



**ANNUAL SERVICE QUALITY REPORT  
JULY 2007 TO JUNE 2008**

**ENERGEN LIMITED**

**Updated January 2010**

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## Introduction

This annual report is prepared in accordance with the Queensland Competition Authority's *Electricity Distribution: Service Quality Reporting Guidelines Version 2.0 2005* (Guidelines).

In this annual report, ENERGEX provides a range of information on the state of its distribution network, including information on the size of the network, the total amount of electricity supplied to customers, and areas of the network where reliability is significantly less than the majority of similar areas in the network.

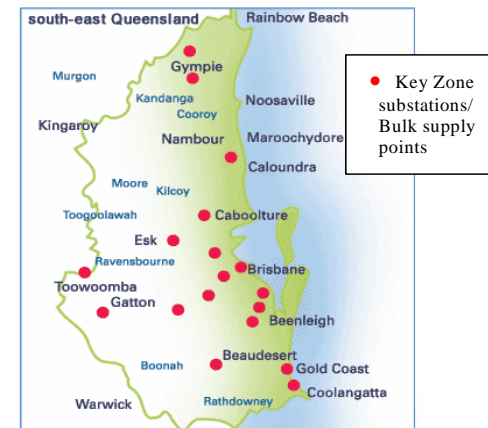
In order to keep customers up to date, ENERGEX also reports a wide range of service quality measures on a quarterly basis, covering the quarters from January to March, April to June, July to September, and October to December. These quarterly reports include extensive information on the reliability of supply, the quality of supply (voltage), and many different measures of customer service such as the performance of the call centre, the time taken to fix street lights, and punctuality in keeping appointments with customers.

## About ENERGEX's electricity distribution network

This report focuses on the performance of ENERGEX's electricity distribution network, which is the network of poles, wires, underground cables and transformers that takes electricity from the high voltage wires operated by the electricity transmission company, and delivers them to customers in south-east Queensland.

ENERGEX provides electricity distribution services to customers in south-east Queensland, in a region stretching from Gympie in the north to Gatton in the west and Coolangatta in the south.

Within this supply area, ENERGEX supplies electricity to more than 1.2 million customers, including 851,497 urban customer and over 363,426 short rural customers.



Map of ENERGEX's electricity distribution network

*Measuring ENERGEX's performance*

ENERGEX's performance is assessed in a number of ways to provide a complete picture of the quality of services provided to customers. This report provides information on ENERGEX's distribution network, including:

- a summary of reliability performance over the financial year, which is reported in detail in the quarterly ENERGEX service quality reports. Reliability performance reports on the number and duration of interruptions in electricity supply experienced by customers;
- the size and characteristics of the network (the physical size in square kilometres of ENERGEX's network, the length of overhead and underground lines, the number of poles, the number of transformers in the network, and the amount of energy delivered to customers);
- the utilisation of ENERGEX's transformers, and maximum demand on the network;
- the performance of the 10 worst performing feeders in urban and rural sections of ENERGEX's network; and
- measures taken to address quality of supply (ie. voltage) problems reported by customers.

ENERGEX monitors the performance of all parts of its distribution network to ensure that all customers receive an acceptable level of service. One way we do this is to examine and report on the performance of different areas of the network with a special focus on the reliability of the feeders that deliver electricity to customers connected to the network. We classify and analyse reliability performance looking at three important industry measures of reliability:

- the total duration of interruptions to supply during the year to these feeders (called System Average Interruption Duration Index or SAIDI);

- the number of times supply was interrupted during the year to these feeders (called System Average Interruption Frequency Index or SAIFI); and
- the average length of time to restore power after an interruption (called Customer Average Interruption Duration Index or CAIDI).

Another important measure of ENERGEX's performance is its ability to provide good quality of supply. This means supplying electricity at a constant voltage (generally 240 volts) and to a standard technical specification suitable for customers' electrical equipment. This report provides information on any quality of supply problems reported by customers, and classifies these reported problems by cause, and by the type of remedial action taken to fix them.

