PowerWater

Standards of Service 2011-12

Key Service Performance Indicators

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1. Introduction

In accordance with clause 8.1 of the Northern Territory Electricity Standards of Service Code (the Code), Power and Water Corporation (Power and Water) submits the actual standards achieved in 2011-12 with respect to each of the key service performance indicators in Schedule 1 of the Code.

Power and Water has reported the actual standards achieved each year against each of the minimum standards of service. Approval of these minimum standards has now lapsed and Power and Water has been directed by the Utilities Commission to report actual performance in relation to either the previous minimum standards or trends and industry comparisons. Power and Water is reporting against previously agreed minimum standards targets for each of the measures. The targets for the System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI)[1] measures of network reliability coincide with Power and Water's Key Performance Indicators outlined in Power and Water's 2011-12 Statement of Corporate Intent (SCI).

1.1 Scope of data

Power and Water reports reliability and quality of supply indicators by region. Customer complaints data has also been provided by region; however all other customer service indicators have been provided for the whole of the NT as current system functionality does not support separate reporting.

As stipulated in Schedule 1 (clause 4.5) of the Code, key service performance indicators have been reported for each quarter where possible and, in addition, charts with monthly SAIDI and SAIFI figures are also provided. Historical data has also been included in this report.

Power and Water does not apply different standards for different customer categories, therefore key service performance indicators have not been separately reported for customer categories as stipulated by Schedule 1 (clause 4.4) of the Code.

1.2 Summary of service levels achieved

Power and Water met the Network SAIDI and SAIFI reliability standards in the Katherine, Tennant Creek and Alice Springs regions and the Network Customer Average Interruption Duration Index (CAIDI) reliability standard in the Katherine region. The Generation SAIDI target was met in the Darwin region and the Generation SAIFI targets were met in the Darwin, Tennant Creek and Alice Springs regions. In addition, Power and Water met the customer service minimum standard set for customer call volume, the customer service minimum standard set for the number of customer complaints and the percentage of new connections provided to existing supply properties within 24 hours. Power and Water met 26 of the 45 agreed minimum standards of service performance.

[1] SAIDI is a measure of interruption duration. It measure the average minutes of off-supply per customer. SAIFI is a measure of interruption frequency. It measures the average number of interruptions per customer.

Of the 19 targets that were not met, the following have reoccurred from last year:

- Darwin Network SAIDI, SAIFI and CAIDI;
- Alice Springs and Tennant Creek Network CAIDI;
- Tennant Creek percentage of consumers supplied by feeders that experience more than 27 interruptions per year;
- Alice Springs Generation SAIDI;
- Darwin, Katherine, Tennant Creek and Alice Springs Generation CAIDI; and
- New connections to new subdivisions where minor extensions or augmentation is required in urban areas; and
- The percentage of telephone calls responded to within 20 seconds from when the customer selects to speak to a human operator.

2. Network indicators

2.1 Network reliability

This section of the report quantifies the performance of Power Networks in 2011-12 using nationally recognised indicators and comparisons with the performance targets. Benchmarking is completed using Energy Supply Association of Australia (ESAA) data. Australian Energy Regulator (AER) feeder categories, and three industry peers, providing comparisons with the national power reliability experience. The efforts made to address the performance of poorly performing feeders are presented along with other significant works. The performance with regard to power quality is detailed and a brief summary of the activities associated with maturing asset management is provided.

Power and Water's service performance is impacted by weather conditions. The Bureau of Meteorology stated that the 2011-12 wet season was average in terms of rainfall, temperatures and wind[2]. During the 2011-12 financial year the Northern Territory experienced long dry periods interspersed by short but very wet bursts. Tropical Cyclone Grant was the only tropical cyclone to make landfall and brought an intense wet period in December 2011. Average weather during this year resulted in a Darwin network SAIDI that is in line with the five year average as shown in Figure 1. By contrast, network SAIDI in the 2010-11 financial year was above the five year average by fifty six per cent, mainly due to poor weather conditions. During that year, the three day rainfall record set at Darwin Airport during Cyclone Carlos surpassed the previous record set during Cyclone Thelma in 1998.

SAIDI

Region	2011-12 SCI Target	Power and Water's Actual Performance (minutes)	
		2011-12 Unadjusted	2011-12 Adjusted[3]
Darwin	220	266	266
Katherine	401	223	223
Tennant Creek	411	388	388
Alice Springs	108	103	103

The SCI targets for adjusted SAIDI were met in Katherine, Tennant Creek and Alice Springs. Darwin exceeded the regional adjusted SAIDI SCI target in the reporting year by forty six minutes. However, performance in Darwin was in line with the five year average performance for Darwin SAIDI as shown in Figure 1.

No 'major event days' or 'network exclusion events' were identified across the four regions in the reporting year. In accordance with Schedule 1 (clause 1.6) of the Code, the 2.5 beta method[4] allows 'major event days' to be removed from the network reliability indicators during the reporting year.

[2] http://www.bom.gov.au/climate/current/season/nt/archive/201204.summary.shtml
[3] The adjusted results are the same as the unadjusted results as there were no 'major event days'.
[4] The 2.5 beta method is an internationally accepted standard for excluding outages from reliability data. The method for exclusion is outlined in IEEE Standard 1366-2003.

Figures 1 to 4[5] demonstrate the accumulated adjusted SAIDI in minutes for each region in the reporting year. They include a previous five year adjusted average (2006-07 to 2010-11) and a 'seasonalised' target. The 'seasonalised' targets are determined by converting the annual Minimum Standard of Service (MSS) into cumulative monthly values by following the five year average trend.

Figure 1 *Accumulated Darwin Adjusted SAIDI Trends*

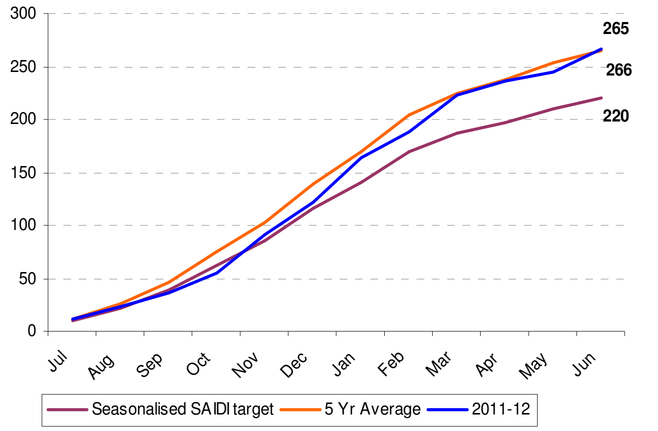


Figure 2 *Accumulated Katherine Adjusted SAIDI Trends*

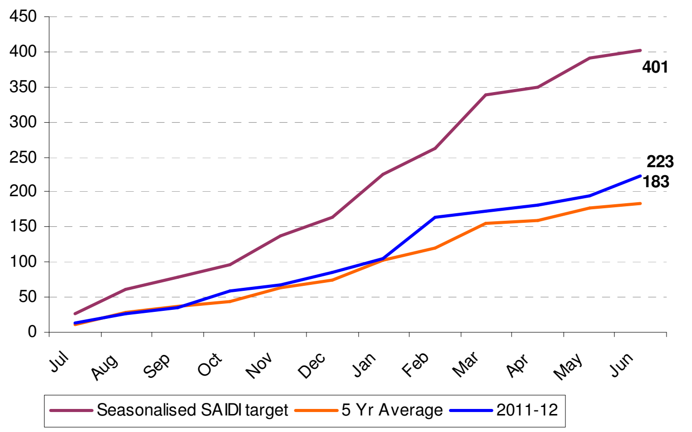


Figure 3 *Accumulated Tennant Creek Adjusted SAIDI Trends*

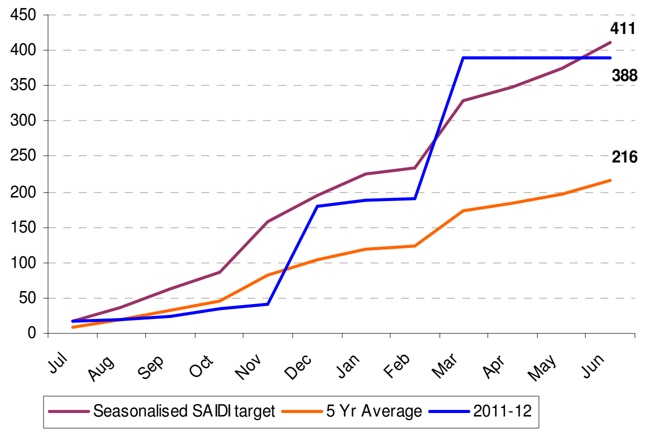
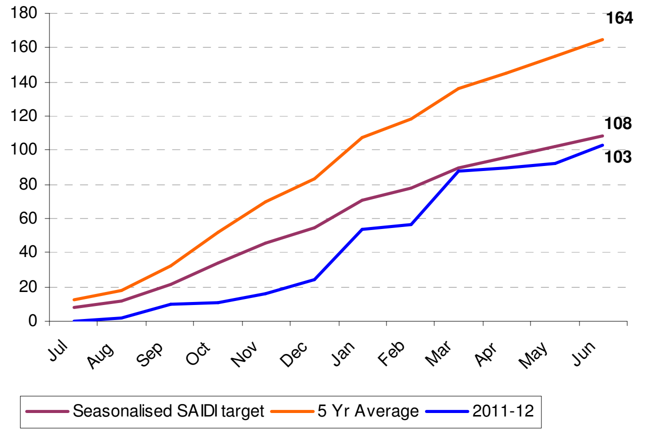


Figure 4 *Accumulated Alice Springs Adjusted SAIDI Trends*



Figures 5 to 8 show five years of historical adjusted SAIDI network performance for each region. Included are the annual regional SAIDI targets.

[5] Five year average values are calculated through the application of current cause codes and methodologies to cleansed historic data which may produce slight inconsistencies with previous Standards of Service reports.

