Network Quality and Reliability of Supply

Performance Report

2010/11

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CONTENTS

Horizon Power service area map 4

Introduction 5

Audit by independent expert 5

Schedule 1 - Information to be published: 6

Clause 4 and 10 6

Clause 5 - Significant interruptions to small use customers. 7

Clause 6 and 10 - Total number of complaints received 9

Clause 7 and 10 - Number of customer complaints in each discrete area: 9

Clause 8 and 10 - Total amount spent addressing complaints. 10

Clause 9 and 10 - Payments to customers for failure to meet certain standards 10

Clause 11, 12 and 13(a) - Average length of interruption of supply (CAIDI) 11

Clause 11, 12 and 13(b) - Average number of interruptions of supply (SAIFI) 12

Clause 11, 12 and 13(c) - Average % of time that electricity has been supplied 13

Clause 11, 12 and 13(d) - Average total length of all interruptions of supply (SAIDI) 14

Clause 14(a) - Horizon Power - Average length of interruption - frequency distribution 15

Clause 15(a) - CAIDI frequency graph. 15

Clause 14(b) - Horizon Power - Number of interruptions - frequency distribution 16

Clause 15(b) - SAIFI frequency graph. 16

Clause 14(c) - Horizon Power - Total length of all interruptions - frequency distribution 17

