the implementation of the current initiatives.