Figure 5 *Darwin Adjusted SAIDI – Historical Performance*

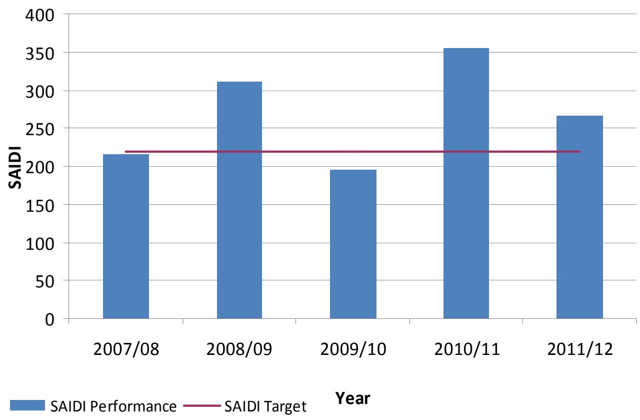


Figure 6 *Katherine Adjusted SAIDI – Historical Performance*

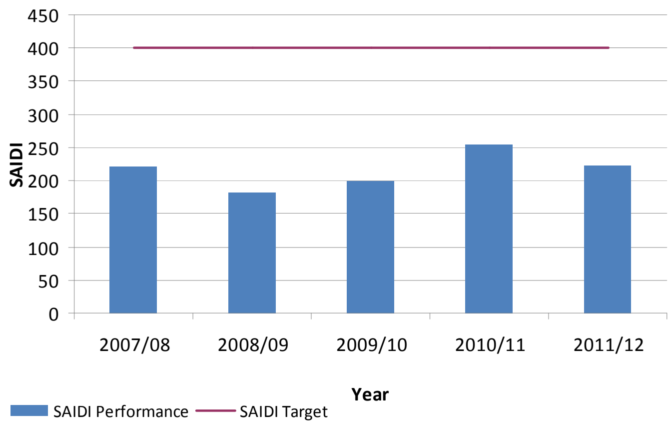


Figure 7 *Tennant Creek Adjusted SAIDI – Historical Performance*

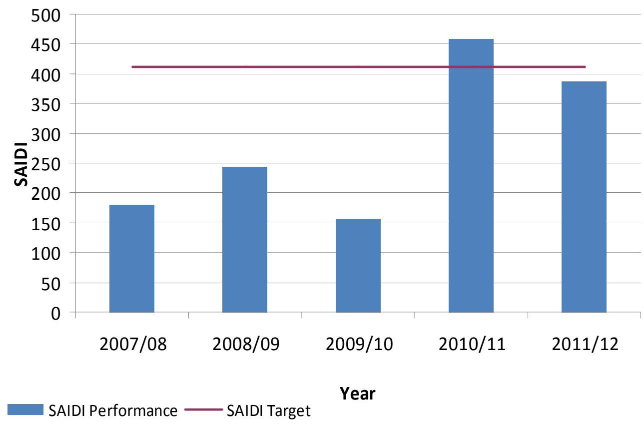
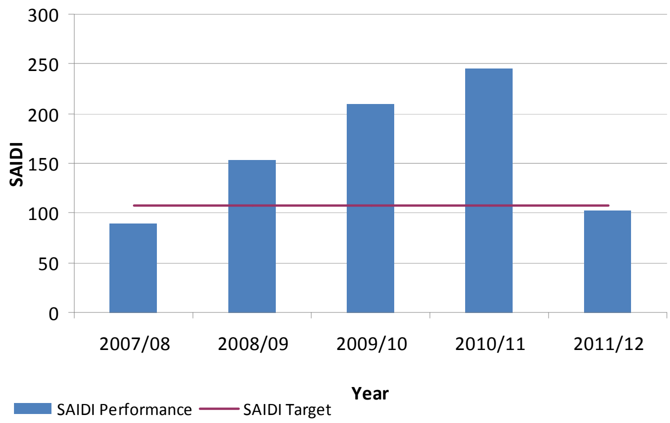


Figure 8 *Alice Springs Adjusted SAIDI – Historical Performance*



Darwin

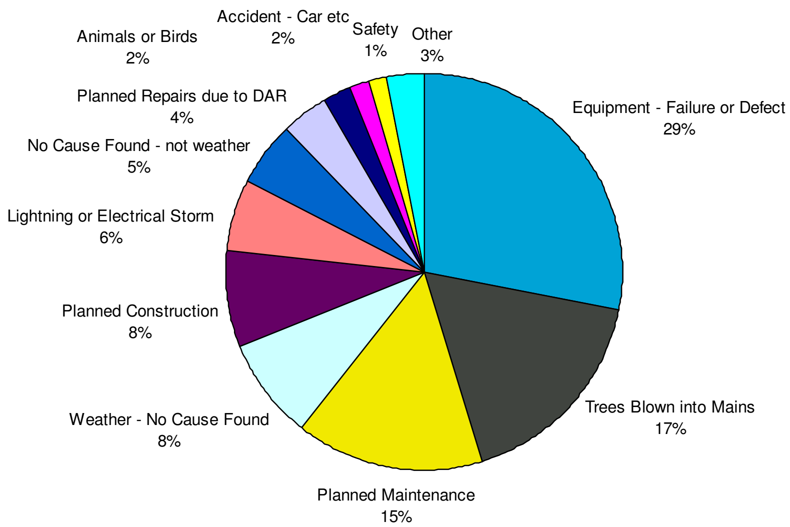
Equipment failure accounted for twenty nine per cent of all network SAIDI outages in the Darwin region (Figure 9). The major contributor to the equipment failure category was cable failures, which typically occur in the Northern suburbs of Darwin and are caused by water ingress to aging cables.

A cable replacement program has been developed following analysis of cable fault data and new testing equipment will enable further validation of the cable replacement program. That equipment will also enable faster location of cable faults.

Another major cause of interruptions is equipment failure in aged zone substations such as City Zone Substation. A 66kV outdoor equipment failure at this substation in 2011-12 caused a significant outage where more than 28,000 customers were affected for up to 91 minutes. Heavy corrosion was found on the outdoor equipment and the asset was replaced. Power Networks plans to replace this older zone substation by the end of 2014.

Vegetation related outages during this period accounted for seventeen per cent of all network outages in the Darwin region. The majority of outages were concentrated in the rural network. In total 49 locations around Darwin are targeted for increased tree trimming schedules in the 2012-13 Power Networks Maintenance Plan. The majority (eighty per cent) of these locations are on the rural network.

Figure 9 *Darwin SAIDI – Cause Breakdown*



Tennant Creek

Power Networks is closely monitoring the Tennant Creek network. The Tennant Creek power system is small and load shedding events[6] causing widespread outages are occasionally triggered by network faults. During the reporting year Power Networks and Power and Water Generation have attempted to minimise the likelihood of these events by increasing the available spinning reserve[7]. Power Networks has reconfigured Feeder 6 (22TC606) which has been the cause of several outages, completed a protection review and increased circuit breaker maintenance. In the 2012-13 Power Networks Feeder Upgrade program, the planned installation of a number of remote switches on Feeder 6 will aid in fault finding and keep the power system stable.

SAIFI

Region	2011-12 SCI Target	Power and Water's Actual Performance	
		2011-12 Unadjusted	2011-12 Adjusted[8]
Darwin	4.2	4.9	4.9
Katherine	9.6	5.4	5.4
Tennant Creek	9.8	5.7	5.7
Alice Springs	2.9	1.3	1.3

[6] A load shedding event occurs when frequency falls and triggers the Under Frequency Load Shedding trigger. Load is shed in stages on the network to prevent a system wide collapse.
[7] Spinning reserve is the extra generating capacity that is made available for sudden short falls in electricity supply and increase power system inertia.
[8] The adjusted results are the same as the unadjusted results as there were no 'major event days'.

The SCI targets for adjusted SAIFI were met in the Katherine, Tennant Creek and Alice Springs regions. Darwin exceeded the adjusted SAIFI SCI target in the reporting year by 0.7 interruptions. Performance, however, was generally in line with the five year average performance for Darwin SAIFI as shown in Figure 10.

As with the previous SAIDI graphs, Figures 10 to 13[9] show the accumulated SAIFI number of interruptions for the reporting year, along with the previous five year average (2006-07 to 2010-11) and 'seasonalised' targets.

Figure 9 *Accumulated Darwin Adjusted SAIFI Trends*

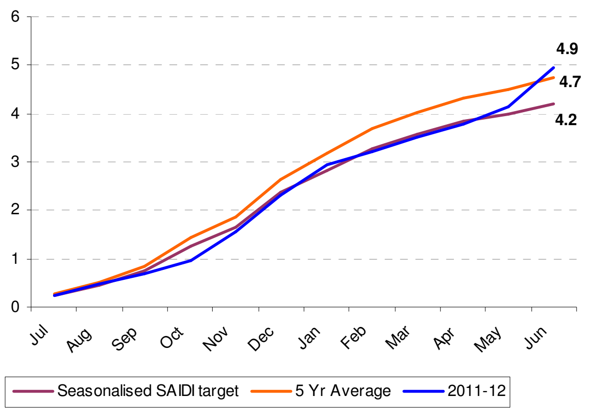


Figure 10 *Accumulated Katherine Adjusted SAIFI Trends*

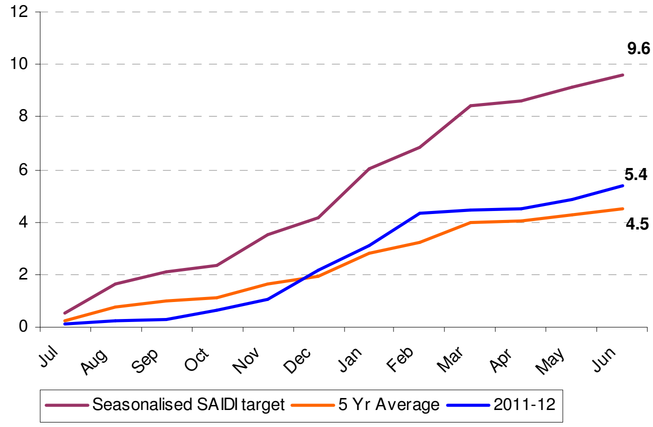


Figure 11 *Accumulated Tennant Creek Adjusted SAIFI Trends*

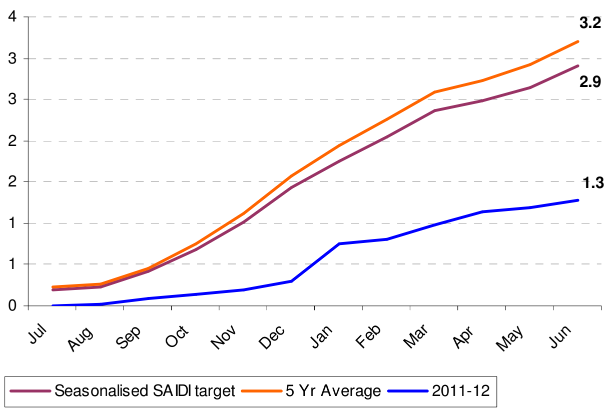
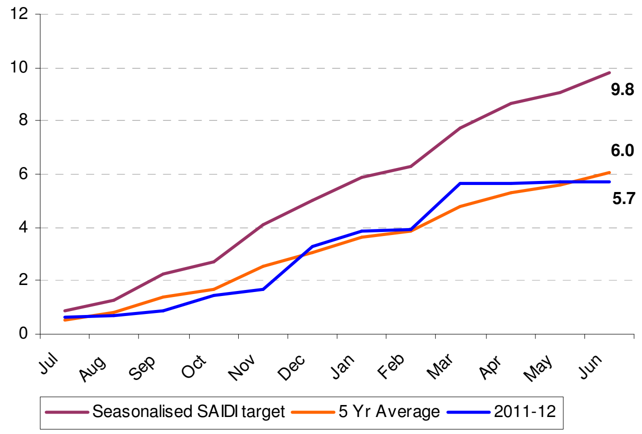


Figure 12 *Accumulated Alice Springs Adjusted SAIFI Trends*



The historical SAIFI network performance for each region is provided in Figures 14 to 17.

[9] Five year average values are calculated through the application of current cause codes and methodologies to cleansed historic data which may produce slight inconsistencies with previous Standards of Service reports.