Clause 15(c) - SAIDI frequency graph 17

Affect of Major Event Days 18

Appendix 19

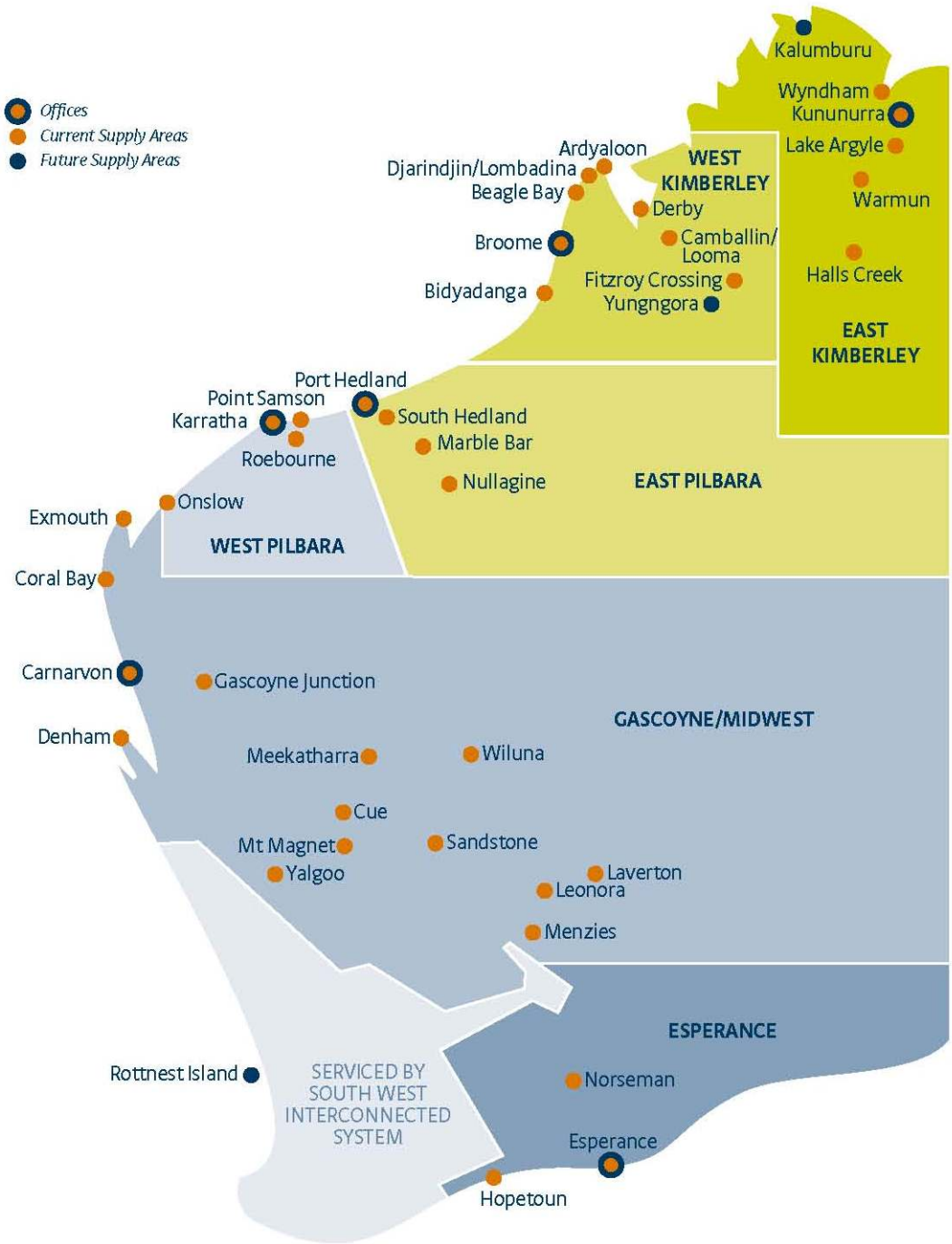
Major Event Days 19

IEEE 136602003 - Section 4.5 Major Event Day classification 19

Normalised data sets - Unplanned 19

HORIZON POWER SERVICE AREA MAP

Horizon Power is the Network Operator for thirty four discrete areas including the North West Interconnected System.



INTRODUCTION

This report has been produced to meet the requirements of the Electricity Industry (Network Quality and Reliability of Supply) Code 2005.

AUDIT BY INDEPENDENT EXPERT

Division 3 of the Electricity Industry (Network Quality and Reliability of Supply) Code 2005 requires that Horizon Power arrange for an independent expert to audit, and report on the operation of the systems that Horizon Power has in place for monitoring its compliance with the code.

Horizon Power has appointed Qualeng to perform the audit of its systems for compliance with the code. Qualeng is a locally based engineering consulting group with over 15 years engineering, regulatory and quality assurance expertise throughout various industries. Qualeng has a long and successful trading history and comprises a team of highly experienced consultants with recent, relevant and international expertise in the energy sector.

Schedule 1 - Information to be published:

Clause 4 and 10

Clause 4(a) Number of breaches of each provision of the Code:

Quality of Supply	2009/10	2010/11
Voltage fluctuations	0	0
Harmonics	0	0

Clause 4(b) Remedial action taken for each provision:

Voltage Fluctuations

Location	Action Taken
	N/A

Harmonics

Location	Action Taken
	N/A

N/A = Not Applicable.

Continuous monitoring of voltage and harmonic distortion is done at the substation busbar. Temporary power quality monitoring equipment is installed on the network for specific problem monitoring in response to a customer power quality complaint.

Clause 5 - Significant interruptions to small use customers.

	Clause Description	Total
DB 1	Clause 5(a) Number of premises that experienced interruptions greater than 12 hours continuous.	**1138**
DB 2	Clause 5(b) Number of premises that experienced more than 16 interruptions.	**819**

Detailed analysis of interruptions where duration is greater than 12 hours.

Discrete Area	Duration (minutes)	Premises	Cause Description	Damage Description
Carnarvon	11211	556	Emergency Outage For Hazard	Unknown
Carnarvon	3840	32	Equipment Failure	Metal Pole / HV Insulator / Broken
Derby	796	1	Unknown	Drop Out Fuse / Blown
Djarindjin	760	1	Equipment Failure	Distribution Transformer / Fuse / Blown
Esperance	793	1	Equipment Failure	LV Fuse Disconnector Overhead / Broken
Esperance	1175	20	Lightning	Bay / Conductor / Damaged / Hit
Esperance	1814	7	Lightning	Drop Out Fuse / Blown
Esperance	1620	118	Lightning	Wood Pole / HV Cross Arm / Broken
Esperance	862	25	Wind / Debris	Sectionaliser / Blown
Esperance	1435	8	Wind / Debris	Wood Pole / Pole Distribution / Broken
Esperance	1230	1	Equipment Failure	Bay / Conductor / Clashing or Sagging
Exmouth	1686	1	Wind / Debris	Drop Out Fuse / Blown
Exmouth	1282	45	Wind / Debris	Metal Pole / HV Tap / Clamp / Loose
Fitzroy Crossing	797	1	Lightning	Drop Out Fuse / Blown
Gascoyne Junction	8295	1	Unnecessary Attendance	Unknown
Gascoyne Junction	1488	3	Water Infiltration	Unknown
Hopetoun	1092	1	Emergency Outage For Hazard	Distribution Transformer / Blown
Hopetoun	1320	1	Equipment Failure	Wood Pole / Pole Distribution / Burnt
Kununurra	970	1	Equipment Failure	LV Cable Joint / Blown
Laverton	980	1	Customer Installation	Distribution Transformer / Fuse / Blown
Marble Bar	5839	1	Customer Installation	Unknown
Marble Bar	1198	1	Vandalism or Willful Damage	LV Electric Meter / Damaged / Hit
Norseman	1552	1	Wind / Debris	Bay - Non Bundled Insulated / Conductor / Broken
NWIS	804	1	Customer Installation	LV Electric Meter Fuse / Blown
NWIS	5600	1	Customer Installation	Unknown