## Summary of ENERGEX's Performance

### Reliability Performance

For the distribution network as a whole, to the end of June 2008 (and after removal of excluded events) the reliability performance results were:

- the average duration of interruptions for the distribution system (as measured by SAIDI) was 130.836 minutes, which was higher than the 114.456 minutes reported for 2006-07;
- the average number of interruptions for the distribution system (as measured by SAIFI) was 1.538, which was higher than the 1.382 interruptions reported for 2006-07; and
- the average time taken to restore power after an interruption for the distribution system (as measured by CAIDI) was 85.054 minutes, which is higher than the 82.814 minutes reported for 2006-07.

Breaking down the overall reliability performance into the geographical categories of CBD, urban and short rural, the ENERGEX reliability performance can be assessed for different customer groups. The reliability performance by category for 2007-08 compared to the 2006-07 financial year (after removal of excluded events) is summarised in Table 1.

The CBD reliability figures for 2007/08 were affected by eight loss of supply events. A total of 122 customers were affected for an average of 118 minutes. In all cases the events were isolated to single sites thus minimising the number of customers affected. Four events were due to third party incidents, three events were due to

equipment failure and one event was due to a planned interruption to commission new equipment.

**Table 1** ENERGEX Reliability performance by feeder category

Category	measure	2007-08	2006-07
CBD	SAIDI	3.811	1.273
	SAIFI	0.032	0.015
	CAIDI	118.265	86.975
Urban	SAIDI	83.863	80.444
	SAIFI	1.044	1.016
	CAIDI	80.310	79.186
Short rural	SAIDI	240.949	202.681
	SAIFI	2.699	2.327
	CAIDI	89.275	87.110

The rural reliability figures for 2007/08 were affected by a greater number of severe weather events. In particular, a low depression system in August 2007 caused network outages and also caused localised flooding, which extended restoration times. Severe storms and lightning damage over consecutive days in October 2007 resulted in a high number of rural customers losing supply. And finally, strong winds in May 2008 caused a high number of vegetation-related events in the rural network.

## Network Characteristics

ENERGEX has continued to invest heavily in the network to accommodate the high customer growth in south-east Queensland and improve reliability standards. This investment can be seen in the following network characteristics data:

- The underground sub-transmission network increased by 42.4 km from 1,044.6 km to 1,087 km;
- 7 sub-transmission transformers were installed during 2007-08 taking the total number of sub-transmission transformers to 531;
- 1,159 distribution transformers were installed taking the total number of distribution transformers to 43,420 and raising the total capacity to 11,137 MVA;
- The total length of distribution lines in the urban area increased by 931.2 kms to 20,191 km;
- The total length of distribution lines in the short rural network increased by 160.6 kms to 26,179 km;
- Within ENERGEX's network service area of 25,064 square kilometres, the number of poles increased by 9,426 during 2007-08 to 622,064 poles.
- The total amount of energy delivered was 20,920 GWh, which is a slight increase on the 20,758 GWh recorded for the previous financial year; and
- The amount of distribution losses experienced by the network was 5.74 per cent for the financial year, which decreased by 0.91 per cent to that recorded in 2006-07.

## Worst performing feeders

The worst performing feeders were selected according to normalised distribution SAIDI minutes. The normalised data selects the worst performing feeders excluding the impact of severe and unpredictable events.

## 1. Administrative Data

Item No.	Measure	Descriptor	Value
1.1	<i>DNSP Business</i>	Name	ENERGEX Limited
1.2	<i>First day of reporting period</i>	date	01-07-2007
1.3	<i>Last day of reporting period</i>	date	30-06-2008

## 2. Aggregate Data

Item No.	Measure	Descriptor	Value
2.2 <sup>a</sup>	<i>Length of distribution lines</i>		
	Sub-transmission lines		
	sub-transmission – overhead	kilometres	3,774
	sub-transmission – underground	kilometres	1,087
	CBD		
	high voltage – overhead	kilometres	0
	high voltage – underground	kilometres	97
	low voltage – overhead	kilometres	0
	low voltage – underground	kilometres	21
	Urban		
	high voltage – overhead <sup>b</sup>	kilometres	3,634
	high voltage – underground	kilometres	3,514
	low voltage – overhead	kilometres	6,779
	low voltage – underground	kilometres	6,264