Figure 13 *Darwin Adjusted SAIFI – Historical Performance*

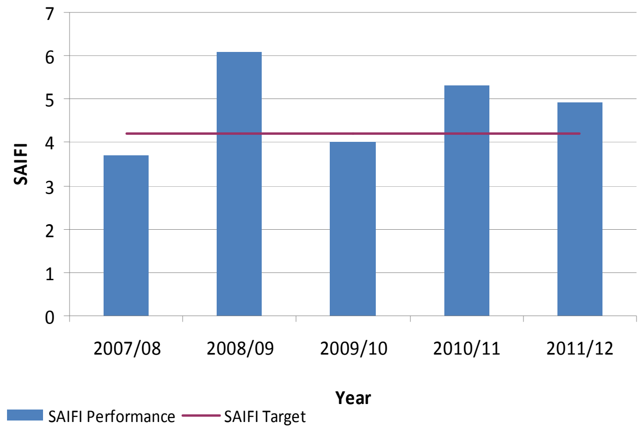


Figure 14 *Katherine Adjusted SAIFI – Historical Performance*

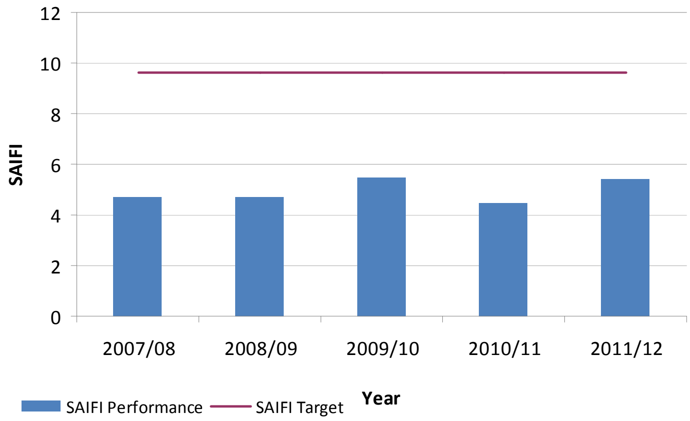


Figure 15 *Tennant Creek Adjusted SAIFI - Historical Performance*

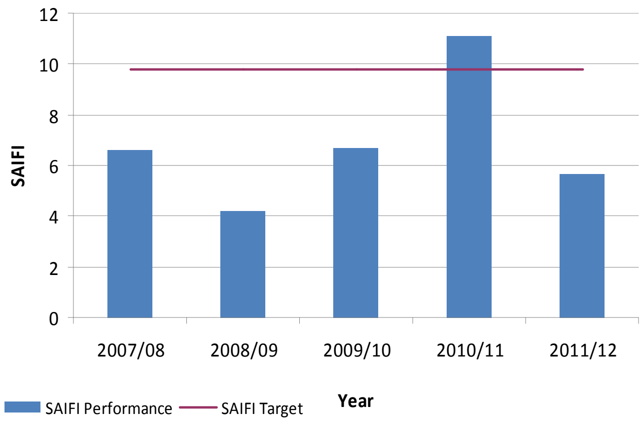
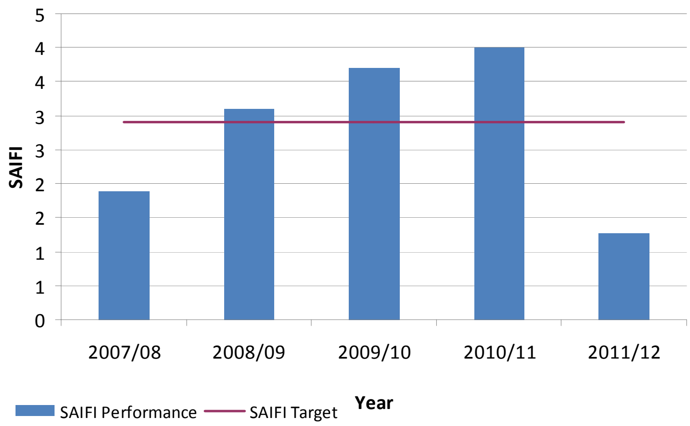


Figure 16 *Alice Springs Adjusted SAIFI – Historical Performance*

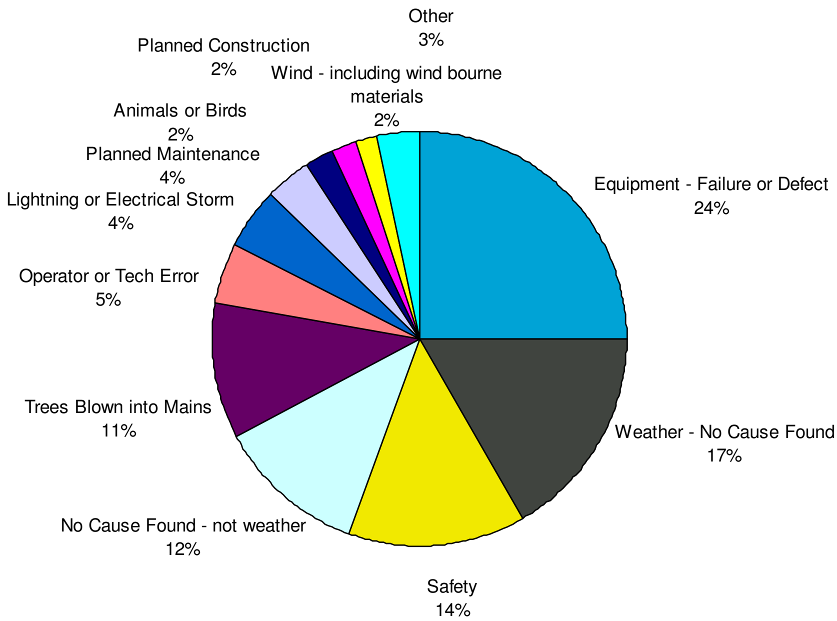


Darwin

As demonstrated in Figure 17, the SAIFI figure for the Darwin region is largely attributed to equipment failure (as is the case for the corresponding SAIDI figure). This accounts for twenty four per cent of all network SAIFI outages in the Darwin region. The causes of these outages are the same as discussed above for SAIDI.

The next highest cause of network SAIFI is weather, contributing seventeen per cent in the Darwin region. The majority of these outages occurred on the 22kV rural overhead network while storms and wind affected the area.

Figure 17 *Darwin SAIFI – Cause Breakdown*



CAIDI

Region	Agreed Minimum Standard	Power and Water's Actual Performance	
		2011-12 Unadjusted	2011-12 Adjusted[10]
Darwin	52.0	53.9	53.9
Katherine	42.0	41.2	41.2
Tennant Creek	41.8	68.3	68.3
Alice Springs	37.2	81.2	81.2

The agreed minimum standard was met in the Katherine region. The Darwin, Tennant Creek and Alice Springs regions exceeded the agreed minimum standard in the 2011-12 financial year.

Power and Water considers that the CAIDI performance measurement is a flawed indicator for outages, as the calculation is based on duration of outages over outage frequency. This can result in a situation where having a higher frequency of outages benefits the outcome of the performance indicator, which may not reflect improvement in either duration or frequency of outages.

2.2 Historical unadjusted network performance

Power Networks' historical unadjusted network performance is compared to the Australian weighted average for distribution networks in Figures 19 and 20 (as published in Energy Supply Association of Australia's (ESAA) *Electricity Gas Australia* annual publications).

[10] The adjusted results are the same as the unadjusted results as there were no 'major event days'.

Figure 18 *Unadjusted NT SAIDI – Historical Performance compared to Australian Average*

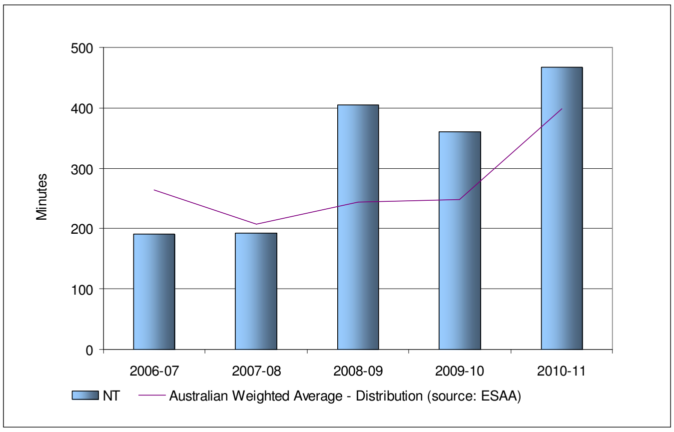
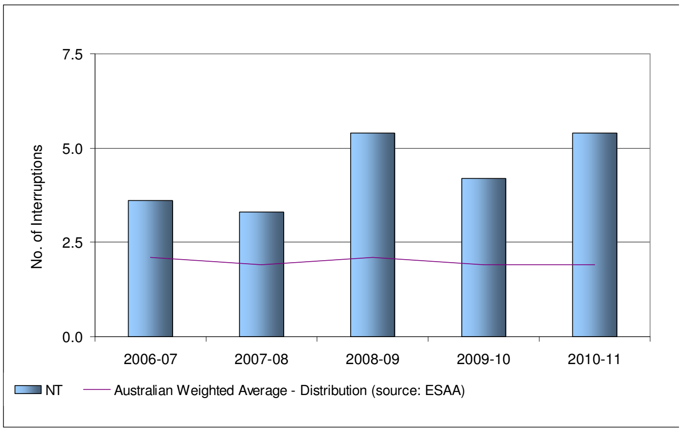


Figure 19 *Unadjusted NT SAIFI – Historical Performance compared to Australian Average*



Note: ESAA figures for 2011-12 have not yet been published.

The data demonstrates that Power and Water's performance follows the national trend for SAIDI despite the relatively small customer base. Weather is the primary driver of variations in outage performance.

The Northern Territory is a challenging environment to maintain reliable supply, in particular due to the effects of lightning strikes and animals (fruit bats) to a much greater extent than in other states. The impact of cyclones and major storms can also be particularly devastating. Further, expenditure constraints over successive periods have led to a general deterioration in asset condition, highlighted by the Casuarina incident in the 2008-09 year, which is being progressively addressed.

2.3 AER feeder category benchmarking

Power and Water supports the use of the Australian Energy Regulator's (AER) feeder categories[11] and has segregated network feeders accordingly. Use of these categories provides a powerful tool that allows benchmarking against other Australian utilities and regions with similar latitudes. While the key performance indicators from Schedule 1 of the Code are the driver for reliability investment, this benchmarking verifies that the investment is required to align line performance with the national experience.