Discrete Area	Duration (minutes)	Premises	Cause Description	Damage Description
NWIS	939	1	Equipment Failure	Customer Service Overhead Attachmnt / Broken
NWIS	10569	5	Equipment Failure	LV Cable Joint / Blown
NWIS	844	1	Equipment Failure	LV Cable Underground / Damaged / Hit
NWIS	867	1	Equipment Failure	LV Electric Meter Fuse / Blown
NWIS	7047	1	Equipment Failure	LV Electric Meter / Damaged / Hit
NWIS	818	1	Equipment Failure	Pillar / Fuse / Damaged / Hit
NWIS	940	1	Equipment Failure	Unknown
NWIS	5556	1	Fire (Not Pole Top Fire)	LV Customer Service Line / Other
NWIS	1172	70	Human Error	LV Cable Underground / Damaged / Hit
NWIS	6468	3	Lightning	Distribution Transformer / Damaged / Hit
NWIS	7862	11	Lightning	Unknown
NWIS	1037	1	Vehicle	LV Cable Underground / Damaged / Hit
NWIS	5295	1	Vehicle	Mini Pillar / Blown
NWIS	879	1	Water Infiltration	Drop Out Fuse / Blown
NWIS	4101	1	Wind / Debris	Bay / Conductor / Broken
NWIS	5396	1	Wind / Debris	Distribution Transformer / Fuse / Blown
NWIS	1151	1	Wind / Debris	Distribution Transformer / HV Tap / Clamp / Broken
NWIS	2740	19	Wind / Debris	Drop Out Fuse / Blown
NWIS	3524	57	Wind / Debris	Drop Out Fuse / Other
NWIS	1554	1	Wind / Debris	Electric Meter / LV Customer Equipment / Low Volts
NWIS	1910	1	Wind / Debris	LV Customer Service Line / Damaged / Hit
NWIS	2605	1	Wind / Debris	LV Electric Meter Fuse / Blown
NWIS	42474	94	Wind / Debris	Unknown
Onslow	787	1	Equipment Failure	Drop Out Fuse / Blown
Onslow	1154	26	Lightning	Unknown
Onslow	1471	1	Vehicle	LV Cable Underground / Damaged / Hit
Warmun	1253	1	Equipment Failure	LV Electric Meter Fuse / Blown
Wiluna	1372	1	Equipment Failure	LV Circuit Breaker / Other
Wiluna	1117	1	Equipment Failure	Unknown
Wyndham	1319	1	Water Infiltration	Unmetered Supply Pit / Water Infiltration or Flooded
Wyndham	1319	1	Water Infiltration	Unmetered Supply Pit / Water Infiltration or Flooded
		1138		

The increase in customer interruptions greater than 12 hours is due to the above average extreme weather events (cyclones, severe storms & floods) Horizon Power systems experienced in 2010/11.

Clause 6 and 10 - Total number of complaints received

	2009/10	2010/11
DC 10	**54**	**29**

Clause 7 and 10 - Number of customer complaints in each discrete area:

Discrete Area	2009/10	2010/11
NWIS	**11**	**7**
Ardyaloon		
Beagle Bay		
Bidyadanga		
Broome	**5**	**11**
Carnarvon	**2**	**1**
Coral Bay		
Cue		
Denham		
Derby	**7**	**3**
Djarindjin		
Esperance	**17**	**3**
Exmouth	**1**	**2**
Fitzroy Crossing		
Gascoyne Junction		
Halls Creek	**2**	
Hopetoun	**2**	
Kununurra	**5**	
Lake Argyle		
Laverton		
Leonora		
Looma		
Marble Bar		
Meekatharra		
Menzies		
Mount Magnet		
Norseman		
Nullagine		
Onslow	**2**	**1**
Sandstone		
Warmun		**1**
Wiluna		
Wyndham		
Yalgoo		
Horizon Power	**54**	**29**

Clause 8 and 10 - Total amount spent addressing complaints.

	2009/10	2010/11
DC 9	**$410,959**	**$396,423**

Clause 9 and 10 - Payments to customers for failure to meet certain standards

The number and total payments made to customers for failure to give required notice of planned interruption.

	2009/10		2010/11	
	Number	Cost	Number	Cost
DD 2	**1**	**$150**	**0**	**0**

The number and total payments made to customers for supply interruptions exceeding 12 hours.