Item No.	Measure	Descriptor	Value
	Short rural		
	high voltage – overhead <sup>b</sup>	kilometres	14,208
	high voltage – underground	kilometres	1,047
	low voltage – overhead	kilometres	8,126
	low voltage – underground	kilometres	2,798
	Long rural		
	high voltage – overhead	kilometres	n/a
	high voltage – underground	kilometres	n/a
	low voltage – overhead	kilometres	n/a
	low voltage – underground	kilometres	n/a
2.3 <sup>c</sup>	<i>Number of poles</i>	number	622,064
2.4	<i>Network service area</i>	square kilometres	25,064
2.5 <sup>d</sup>	<i>Energy delivered</i>	GW.h	20,920
	CBD	GW.h	NA
	Urban	GW.h	NA
	Short rural	GW.h	NA
	Long rural	GW.h	NA
2.6	<i>Distribution losses</i>	percentage	5.74
2.7	<i>Transformers</i>		
	sub-transmission (ST/HV)		
	total number	number	531
	installed capacity (zone substations)	MVA	8,680

Item No.	Measure	Descriptor	Value
	distribution (HV/LV)		
	total number	number	43,420
	installed capacity	MVA	11,137
2.8 <sup>e</sup>	<i>Sub-transmission transformer utilisation factor</i>	percentage	27.51
2.81	<i>Zone substations maximum demand divided by nameplate rating</i>	percentage	56.2
2.9	<i>Coincident maximum demand for the total network over the reporting period</i>	MVA	4,284

Source: NFM

### 3. Reliability measures<sup>f</sup>

Item No.	Measure									
3.4	System Average Interruption Duration Index (SAIDI) – worst performing feeders									
Urban										
Number	Locale <sup>a</sup>	Customer Numbers	Feeder Length (km)	SAIDI Generation	SAIDI Transmission	Distribution Only Total Feeder SAIDI	SAIDI Exclusions <sup>b</sup>	Normalised Distribution Only Feeder SAIDI <sup>c</sup>	SAIDI Planned	SAIDI Unplanned
MDHSWB10	Meenandah	4	2.184	0.000	0.000	1597.25	0.000	1597.25	0.000	1597.25
RCN11	Runcorn	6	1.061	0.000	0.000	888.667	0.000	888.667	835.667	53
FIS8B	Fisherman's Is	2	3.694	0.000	0.000	740.000	0.000	740.000	740.000	0.000
NSW25	Nth Springwood	344	4.199	0.000	0.000	610.254	0.000	610.254	0.000	610.254
CVL13A	Cleveland	5	2.003	0.000	0.000	575.000	0.000	575.000	575.000	0.000
WRG9	Woodridge	1,368	10.471	0.000	0.000	555.215	0.000	555.215	31.173	524.042
BIS2A	Bribie Island	1,767	9.534	0.000	0.000	465.474	0.000	465.474	2.250	463.224
MHPWED5	West End	103	3.02	0.000	0.000	463.111	0.000	463.111	7.525	455.585
TGP8A	Tingalpa	692	4.249	0.000	0.000	451.973	0.000	451.973	4.721	447.253
WCL6	Wacol	2	0.488	0.000	0.000	427.096	0.000	427.096	427.096	0.000

Source: NFM

Item No.	Measure									
3.5	<i>System Average Interruption Frequency Index (SAIFI) – worst performing feeders</i>									
<b>Urban</b>										
Number	Locale	Customer Numbers	Feeder Length (km)	SAIFI Generation	SAIFI Transmission	Distribution Only Total Feeder SAIFI	SAIFI Exclusions	Normalised Distribution Only Feeder SAIFI	SAIFI Planned	SAIFI Unplanned
MDHSWB10	Meenandah	4	2.184	0.000	0.000	1.000	0.000	1.000	0.000	1.000
RCN11	Runcorn	6	1.061	0.000	0.000	1.500	0.000	1.500	0.500	1.000
FIS8B	Fisherman's Is	2	3.694	0.000	0.000	1.000	0.000	1.000	1.000	0.000
NSW25	Nth Springwood	344	4.199	0.000	0.000	2.529	0.000	2.529	0.000	2.529
CVL13A	Cleveland	5	2.003	0.000	0.000	1.000	0.000	1.000	1.000	0.000
WRG9	Woodridge	1,368	10.471	0.000	0.000	2.300	0.000	2.300	0.082	2.218
BIS2A	Bribie Island	1,767	9.534	0.000	0.000	5.790	0.000	5.790	0.014	5.777
MHPWED5	West End	103	3.02	0.000	0.000	3.990	0.000	3.990	0.019	3.971
TGP8A	Tingalpa	692	4.249	0.000	0.000	4.758	0.000	4.758	0.059	4.698
WCL6	Wacol	2	0.488	0.000	0.000	1.221	0.000	1.221	1.221	0.000