The AER feeder categories are defined as follows:

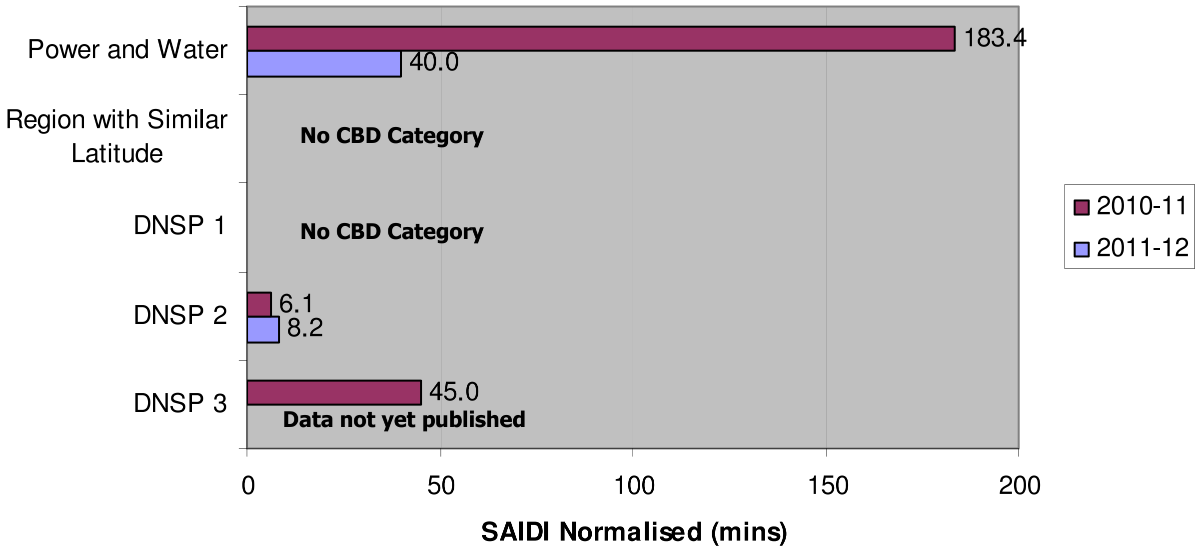
1. CBD – supplying predominantly commercial high rise, supplied by a predominantly underground network with significant interconnections and redundancy;
2. Urban – annual maximum feeder demand greater than 0.3 MVA/km;
3. Rural Short – not CBD, Urban or Rural Long. Total route length less than 200 km; and
4. Rural Long – total route length greater than 200 km.

Using the AER feeder categories, Power and Water's network performance is compared to other Australian Distribution Network Service Providers (DNSP) for the years 2010-11 and 2011-12.

[11] The AER have adopted the SCONRRR feeder categories from the Utility Regulators' Forum (March 2002)

CBD

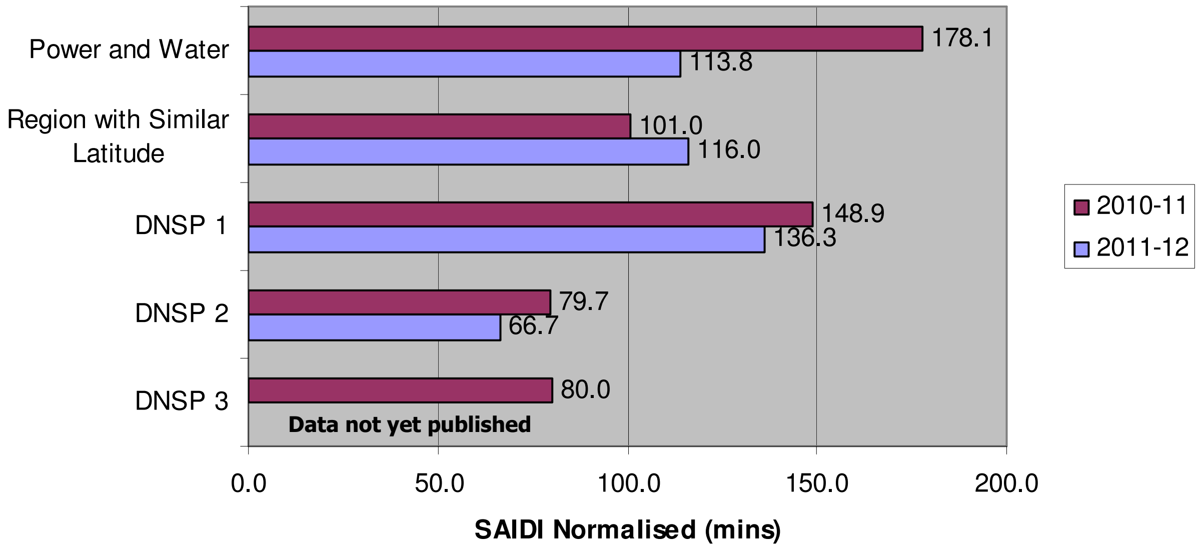
Figure 20 *CBD AER Feeder Category Benchmarking*



Power and Water's CBD feeder performance in the 2011-12 financial year was below average. Planned maintenance associated with the Woods Street Switching Station upgrade contributed significantly to SAIDI in this category.

Urban

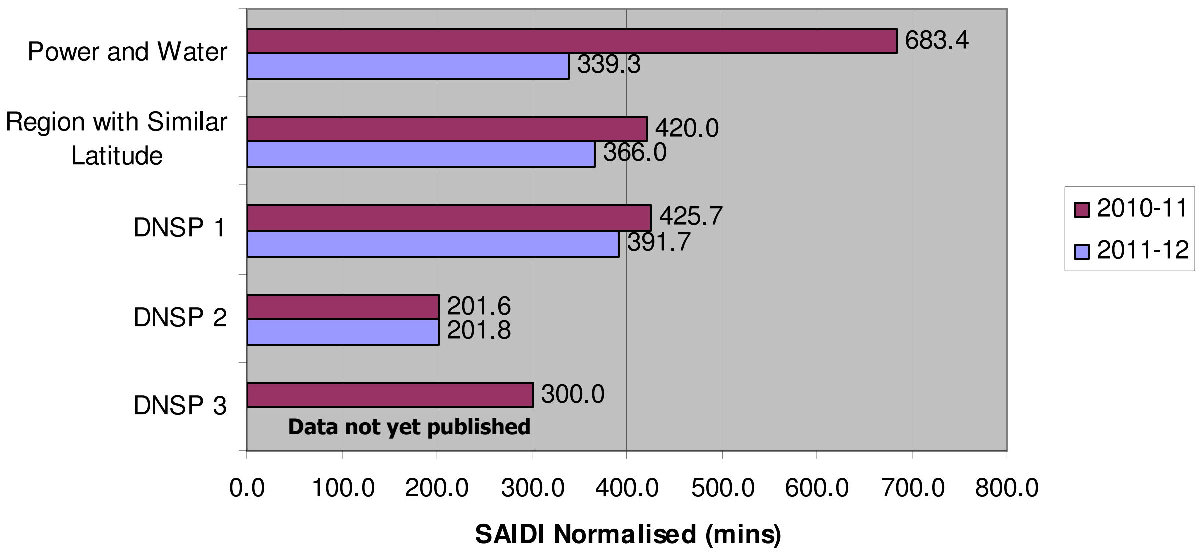
Figure 21 *Urban AER Feeder Category Benchmarking*



The urban feeder performance in 2011-12 was average when compared to other Australian Distribution Network Service Providers.

Rural Short

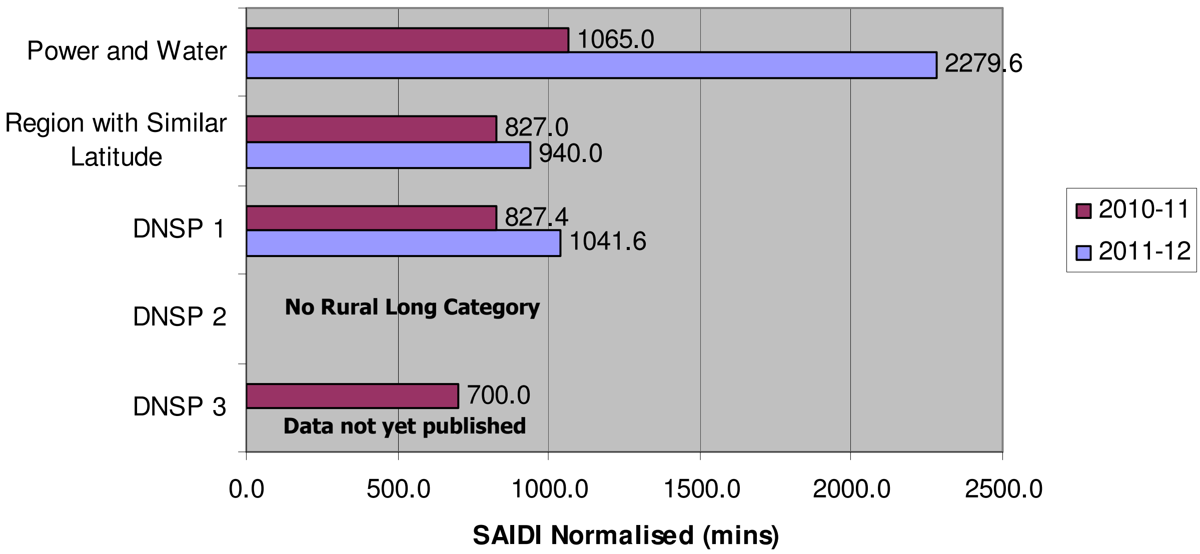
Figure 22 *Rural Short AER Feeder Category Benchmarking*



The performance of Power and Water's rural short feeders in the 2011-12 financial year was average when compared to other Australian Distribution Network Service Providers.

Rural Long

Figure 23 *Rural Long AER Feeder Category Benchmarking*



The performance of Power and Water's rural long feeders was below average in the 2011-12 financial year. There are two rural long feeders in the Northern Territory; Mataranka (22KP07) in the Katherine region and Feeder 6 (22TC602) in the Tennant Creek region. These two feeders serve 0.3 per cent of Power and Water's customers however require a disproportionate allocation of resources. Interruption causes, initiatives and actions for these feeders are discussed below in section 2.5 Worst Performing Feeders.

2.4 Feeder minimum standards

Power Networks continues to use the Utilities Commission's (expired) minimum standards to define feeder minimum performance standards. These minimum performance standards set interruption frequency and duration thresholds by regions for feeders in the network. If a feeder exceeds these thresholds, it is termed a worst performing feeder.

Schedule 1 of the Code sets out the number of feeders allowed exceeding the threshold. The following tables show the annual number of feeders that are above the frequency or duration threshold for the reporting year. This is compared with the annual allowable limits in number of feeders.

Number of feeders that have experienced more than the frequency threshold compared to the annual allowable limits in number of feeders

Region	Interconnected or Radial	Interruption Frequency Threshold (per annum)	Allowable Limits above Threshold No. of Feeders	Annual Number of Feeders 2011-12	Percentage Frequency Threshold (per annum)	Percentage of consumers supplied by feeders that experience more than frequency threshold per year
Darwin-Urban	Interconnected	15	10	1	27%	5%
Alice Springs	Interconnected	15	4	2	10%	5%
Darwin-Rural	Radial	27	8	3	50%	51%
Katherine	Radial	27	7	3	50%	17%
Tennant Creek	Radial	27	3	1	32%	47%

Number of feeders that have experienced more than the duration threshold compared to the annual allowable limits in number of feeders

Region	Interconnected or Radial	Interruption Duration Threshold (per annum)	Allowable Limits above Threshold No. of Feeders	Annual Number of Feeders 2011-12
Darwin-Urban	Interconnected	1500	9	5
Alice Springs	Interconnected	1500	4	2
Darwin-Rural	Radial	2500	9	7
Katherine	Radial	2500	6	3
Tennant Creek	Radial	2500	3	1

Power and Water met the agreed minimum standards in both the Darwin-Urban and Alice Springs regions. Power and Water also met the agreed minimum standards in the Darwin-Rural, Katherine and Tennant Creek regions with the exception of the Darwin-Rural and Tennant Creek agreed minimum standard relating to the percentage of customers supplied by feeders that experience more than 27 interruptions per year.