	2009/10		2010/11	
	Number	Cost	Number	Cost
DD 3	**71**	**$5,680**	**589**	**$47,140**

Clause 11, 12 and 13(a) - Average Length of Interruption of Supply to Customer Premises in Minutes (CAIDI)

Discrete Area	2007/08	2008/09	2009/10	2010/11	Average
NWIS	76.6	59.88	49.50	77.32	65.82
Ardyaloon	0	77.27	0.00	0.00	19.32
Beagle Bay	0	749.34	0.00	141.09	222.61
Bidyadanga	31.93	0	0.00	29.00	15.23
Broome	42.17	46.53	55.36	44.97	47.26
Carnarvon	38.97	35.17	80.61	210.54	91.32
Coral Bay	7.6	4.17	0.00	0.00	2.94
Cue	0	127	145.05	185.00	114.26
Denham	63.88	80.17	0.00	64.27	52.08
Derby	34.79	40.96	42.68	54.39	43.21
Djarindjin	0	8.02	0.00	0.00	2.01
Esperance	56.18	141.85	121.28	81.29	100.15
Exmouth	31.99	76.89	41.50	68.46	54.71
Fitzroy Crossing	129.5	233.13	59.68	104.83	131.78
Gascoyne Junction	0	152.24	0.00	264.00	104.06
Halls Creek	33.02	52.99	114.37	77.63	69.50
Hopetoun	103.06	125.61	80.14	165.46	118.57
Kununurra	30.97	36.87	42.07	68.19	44.52
Lake Argyle	46.72	39.69	22.21	89.17	49.45
Laverton	34.29	71.58	59.80	74.13	59.95
Leonora	35.9	65.76	26.20	199.85	81.93
Looma	184.98	459.96	225.00	47.20	229.29
Marble Bar	8.36	11.85	10.03	8.46	9.67
Meekatharra	81.16	125.7	0.00	92.87	74.93
Menzies	35.31	0	0.00	135.52	42.71
Mount Magnet	28.97	103.61	28.32	36.41	49.33
Norseman	52.16	51.63	81.65	85.00	67.61
Nullagine	14.9	6.17	249.19	0.00	67.57
Onslow	16.54	14.2	67.38	74.96	43.27
Sandstone	44.2	12.75	0.00	60.85	29.45
Warmun	0	20.4	0.00	61.50	20.48
Wiluna	26.27	343.57	0.00	76.38	111.55
Wyndham	39.79	34.85	41.93	52.33	42.22
Yalgoo	0	8.88	0.00	0.00	2.22
Horizon Power	**47.65**	**68.19**	**73.43**	**87.35**	**69.15**

Clause 11, 12 and 13(b) - Average Number of Interruptions of Supply to Customer Premises (SAIFI)

Discrete Area	2007/08	2008/09	2009/10	2010/11	Average
NWIS	1.45	1.89	2.31	2.41	2.02
Ardyaloon	0	2.88	0.00	0.00	0.72
Beagle Bay	0	0.5	0.00	0.50	0.25
Bidyadanga	0.29	0	0.00	0.09	0.10
Broome	10.08	8.62	1.09	3.80	5.90
Carnarvon	4.34	5.89	3.11	6.88	5.05
Coral Bay	2.55	2.29	0.00	0.00	1.21
Cue	0	0.26	1.19	0.96	0.60
Denham	2.86	1.06	0.00	3.81	1.93
Derby	11.01	7.9	2.20	5.99	6.77
Djarindjin	0	1.99	0.00	0.00	0.50
Esperance	11.62	5.51	5.04	5.25	6.85
Exmouth	9	4.43	1.14	3.60	4.54
Fitzroy Crossing	0.46	0.84	1.28	3.35	1.48
Gascoyne Junction	0	0.49	0.00	0.50	0.25
Halls Creek	9.23	6.28	0.28	1.22	4.25
Hopetoun	8.17	2.72	2.60	2.22	3.93
Kununurra	14.68	10.08	6.32	6.14	9.31
Lake Argyle	7.1	8.19	1.73	4.00	5.26
Laverton	5.05	7.27	1.71	2.54	4.14
Leonora	1.26	0.46	1.48	1.16	1.09
Looma	2	1.4	0.12	1.13	1.16
Marble Bar	11.41	2.59	3.77	1.00	4.69
Meekatharra	1.28	1.38	0.00	1.19	0.96
Menzies	0.96	0	0.00	1.68	0.66
Mount Magnet	2.27	6.44	3.53	4.46	4.17
Norseman	1.16	7.43	4.00	4.71	4.32
Nullagine	4	1.02	0.44	0.00	1.37
Onslow	9.74	9.06	3.22	5.23	6.81
Sandstone	0.05	0.95	0.00	1.65	0.66
Warmun	0	1.91	0.00	1.52	0.86
Wiluna	2.05	0.51	0.00	1.33	0.97
Wyndham	29.95	21.88	7.79	7.41	16.76
Yalgoo	0	1.01	0.00	0.00	0.25
Horizon Power	**6.67**	**4.92**	**2.78**	**3.77**	**4.53**

Clause 11, 12 and 13(c) - Average Percentage Of Time That Electricity Has Been Supplied To Customer Premises.