Source: NFM

Item No.	Measure									
3.6	<i>Customer Average Interruption Duration Index (CAIDI) – worst performing feeders</i>									
<b>Urban</b>										
Number	Locale	Customer Numbers	Feeder Length (km)	CAIDI Generation	CAIDI Transmission	Distribution Only Total Feeder CAIDI	CAIDI Exclusions	Normalised Distribution Only Feeder CAIDI	CAIDI Planned	CAIDI Unplanned
MDHSWB10	Meenandah	4	2.184	0.000	0.000	1597.250	0.000	1597.250	0.000	1597.250
RCN11	Runcorn	6	1.061	0.000	0.000	592.444	0.000	592.444	1671.333	53.000
FIS8B	Fisherman's Is	2	3.694	0.000	0.000	740.000	0.000	740.000	740.000	0.000
NSW25	Nth Springwood	344	4.199	0.000	0.000	241.294	0.000	241.294	0.000	241.294
CVL13A	Cleveland	5	2.003	0.000	0.000	575.000	0.000	575.000	575.000	0.000
WRG9	Woodridge	1,368	10.471	0.000	0.000	241.374	0.000	241.374	380.027	236.247
BIS2A	Bribie Island	1,767	9.534	0.000	0.000	80.386	0.000	80.386	164.000	80.188
MHPWED5	West End	103	3.02	0.000	0.000	116.060	0.000	116.060	386.302	114.734
TGP8A	Tingalpa	692	4.249	0.000	0.000	95.001	0.000	95.001	79.382	95.198
WCL6	Wacol	2	0.488	0.000	0.000	349.750	0.000	349.750	349.750	0.000

Source: NFM

Item No.	Measure									
3.4	System Average Interruption Duration Index (SAIDI) – worst performing feeders									
<b>Short Rural</b>										
Number	Locale	Customer Numbers	Feeder Length (km)	SAIDI Generation	SAIDI Transmission	Distribution Only Total Feeder SAIDI	SAIDI Exclusions	Normalised Distribution Only Feeder SAIDI	SAIDI Planned	SAIDI Unplanned
BMT3	Black Mountain	1,653	105.517	0.000	0.000	1531.879	0.000	1531.879	27.241	1504.639
MTB6A	Mt Tamborine	397	30.524	0.000	0.000	1238.854	0.000	1238.854	7.365	1231.489
IPL3	Innisplain	471	120.306	0.000	0.000	1184.314	0.000	1184.314	276.665	907.649
IPL1	Innisplain	693	202.748	0.000	0.000	1174.218	0.000	1174.218	158.023	1016.195
RWD1	Rosewood	501	186.798	0.000	0.000	1056.803	0.000	1056.803	416.460	640.343
BWH5	Beerwah	711	52.782	0.000	0.000	974.064	0.000	974.064	35.599	938.465
PWC4	Palmwoods	1,906	85.655	0.000	0.000	915.335	0.000	915.335	53.643	861.692
IBS1	Ibis	2,868	45.901	0.000	0.000	853.341	0.000	853.341	9.924	843.416
SDM3	Somerset Dam	165	69.104	0.000	0.000	847.509	0.000	847.509	19.495	828.014
WFD3	Woodford	1,279	170.433	0.000	0.000	830.586	0.000	830.586	321.309	509.277