2.5 Worst performing feeders

The table below lists the worst performing feeders using the frequency and duration thresholds as defined by the Code. Feeders that have breached the frequency or duration thresholds for two consecutive years are termed 'consecutively worst performing feeders'. These feeders are highlighted in bold in the table below.

2011-12 Worst Performing Feeders

Region	Interconnected or Radial	Feeder Name	Duration Threshold	Duration (mins)	Frequency Threshold	Frequency
Alice Springs	Interconnected	**22RG04 BREWER 2**	1500	**>1500**	15	**>15**
		22RG13 BREWER 1		**>1500**		**>15**
Darwin	Interconnected	11BE03 TDZ	1500	>1500	15	<15
		11BE10 KARAMA 2		**>1500**		**>15**
		11BE14 ROBINSON		>1500		<15
		11PA17 THORNGATE		>1500		<15
		11SN14 COONAWARRA		>1500		<15
	Radial	22MM05 HERBERT	2500	>2500	27	>27
		22MM06 STRANGWAYS		>2500		<27
		22MM10 VIRGINIA		**>2500**		**>27**
		22MM13 DUNDEE		**>2500**		<27
		22PA101 HOWARD SPRINGS		**>2500**		**>27**
		MM - HUMPTY DOO - MR		>2500		<27
		PINE CK - COSMO HOWLEY		>2500		<27
Katherine	Radial	22KA03 FLORINA	2500	>2500	27	>27
		22KA10 MATARANKA 1*		**>2500**		**>27**
		22KA18 GORGE		>2500		>27
Tennant Creek	Radial	**22TC602 FEEDER 6**	2500	>2500	27	**>27**

* The 22kV switchboard at Katherine Power Station has been upgraded. The Mataranka feeder (22KP07 Mataranka) was moved to the new board at the time of the upgrades and renamed 22KA10 Mataranka 1.

The next section discusses the Power Networks Feeder Upgrade Program, with specific reference to those feeders classed as 'consecutively worst performing feeders'.

2.6 Performance improvements (2011-12)

The Power Networks Feeder Upgrade Program is an annual program that uses five calendar years of interruption data to analyse outage causes for worst performing feeders. Planned upgrades for worst performing feeders are aimed at reducing the frequency and/or duration of outages depending on which indicator threshold has been breached. Upgrade plans are based on data that includes the most current information. The data is analysed in calendar years, which means performance up to and including December of any given year being analysed and actioned in plans that will commence in the following July.

2.6.1. Upgrade actions

Improving feeder performance involves a range of options determined by analysis of the cause and location of outages. The following section outlines a number of typical actions that are employed to address poor feeder reliability. Specific information on consecutively worst performing feeders is located in the table which follows that information.

Air Break Switch to Gas Break Switch changeovers

Air Break Switches (ABS) are changed over to remotely controlled Gas Break Switches (GBS) in strategic locations to improve interruption restoration times. Poorly performing feeders with high interruption durations are targeted in this type of activity. ABS defects include jamming, burnt bridges and misalignment of arc shutes. The changing out of ABS to GBS reduces maintenance requirements as these common defects are engineered out in the GBS.

Strategic replacements in each region are being identified in the feeder upgrade program. In addition, strategic change outs are being identified based on asset condition stemming from inspection and defect information in the Power Network Maintenance Plan.

Hardware upgrades

Hardware upgrades include the replacement of older pin insulators with taller post top insulators. The post top insulators provide better clearances and improve the lightning performance of the line. In addition, post top insulators facilitate the installation of animal guards that minimise animal interference.

Hardware upgrades also include the installation of fibreglass cross arms which are non-conductive, improve the lightning performance of the line and minimise interruptions due to animal interference. This type of cross arm is also used to replace wooden cross arms which are susceptible to corrosion and subsequent failure.

Animal guards are installed as a part of hardware upgrades on a feeder, with two types in use. The first and preferred is an electrostatic guard for post top insulators and the second is a plate animal guard used when the electrostatic guard is not appropriate.

Network reconfigurations including GCR installation.

On poorly performing feeders prone to transient faults caused by vegetation, weather and/or animals, auto-reclosing at key network locations reduces outage and restoration times through better sectionalisation and remote operation. Gas Circuit Reclosers (GCR) also improve restoration times by allowing the immediate reconfiguration of the network after an interruption from an adjacent feeder. GCR are being installed on selected poorly performing feeders with a high number of transient faults and long outage durations.

Underground cable monitoring and replacement

High voltage cables are tested and their condition assessed to determine if replacement is required. In addition, cables with more than two or three failures are scheduled for replacement. These actions subsequently reduce the number of cable failures occurring in the system. Poorly performing feeders with a high incidence of cable failures have been targeted for priority testing and replacement programs.

The above actions are applied to specific feeders as detailed in the table below. This shows the worst performing feeders for the current reporting year and details the major interruption causes for the year and the corresponding planned upgrade actions in the 2012-13 Feeder Upgrade Program.

2011-12 Consecutively Worst Performing Feeders: Major Interruption Causes and Actions from the 2012-13 Feeder Upgrade Program

Feeder Name	2011-12 Major Interruption Causes	2012-13 PN Feeder Upgrade Actions
11BE10 KARAMA 2	• Planned maintenance • Equipment failure or defect • Outages for safe switching	• BBC replacements (safe switching) • Prioritised feeder inspections (equipment failure) • Cable replacement (equipment failure)
22MM10 Virginia	• Equipment failure or defect • Trees blown into mains • Weather related outages including wind borne materials • Time taken for fault finding and restoration	• Targeted tree trimming (trees and wind) • Installation of remote GCR (trees and wind, restoration time) • Replacement of old steel conductor (equipment failure) • Installation of LV spacers (equipment failure) • Wooden cross-arm and pin insulators (equipment failure)
22MM13 Dundee	• Trees blown into mains • Lightning and electrical storms • Weather related outages • Planned maintenance • Equipment failure or defect • Animals and birds • Time taken for fault finding and restoration	• Installation of remote GCR (trees, weather related outages, restoration time) • Installation of remote GBS (restoration time) • Installation of animal protection (animals and birds) • ARC repairs at ZSS (equipment failure) • Targeted tree trimming (trees and wind)
22PA101 Howard Springs	• Trees blown into mains • Weather related outages • Planned maintenance • Equipment failure or defect	• Targeted tree trimming (trees) • Installation of remote GCR (trees and weather related outages) • Audit and installation of bolted lugs on ubolts (equipment failure)
22KA10 Mataranka 1	• Planned maintenance • Weather related outages • Animals and birds • Lightning and electrical storms • Time taken for fault finding and restoration	• Installation of remote control on 3 GCR (weather related outages, animals and birds, lightning and restoration time) • Targeted tree trimming (trees) • Installation of animal protection (animals and birds)

Feeder Name	2011-12 Major Interruption Causes	2012-13 PN Feeder Upgrade Actions
22TC602 Feeder 6	• Planned maintenance • Weather related outages • Equipment failure or defect • Time taken for fault finding and restoration	• Changed protection settings to reduce fault clearance times for low current faults (equipment failure and restoration time) • Completed diagnostic maintenance on feeder circuit breaker (equipment failure) • Installation of GCR (restoration time and weather related outages)
22RG04 Brewer 2	• Weather related outages • Planned construction • Equipment failure • Animals and birds • Time taken for fault finding and restoration	• Reconfiguration of the entire 22kV network including splitting this 'Tie' feeder into two sections (weather related outages and restoration time) • Add auto reclose capabilities (weather related outages) • Auditing and installation of bird protection (animals and birds) • Replace steel EDO crossarms with fibreglass type install bat protection (equipment failure)
22RG13 Brewer 1	• Planned construction • Weather related outages • Animals and Birds • Equipment failure • Time taken for fault finding and restoration	• Reconfiguration of the entire 22kV network including splitting this 'Tie' feeder into two sections (weather related outages and restoration time) • Add auto reclose capabilities (weather related outages) • Auditing and installation of bird protection (animals and birds) • Replace steel EDO crossarms with fibreglass type install bat protection (equipment failure)

All of the activities above are undertaken with the main driver being reliability improvement. Other drivers include safety, asset replacement, growth and/or regulation, and resulting expenditure may also add to reliability improvement.

Asset replacement programs are developed using condition monitoring as the primary data set for decision making and factors influencing asset condition may include performance (not related to SAIDI and SAIFI), age or obsolescence. Some of the major assets scheduled for replacement include the zone substation sites of Snell Street, City Zone, McMinns and Manton.

2.7 Quality

Power Networks receives information about the performance of the network through a number of data sources including customer notification of events and by network monitoring systems. Customer notifications regarding power outages or power quality are logged through the Power and Water call centre or website. 'Call out' crews are assigned and investigate service requests due to upstream feeder faults, requests for the isolation of power and other requests resulting from power outages. The number of 'call outs' in relation to voltage events such as fluctuation or part power are shown in the tables below.

The 2010-11 Standards of Service Report reported 1425 notifications incorrectly as complaints. The distinction between notifications and complaints is highlighted below.

The number of 'call outs' in relation to fluctuating power events: 2011-12

Region	Power and Water's Actual Performance				
	1st Quarter Jul 11 to Sept 11	2nd Quarter Oct 11 to Dec 11	3rd Quarter Jan 12 to Mar 12	4th Quarter Apr 12 to Jun 12	Annual 2011-12
Northern	25	56	50	28	159
Katherine	4	17	3	4	28
Tennant Creek	1	1	0	0	2
Southern	8	5	8	8	29
All Customers	**38**	**79**	**61**	**40**	**218**

The number of 'call outs' in relation to part power events: 2011-12

Region	Power and Water's Actual Performance				
	1st Quarter Jul 11 to Sept 11	2nd Quarter Oct 11 to Dec 11	3rd Quarter Jan 12 to Mar 12	4th Quarter Apr 12 to Jun 12	Annual 2011-12
Northern	145	280	321	125	871
Katherine	26	65	47	31	169
Tennant Creek	0	11	9	1	21
Southern	25	27	38	21	111
All Customers	**196**	**383**	**415**	**178**	**1172**

Customer notifications are classified as customer complaints when they are not immediately addressed by the 'call out' crews or when the customer is dissatisfied due to ongoing issues with their power supply. The number of customer complaints relating to voltage events in the 2011-12 financial year was seven.

Customer complaints are reported in line with Power and Water's complaint process, developed in accordance the Australian Standard (ISO10002-2006).

2.8 Asset management maturity

The asset management maturity of Power Networks has grown considerably over recent years. There is an increased focus on structured maintenance and condition information, management of essential spares and the development of monitoring systems. Efforts in these areas are further described below.