Discrete Area %	2007/08	2008/09	2009/10	2010/11	Average
NWIS	99.98	99.98	99.99	99.99	99.98
Ardyaloon	100.00	99.96	100.00	100.00	99.99
Beagle Bay	100.00	99.93	100.00	99.97	99.98
Bidyadanga	100.00	100.00	100.00	99.99	100.00
Broome	99.92	99.92	99.99	99.99	99.96
Carnarvon	99.97	99.96	99.98	99.96	99.97
Coral Bay	100.00	100.00	100.00	100.00	100.00
Cue	100.00	99.99	99.97	99.96	99.98
Denham	99.97	99.98	100.00	99.99	99.98
Derby	99.93	99.94	99.99	99.99	99.96
Djarindjin	100.00	100.00	100.00	100.00	100.00
Esperance	99.88	99.85	99.98	99.98	99.92
Exmouth	99.95	99.94	99.99	99.99	99.96
Fitzroy Crossing	99.99	99.96	99.99	99.98	99.98
Gascoyne Junction	100.00	99.99	100.00	99.95	99.98
Halls Creek	99.94	99.94	99.98	99.99	99.96
Hopetoun	99.84	99.94	99.98	99.97	99.93
Kununurra	99.91	99.93	99.99	99.99	99.96
Lake Argyle	99.94	99.94	100.00	99.98	99.96
Laverton	99.97	99.90	99.99	99.99	99.96
Leonora	99.99	99.99	100.00	99.96	99.99
Looma	99.93	99.88	99.96	99.99	99.94
Marble Bar	99.98	99.99	100.00	100.00	99.99
Meekatharra	99.98	99.97	100.00	99.98	99.98
Menzies	99.99	100.00	100.00	99.97	99.99
Mount Magnet	99.99	99.87	99.99	99.99	99.96
Norseman	99.99	99.93	99.98	99.98	99.97
Nullagine	99.99	100.00	99.95	100.00	99.99
Onslow	99.97	99.98	99.99	99.99	99.98
Sandstone	100.00	100.00	100.00	99.99	100.00
Warmun	100.00	99.99	100.00	99.99	100.00
Wiluna	99.99	99.97	100.00	99.99	99.99
Wyndham	99.77	99.86	99.99	99.99	99.90
Yalgoo	100.00	100.00	100.00	100.00	100.00
Horizon Power	**99.94**	**99.94**	**99.99**	**99.98**	**99.96**

.

Clause 11, 12 and 13(d) - Average Total Length of All Interruptions of Supply to Customer Premises in Minutes (SAIDI)

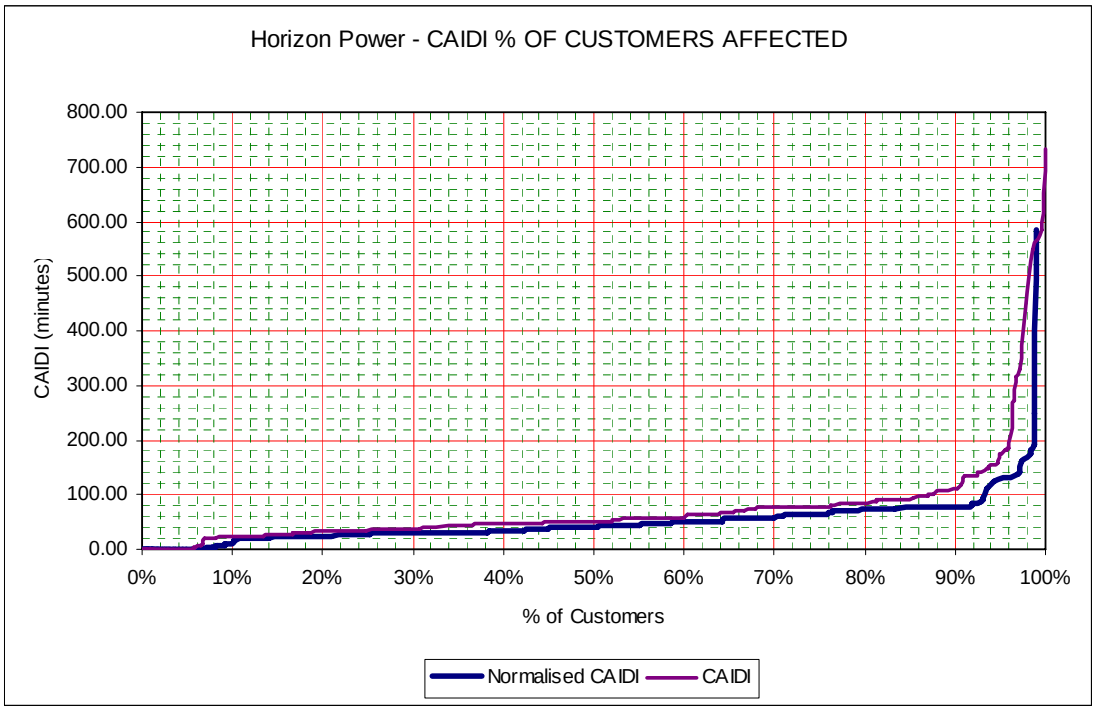
DISCRETE AREA	2007/08	2008/09	2009/10	2010/11	Average
NWIS	111	113	114	186	131
Ardyaloon	0	223	0	0	56
Beagle Bay	0	375	0	70	111
Bidyadanga	9	0	0	3	3
Broome	425	401	61	171	264
Carnarvon	169	207	250	1448	519
Coral Bay	19	10	0	0	7
Cue	0	33	173	178	96
Denham	183	85	0	245	128
Derby	383	324	94	326	282
Djarindjin	0	16	0	0	4
Esperance	653	782	611	427	618
Exmouth	288	341	47	246	231
Fitzroy Crossing	60	196	76	351	171
Gascoyne Junction	0	75	0	133	52
Halls Creek	305	333	32	95	191
Hopetoun	842	342	209	368	440
Kununurra	455	372	266	419	378
Lake Argyle	332	325	38	357	263
Laverton	173	520	103	188	246
Leonora	45	30	39	232	86
Looma	370	644	27	53	274
Marble Bar	95	31	38	8	43
Meekatharra	104	173	0	110	97
Menzies	34	0	0	228	65
Mount Magnet	66	667	100	162	249
Norseman	61	384	326	400	293
Nullagine	60	6	110	0	44
Onslow	161	129	217	392	225
Sandstone	2	12	0	101	29
Warmun	0	39	0	94	33
Wiluna	54	175	0	102	83
Wyndham	1192	762	327	388	667
Yalgoo	0	9	0	0	2
Horizon Power	**318**	**336**	**204**	**329**	**297**