Source: NFM

Item No.	Measure									
3.5	System Average Interruption Frequency Index (SAIFI) – worst performing feeders									
Short Rural										
Number	Locale	Customer Numbers	Feeder Length (km)	SAIFI Generation	SAIFI Transmission	Distribution Only Total Feeder SAIFI	SAIFI Exclusions	Normalised Distribution Only Feeder SAIFI	SAIFI Planned	SAIFI Unplanned
BMT3	Black Mountain	1,653	105.517	0.000	0.000	10.546	0.000	10.546	0.102	10.444
MTB6A	Mt Tamborine	397	30.524	0.000	0.000	0.598	0.000	0.598	0.036	0.562
IPL3	Innisplain	471	120.306	0.000	0.000	6.194	0.000	6.194	1.656	4.538
IPL1	Innisplain	693	202.748	0.000	0.000	6.409	0.000	6.409	0.599	5.809
RWD1	Rosewood	501	186.798	0.000	0.000	5.580	0.000	5.580	1.040	4.541
BWH5	Beerwah	711	52.782	0.000	0.000	5.729	0.000	5.729	0.109	5.619
PWC4	Palmwoods	1,906	85.655	0.000	0.000	8.097	0.000	8.097	0.190	7.906
IBS1	Ibis	2,868	45.901	0.000	0.000	5.950	0.000	5.950	0.034	5.916
SDM3	Somerset Dam	165	69.104	0.000	0.000	9.459	0.000	9.459	0.055	9.404
WFD3	Woodford	1,279	170.433	0.000	0.000	8.517	0.000	8.517	0.976	7.540

Source: NFM

Item No.	Measure									
3.6	<i>Customer Average Interruption Duration Index (CAIDI) – worst performing feeders</i>									
<b>Short Rural</b>										
Number	Locale	Customer Numbers	Feeder Length (km)	CAIDI Generation	CAIDI Transmission	Distribution Only Total Feeder CAIDI	CAIDI Exclusions	Normalised Distribution Only Feeder CAIDI	CAIDI Planned	CAIDI Unplanned
BMT3	Black Mountain	1,653	105.517	0.000	0.000	145.250	0.000	145.250	267.011	144.061
MTB6A	Mt Tamborine	397	30.524	0.000	0.000	2071.860	0.000	2071.860	207.156	2189.734
IPL3	Innisplain	471	120.306	0.000	0.000	191.201	0.000	191.201	167.041	200.019
IPL1	Innisplain	693	202.748	0.000	0.000	183.218	0.000	183.218	263.595	174.924
RWD1	Rosewood	501	186.798	0.000	0.000	189.377	0.000	189.377	400.584	141.020
BWH5	Beerwah	711	52.782	0.000	0.000	170.034	0.000	170.034	325.607	167.007
PWC4	Palmwoods	1,906	85.655	0.000	0.000	113.053	0.000	113.053	281.775	108.990
IBS1	Ibis	2,868	45.901	0.000	0.000	143.417	0.000	143.417	288.553	142.573
SDM3	Somerset Dam	165	69.104	0.000	0.000	89.599	0.000	89.599	355.944	88.048
WFD3	Woodford	1,279	170.433	0.000	0.000	97.526	0.000	97.526	329.111	67.541

Source: NFM

### 3.7 CBD Outages

Event	Cause	Feeder	SAIDI	SAIFI	CAIDI	Customers Affected
1	Fire in low voltage switchboard required emergency interruption to three HV feeders	CMPCQE8	276.000	1.000	276	4
		CMP8	233.000	1.000	233	7
		CMUT1	233.000	1.000	233	1
2	Failure of customers low voltage cables resulted in HV protection system interrupting supply to a QUT feeder	QUT3	228.844	1.000	229	2
3	Burst water main at 333 Anne St resulted in flooding of customer's substation and interruption to two HV feeders.	AHTTR1H	217.000	1.000	217	1
		AHTTR2H	217.000	1.000	217	1
4	Failed water pipe allowed water to enter and flow over HV switchgear in customer's substation at 214 Adelaide St. Three HV feeders affected.	CSAT1	189.000	1.000	189	1
		SGOT2	94.500	0.500	189	1
		SGOT1	94.500	0.500	189	11
5	Cable dug up by BCC affecting two HV feeders	NBHT1	124.000	1.000	124	1
		ATCNBH17	124.000	1.000	124	65
6	Faulty protection relay at 61 Mary St caused an interruption to supply to one HV feeder	HAWT1	10.000	1.000	10	32