Preventative Maintenance (PM) has increased in importance over recent years. Power Networks now has structured PM plans for every asset class and the completion of PM is measured and reported at every level of the organisation. The completion rate for PM has improved by over sixty per cent from 2010-11 to 2011-12, contributing to enhanced asset condition information and avoiding a number of what may have been substantial failures. Although the impact of this activity may not be immediately apparent in the performance data above, it is certain that a worse result would have been reported if not for these developments.

The work outlined in Section 2.6.1 is built in work orders termed Specific Maintenance and Replacement (SM&R). Completion rates for this work have also been improving although at a lower rate than that experienced for PM. This is in part due to a lack of historic information for some activities and subsequent difficulties in defining the capacity of the workforce. As more of this work is completed the ability of the workforce will be better quantified and the completion rate is expected to improve.

The roll out of the new asset management systems in Power and Water provide enhanced opportunities to report asset condition. The data from PM referred to above will be entered into the asset systems and models for asset condition developed in coming years. This will promote a better understanding throughout the organisation of the risk posed by asset condition and assist in optimising the timing of asset replacements.

A fundamental function of asset management is to document the asset base. Verification of data within Darwin's overhead systems is complete and has been implemented in the Geospatial Information System (GIS). Underground system asset verification is scheduled for the 2012-13 financial year. The work to date has enabled Power and Water to better analyse outage performance data and correlate this to asset types, components and failure modes. This information has been invaluable when used in the process of developing plans to target poor performing feeders.

The management of essential spares is a critical function that has been better resourced and developed since 2009. An improved understanding of the asset base obtained through the verification activity highlighted above was the first step in this development. The procurement of Original Equipment Manufacture (OEM) recommended spares has also been completed. This process identified obsolete assets and contingency plans have been developed in preparation for the end of life management of some of these assets.

The increasing maturity of Power Networks asset management capability is a journey that has not long commenced enabled by data and analysis which provides the necessary understanding to optimise asset performance while minimising cost. Power Networks is continuing the journey, progressively moving towards best practice asset management.

3. Generation indicators

3.1 Generation reliability

The Utilities Commission's (expired) minimum standards are used to define Generation reliability performance standards.

SAIDI

Region	Agreed Minimum Standard	Power and Water's Actual Performance				
		1st Quarter Jul 11 to Sept 11	2nd Quarter Oct 11 to Dec 11	3rd Quarter Jan 12 to Mar 12	4th Quarter Apr 12 to Jun 12	Annual 2011-12
Darwin	42.7	1.7	0.0	4.3	0.0	6.0
Katherine	25.7	5.9	0.0	88.7	0.3	95.0
Tennant Creek	125.0	14.9	0.0	97.6	18.4	130.8
Alice Springs	122.5	0.0	0.0	231.8	4.7	236.7

The annual performance for SAIDI in the Darwin region was within the agreed minimum standard and considerably improved on previous years. This is attributed to the increased reliability from the generation sets at Weddell Power Station, however, the annual SAIDI performance for the Katherine, Tennant Creek and Alice Springs regions exceeded the agreed minimum standards. In the case of the Katherine region, a 132kV line outage contributed to the poor result, as did the need to carry out necessary work on the switch board. In the Alice Springs region, SAIDI performance was impeded by the delay in commissioning new generation at Owen Springs Power Station due to Network constraints. In Tennant Creek the SAIDI performance is a consequence of unforeseen plant failure with associated unplanned maintenance. Plant configuration at Tennant Creek is currently under review.

Figures 25 to 28 show Power and Water's actual performance for the SAIDI service performance indicator for Generation on a quarterly and annual basis for each region.

Figure 25: Darwin Region – SAIDI

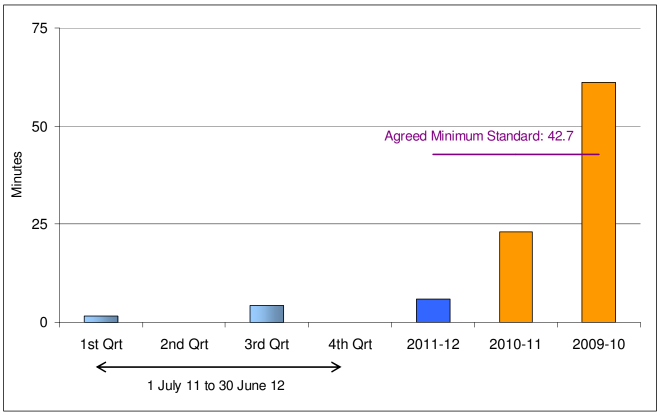


Figure 26: Katherine Region – SAIDI

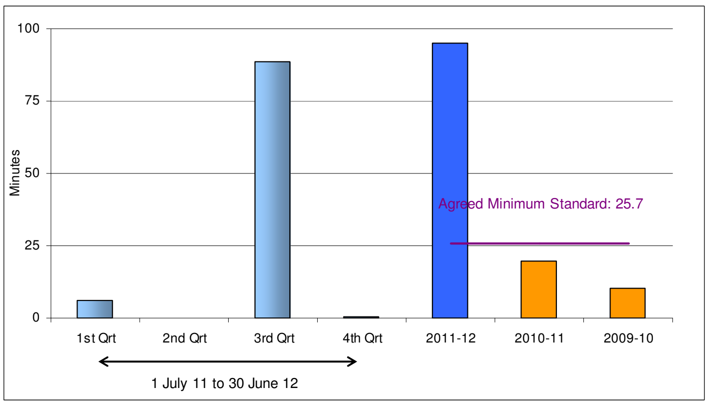


Figure 27: Tennant Creek – SAIDI

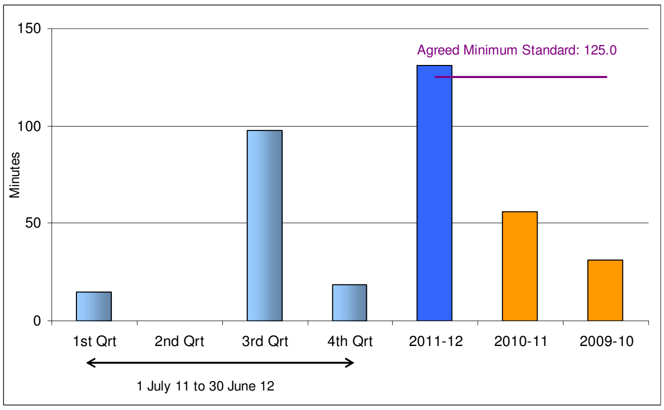
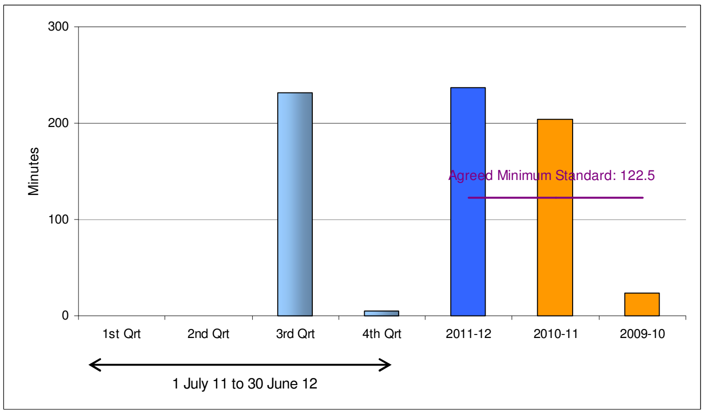


Figure 28: Alice Springs – SAIDI



Figures 29 to 32 show Power and Water's historical performance for the SAIDI service performance indicator for Generation on an annual basis for each region.

Figure 29: Darwin Region SAIDI – Historical Performance

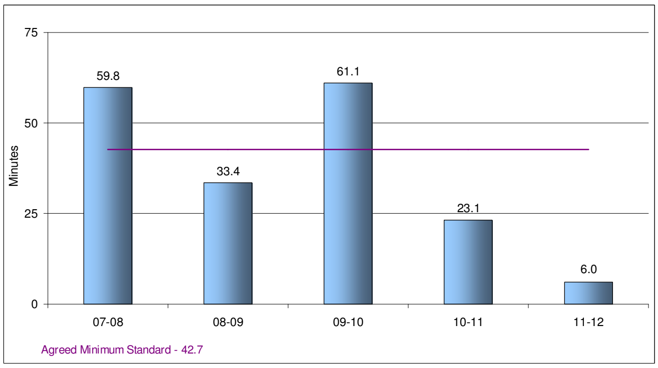


Figure 30: Katherine Region SAIDI – Historical Performance

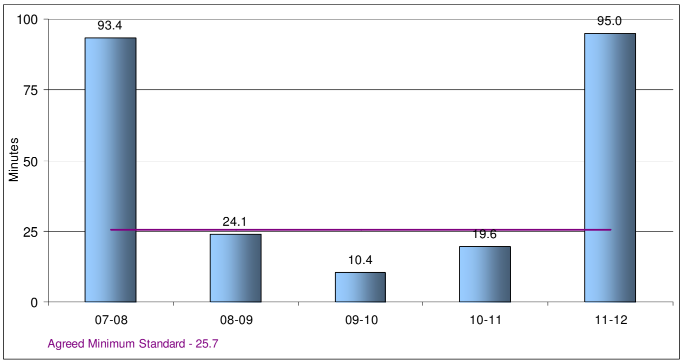


Figure 31: Tennant Creek Region SAIDI – Historical Performance

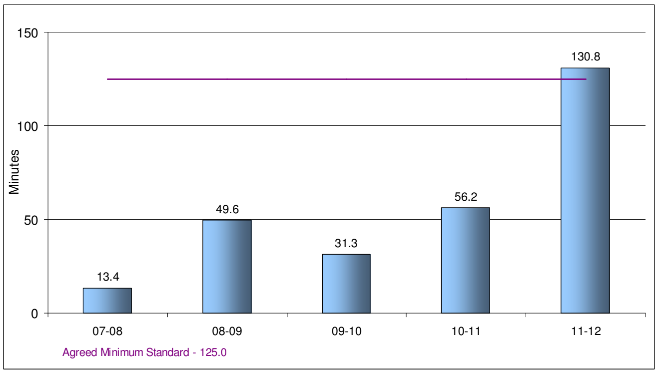
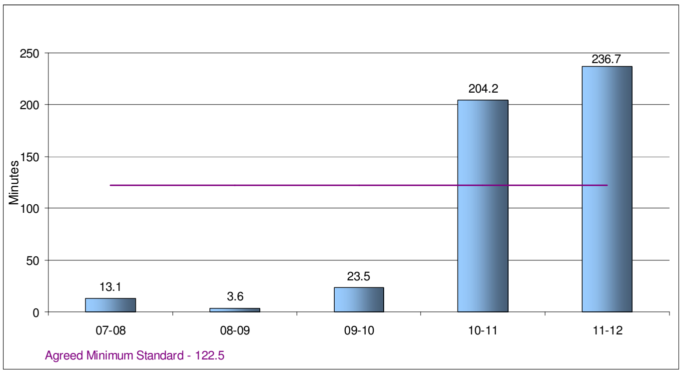


Figure 32: Alice Springs Region SAIDI – Historical Performance



SAIFI

Region	Agreed Minimum Standard	Power and Water's Actual Performance				
		1st Quarter Jul 11 to Sept 11	2nd Quarter Oct 11 to Dec 11	3rd Quarter Jan 12 to Mar 12	4th Quarter Apr 12 to Jun 12	Annual 2011-12
Darwin	3.9	0.2	0.0	0.1	0.0	0.3
Katherine	1.1	0.3	0.0	2.2	0.1	2.7
Tennant Creek	12.5	0.5	0.0	3.4	0.9	4.8
Alice Springs	3.6	0.0	0.0	2.8	0.1	2.9

The annual performances for SAIFI in the Darwin, Tennant Creek and Alice Springs regions were within the agreed minimum standards. The annual SAIFI performance for the Katherine region exceeded the agreed minimum standard for the same reasons as the SAIDI performance i.e. a 132kV line outage contributed to the performance measure, as did the need to carry out necessary work on the switch board.