For the period 01/07/2010 to 30/06/2011 SAIDI using the normalised data sets was **164** minutes.

Clause 14(a) - Horizon Power - Average Length of Interruption - Frequency Distribution

Percentile	Minutes
25th	35.39
50th	50.83
75th	77.51
90th	111.84
95th	175.87
98th	459.75
100th	731.80

Clause 15(a) - CAIDI Frequency Graph.

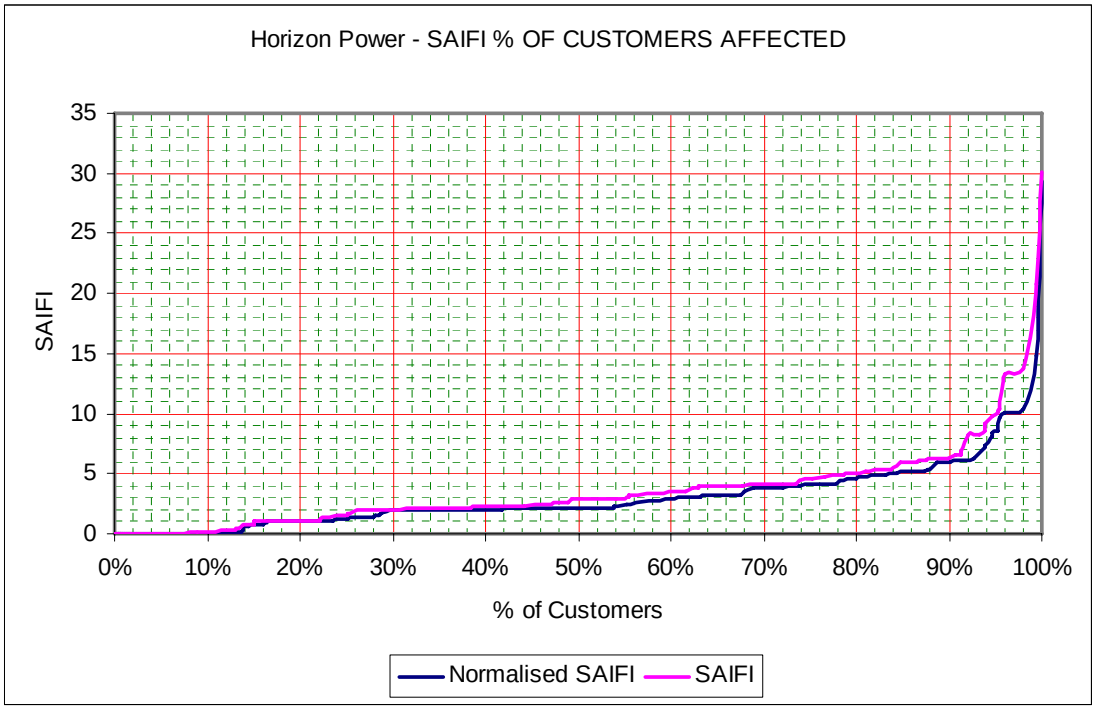


During the period 01/07/2010 to 30/06/2011 of those customers who experienced an interruption, approximately 60% had an interruption of less than 60 minutes.