Source: NFM

Item No.	Measure	Descriptor	Value
3.8	<i>Energy not supplied – planned</i>	MWh	1,581
3.81	<i>Energy not supplied –unplanned</i>	MWh	4,608

Source: NFM

#### 4. Quality of supply data

Item No.	Measure	Descriptor	Value
<b>Quality of supply complaints – possible causes and response<sup>j</sup></b>			
4.2	<i>Network initiated quality of supply complaints</i>	number	659
4.21 <sup>k</sup>	Faulty network equipment	number	65
4.22	Network interference – standard breached by ENERGEX	number	81
4.23	Network interference caused by another customer	number	36
4.24	Network limitation	number	345
4.25	Environment	number	4
4.26 <sup>l</sup>	Other	number	128
4.3	<i>Quality of supply complaints initiated on the customer side of the meter</i>	number	155
4.4	<i>Quality of supply complaints for which no cause was found</i>	number	348

Source: Ellipse

## **Notes to 2007-08 Service Quality Report**

- <sup>a</sup> “Subtransmission” lines mean lines rated at 22 kV or above; “High voltage” lines mean 11, 5.5, and 3.3 kV lines; and “Low voltage” lines mean 415/240 volt lines.
- <sup>b</sup> At the end of each financial year, ENERGEX reviews the categorisation of its 11kV network by reviewing: (a) the actual load on each 11kV feeder; and (b) the actual length of the 11kV feeder. The result from the re-classification exercise for this financial year was that a number of Short rural 11kV feeders were re-classified as Urban 11kV feeders.
- <sup>c</sup> Includes steel lattice towers and other non-wooded poles.
- <sup>d</sup> Represents estimate of total sales to customers. Includes 42 GWh supplied through our subtransmission network to South West Power for distribution in their network, and generated energy of 225 GWh supplied by embedded generation. ENERGEX does not have the capacity to estimate the breakdown of energy delivered by feeder type to an adequate level of accuracy.
- <sup>e</sup> Required as Energy delivered (MWh) as a percentage of sub-transmission transformer capacity (MVA) multiplied by number of hours per year.
- <sup>f</sup> SAIDI, SAIFI and CAIDI are based on actual customer numbers for each feeder type.

Due to the intermeshed nature of the network in the area, the concept of Worse Performing Feeder does not apply to the CBD.

In the CBD, customers are typically served by more than one feeder. Accordingly, the chance of a customer’s supply being interrupted is extremely infrequent. An interruption will generally only occur when there is a second contingency problem. For example:

- the network is configured in an abnormal state for maintenance (non-meshed) during which time a fault occurs;
- the network is configured normally (meshed), but there is a maloperation in protection systems following a fault; or
- there is a problem in the wider system such as a fault on the 110 kV system or 110/11 kV substations.

SAIDI, SAIFI and CAIDI are calculated on the basis of a customer actually experiencing an interruption to supply. Because of the meshed 11 kV feeder arrangements in the CBD, there is no longer a clear link between an 11 kV feeder fault and an interruption to customer supply. This is in contrast to the remainder of the 11kV system, which is predominantly non-meshed. As a result, calculating these reliability indices at the feeder level, and subsequently, identifying the worst performing feeders on very rare events, is not meaningful.

Accordingly, ENERGEX has reported any HV feeder event that has resulted in a customer interruption. The CBD feeders identified should not be classified as ‘worst performing’ in the context adopted for the other network categories because of the two-fold nature of the event, being dependent upon wider failure before registering.

- <sup>g</sup> The locale of the feeder is designated by the suburb in which the feeder originates.

- h. There was no exclusion events in the reporting period.
  - i. Normalised SAIDI, SAIFI and CAIDI data is calculated by deducting the exclusion related data from the total or raw SAIDI, SAIFI and CAIDI data.
  - j. As the database is live, the number of quality of supply complaints reported do not correspond exactly with the total of the four quarterly quality of supply complaints due to removal of possible double entries and misclassified complaints. ENERGEX migrated quality of supply complaints to Ellipse during 2004-05, which is expected to reduce the incidence of misclassification and improve database controls.
  - k. This figure does not include severe voltage dip complaints identified from retailer queries, on behalf of their large commercial customers.
  - l. Includes complaints in the Voltrac system that are not classified.
-