Figures 33 to 36 show Power and Water's Generation SAIFI performance on a quarterly and annual basis.

Figure 33: Darwin Region - SAIFI

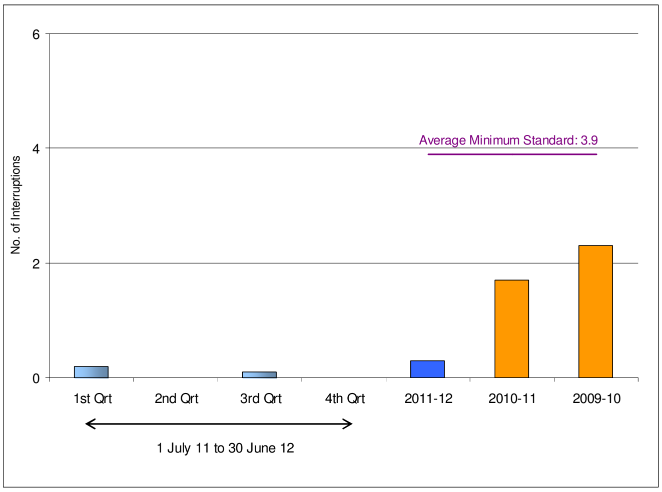


Figure 34: Katherine Region – SAIFI

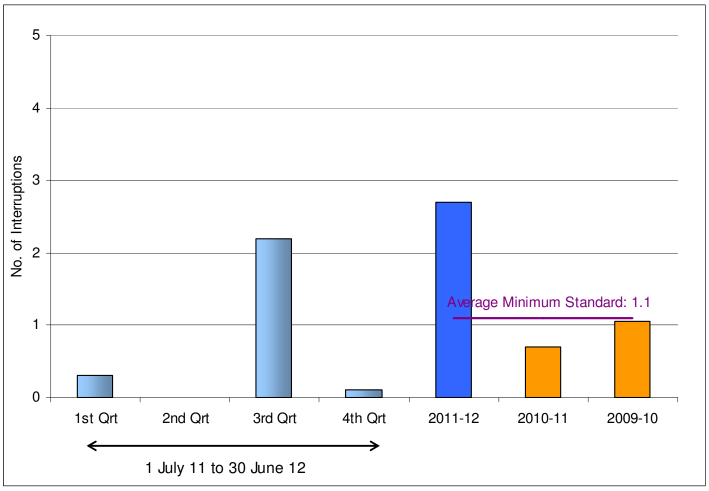


Figure 35: Tennant Creek Region - SAIFI

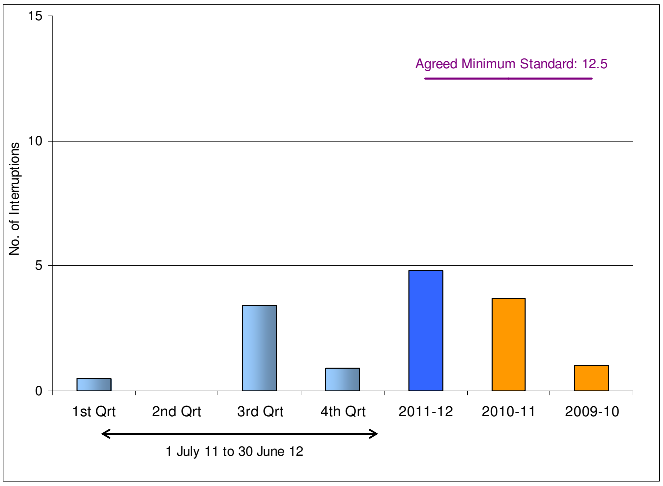
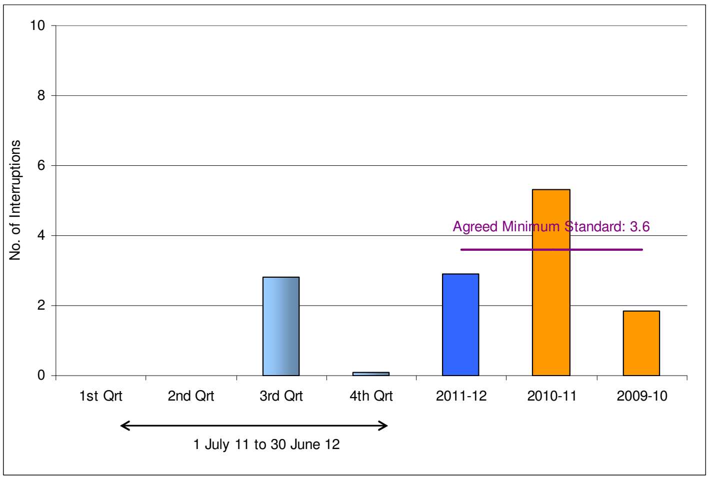


Figure 36: Alice Springs Region – SAIFI



Figures 37 to 40 show Power and Water's historical Generation SAIFI performance.

Figure 37: Darwin Region SAIFI – Historical Performance

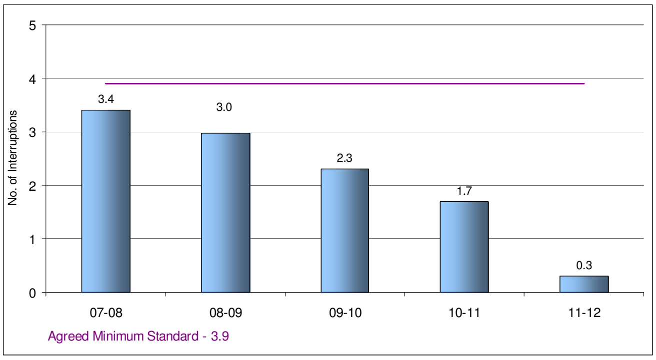


Figure 38: Katherine Region SAIFI – Historical Performance

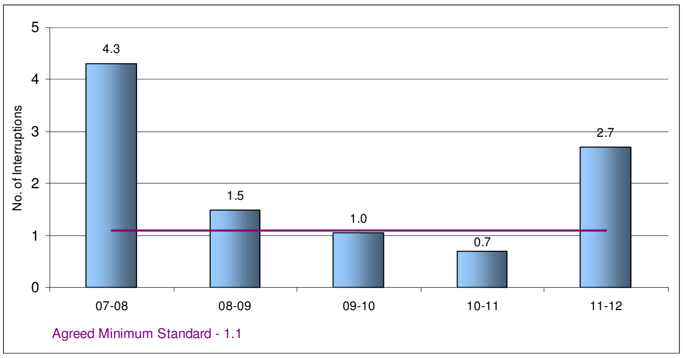


Figure 39: Tennant Creek Region SAIFI – Historical Performance

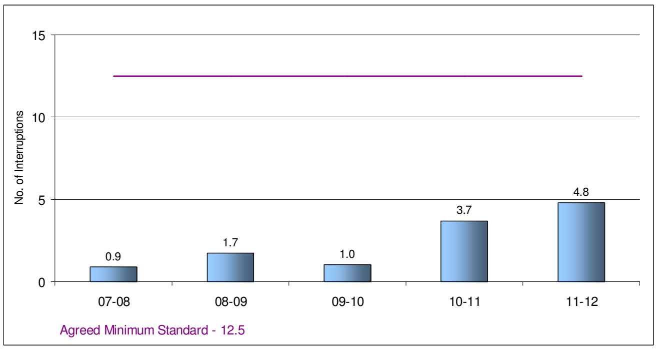
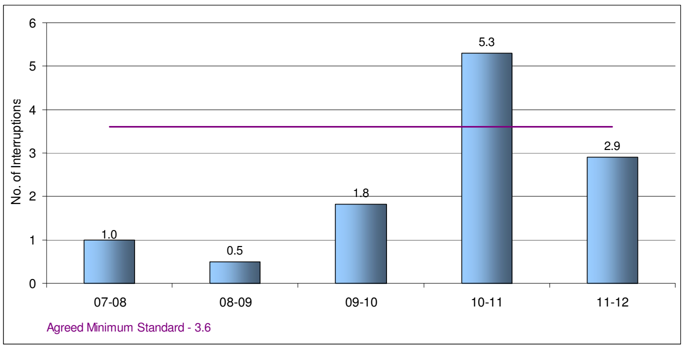


Figure 40: Alice Springs Region SAIFI – Historical Performance



CAIDI

Region	Agreed Minimum Standard	Power and Water's Actual Performance				
		1st Quarter Jul 11 to Sept 11	2nd Quarter Oct 11 to Dec 11	3rd Quarter Jan 12 to Mar 12	4th Quarter Apr 12 to Jun 12	Annual 2011-12
Darwin	10.9	10.8	-	30.6	-	20.3
Katherine	24.5	18.7	-	39.4	2.2	35.0
Tennant Creek	10.0	31.2	-	28.4	21.3	27.4
Alice Springs	34.2	-	-	82.2	43.1	80.7

Generation's CAIDI performance in 2011-12 in each of the regions exceeded the agreed minimum standards.

As mentioned earlier, Power and Water considers that the CAIDI performance measurement is a flawed indicator for outages, as the calculation is based on duration of outages over outage frequency. This can result in a situation where having a higher frequency of outages benefits the outcome of the performance indicator, which may not reflect improvement in either duration or frequency of outages.

Figures 41 to 44 show Power and Water's actual performance for the CAIDI service performance indicator for Generation on a quarterly and annual basis for each region.