Clause 14(b) - Horizon Power - Number of Interruptions - Frequency Distribution

Percentile	Interruptions
25th	1.56
50th	2.91
75th	4.56
90th	6.36
95th	9.89
98th	13.58
100th	30.17

Clause 15(b) - SAIFI Frequency Graph.

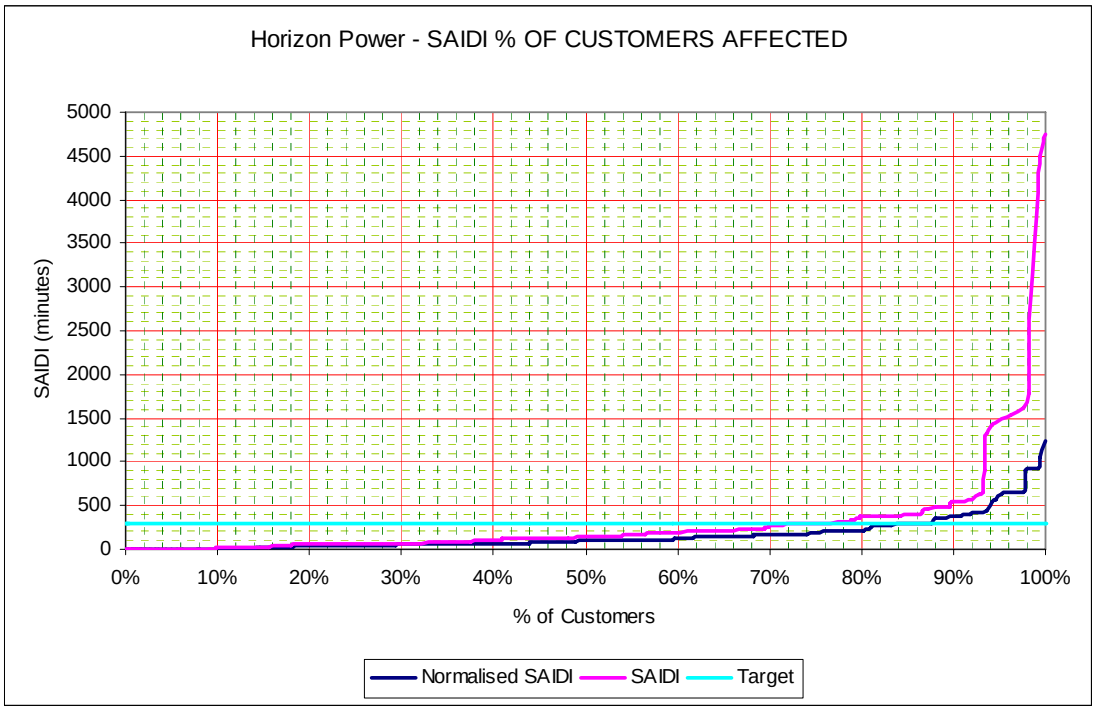


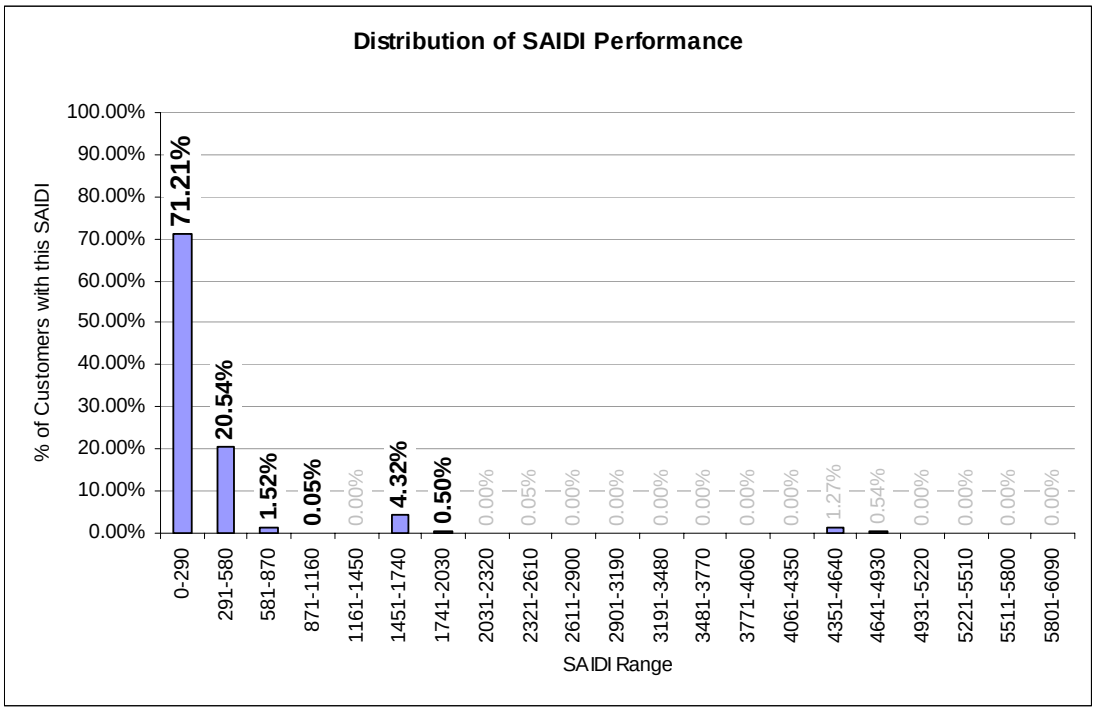
During the period 01/07/2010 to 30/06/2011 approximately 99% of customers experienced an average of less than 16 outages.

Clause 14(c) - Horizon Power - Total Length of all Interruptions - Frequency Distribution

Percentile	Minutes
25th	61.23
50th	138.61
75th	300.87
90th	540.83
95th	1477.27
98th	1734.18
100th	4739.18

Clause 15(c) - SAIDI Frequency Graph





During the period 01/07/2010 to 30/06/2011 71% of customers experienced outages with durations of less than 290 minutes. Using a normalised data set this is increased to 83%.

MAJOR EVENT DAYS

In the period 01/07/2010 to 30/06/2011 there were 8 of Major Event Days recorded.

Power System	Major Event Day Date	Event
Carnarvon	19/12/2010	Flooding
Gascoyne Junction	19/12/2010	Flooding
NWIS	21/02/2011	Cyclone Carlos
NWIS	22/02/2011	Cyclone Carlos
NWIS	23/02/2011	Cyclone Carlos
Onslow	25/01/2011	Cyclone Bianca
Onslow	16/02/2011	Cyclone Carlos
Warmun	13/03/2011	Flooding

Appendix

Major Event Days

Major event days are days in which interruptions affect the delivery of supply in a system and are not reasonably practicable to control such as extreme weather events (cyclones and floods). These days are excluded from Sustained Interruptions used for reliability measurement and reporting.

This report makes reference to the impact of major event days where they have had a significant impact on the statistics.

Major Event Day Classification

The classification of Major Event Days is to allow major events to be studied separately from daily operation, and in the process, to better reveal trends in daily operation that would be hidden by the large statistical effect of major events.

A Major Event Day is a day in which interruptions affect the delivery of supply in a system that is not reasonably practicable to control. All indices are calculated based on removal of the identified Major Event Days.

Interruptions that span multiple days are accrued to the day on which the interruption begins.

Normalised Data Sets - Unplanned

As well as using 'All Faults' data for monitoring system reliability, Horizon Power also uses Normalised data sets unplanned to better reflect incidents that are within the business' control.

In May 2010 then updated in 2011 the ERA published changes in the Electricity Industry Act 2004 Electricity Distribution Licence Performance Reporting Handbook to its definition of Normalised.

Normalised	All unplanned sustained interruptions with the exclusion of interruptions: • that are caused by generation outages • that are caused by transmission outages[9] • that caused by directed load shedding • where the daily unplanned SAIDI exceeds the Major Event Day boundary[10]

Table 1 Electricity Distribution Licence Performance Reporting Handbook – May 2011

Sustained Interruptions are defined in the Electricity Distribution Licence Performance Reporting Handbook - May 2011 as being a loss of electricity associated with an outage of more than one minute in duration.

The Electricity Distribution Licence Performance Reporting Handbook advises that Normalised interruptions should exclude the day's interruptions when a system's SAIDI exceeds the Major Event Day boundary, as defined by the IEEE standard 1366-2003. Due to the small size of many of Horizon Power's systems the log-normal SAIDI fault data doesn't result in a Gaussian (Normal) distribution. This is a fundamental assumption that the IEEE standard 1366-2003 is based upon and as such the use of the IEEE methodology is flawed when applied to many of Horizon Powers systems.

In 50% (18 out of 36) of Horizon Power Systems have less than 20 individual days in each system where faults have occurred from July 2005 to June 2010. This is insufficient for statistical analysis.

Horizon Power excludes days from its Normalised data set where the interruptions affect the delivery of supply in a system that is not reasonably practicable to control such as cyclones and floods.

As Horizon Power is a vertically integrated business and is responsible for generation, transmission and distribution the normalised data set includes generation and transmission outages that are reasonably practicable to control by Horizon Power.