Figure 41: Darwin Region - CAIDI

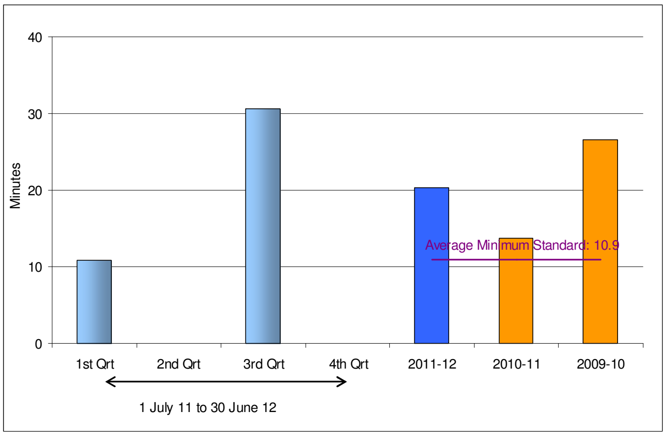


Figure 42: Katherine Region – CAIDI

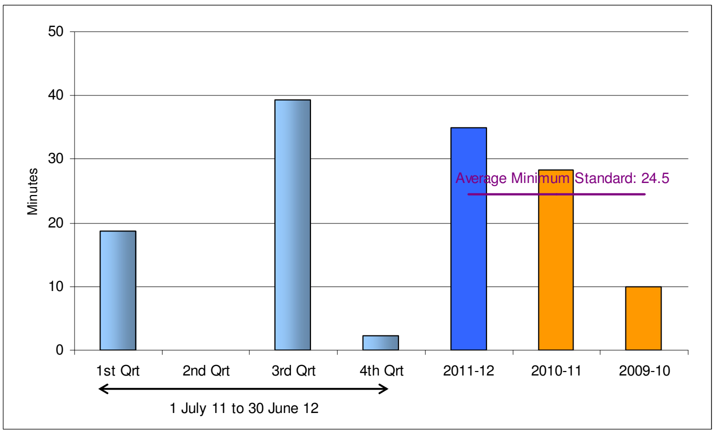


Figure 43: Tennant Creek Region - CAIDI

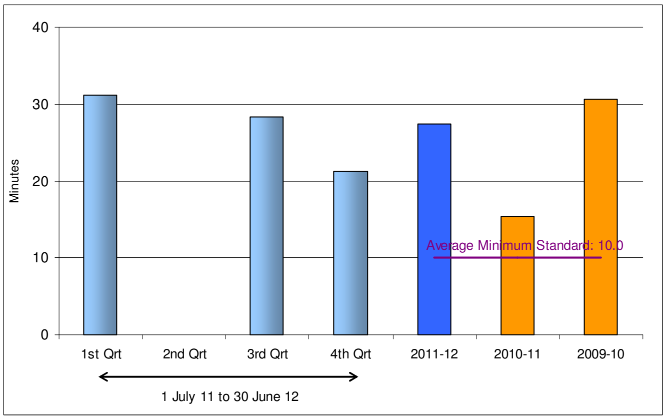
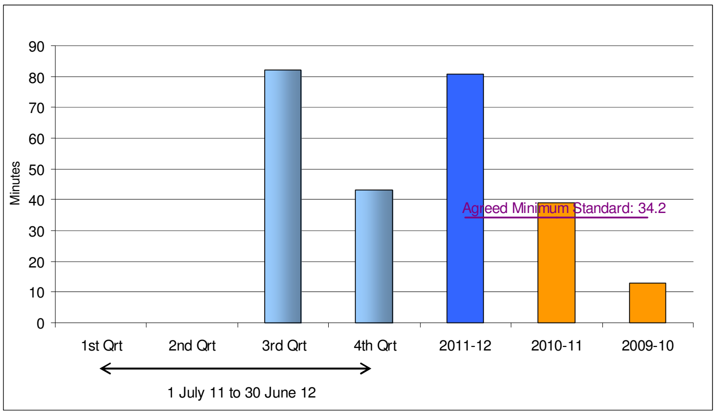


Figure 44: Alice Springs Region – CAIDI



Figures 45 to 48 show Power and Water's historical performance for the CAIDI service performance indicator for Generation.

Figure 45: Darwin Region CAIDI – Historical Performance

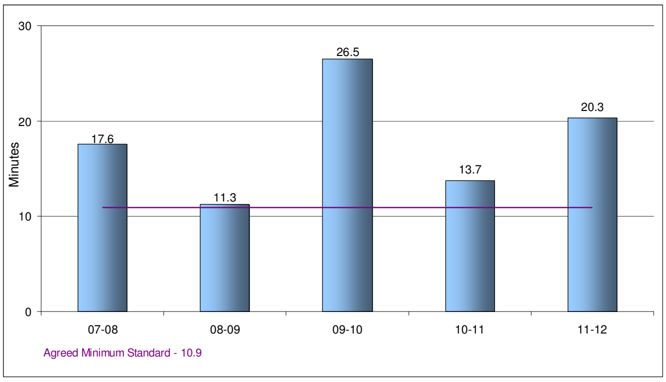


Figure 46: Katherine Region CAIDI – Historical Performance

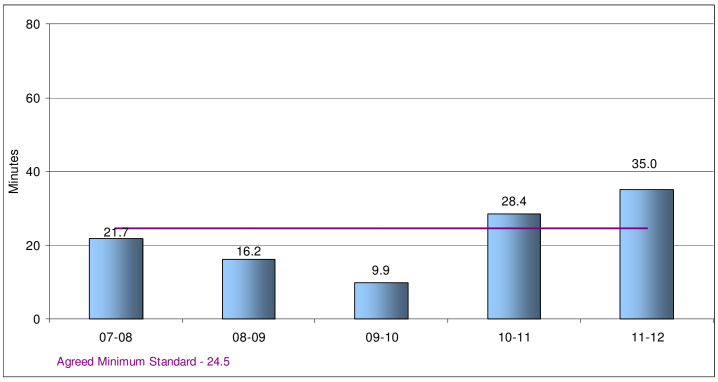


Figure 47: Tennant Creek Region CAIDI – Historical Performance

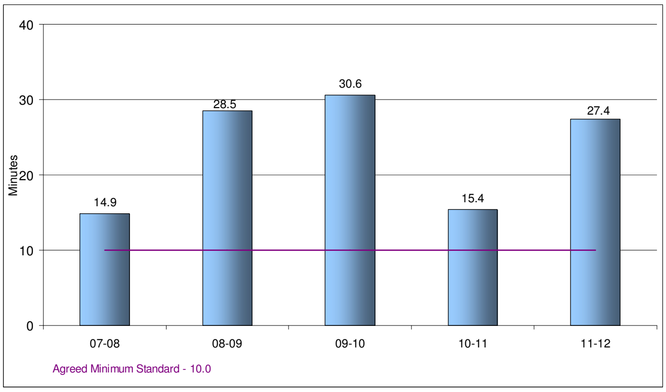
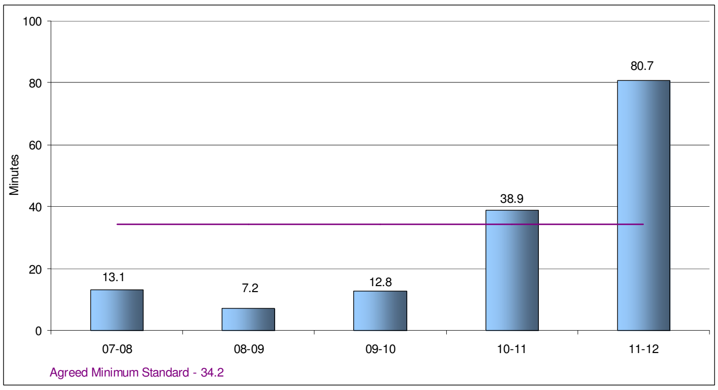


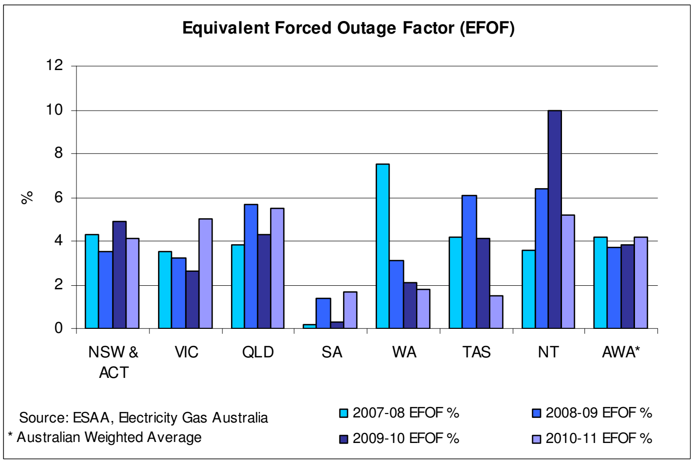
Figure 48: Alice Springs Region CAIDI – Historical Performance



3.2 Historical generation performance

Figure 49 compares Power and Water's historical generation performance to interstate generators and the Australian weighted average (as published in ESAA's *Electricity Gas Australia* annual publications).

Figure 49: Equivalent Forced Outage Factor (EFOF) - Historical Performance compared to Australian Average



Note: ESAA figures for 2011-12 have not yet been published.

Power and Water's equivalent forced outage factor (EFOF) is at its lowest since 2008-09. While the EFOF slightly exceeds the Australian weighted average, it no longer has the highest EFOF of all the jurisdictions and does not stand out prominently within the sample.

4. Customer service indicators

4.1 Customer service

The Utilities Commission's (expired) minimum standards are used to define customer service performance standards

New connections not provided to existing supply properties within 24 hours

NT Wide	Agreed Minimum Standard	Power and Water's Actual Performance				
		1st Quarter Jul 11 to Sept 11	2nd Quarter Oct 11 to Dec 11	3rd Quarter Jan 12 to Mar 12	4th Quarter Apr 12 to Jun 12	Annual 2011-12
All Customers	2%	0.1%	0.1%	0.00%	0.15%	0.08%

Power and Water met the agreed minimum standard in 2011-12 and has done so for the past six years.

New connections not provided to new subdivisions in urban areas within 5 working days

NT Wide	Agreed Minimum Standard	Power and Water's Actual Performance				
		1st Quarter Jul 11 to Sept 11	2nd Quarter Oct 11 to Dec 11	3rd Quarter Jan 12 to Mar 12	4th Quarter Apr 12 to Jun 12	Annual 2011-12
All Customers	10%	4.6%	4.4%	30.9%	1.8%	12.1%

The agreed minimum standard for new connections not provided to new subdivisions in urban areas was not met in 2011-12. During the third quarter of the year, two large city multi-apartment dwellings required connection within five days. This was beyond the capacity of existing resources and is considered an exceptional event.

New connections not provided to new subdivisions where minor extensions or augmentation is required in urban areas within 10 weeks

NT Wide	Agreed Minimum Standard	Power and Water's Actual Performance				
		1st Quarter Jul 11 to Sept 11	2nd Quarter Oct 11 to Dec 11	3rd Quarter Jan 12 to Mar 12	4th Quarter Apr 12 to Jun 12	Annual 2011-12
All Customers	35%	78%	88%	68%	70%	73%

The agreed minimum standard for new connections not provided to new subdivisions was not met in 2011-12. Where minor augmentation is necessary, a longer time frame is required to procure large items of distribution equipment, procure contract resources and arrange internal resources for final connection to the network.

The number and percentage of telephone calls responded to within 20 seconds from when the customer selects to speak to a human operator.

NT Wide	Agreed Minimum Standard	Power and Water's Actual Performance				
		1st Quarter Jul 11 to Sept 11	2nd Quarter Oct 11 to Dec 11	3rd Quarter Jan 12 to Mar 12	4th Quarter Apr 12 to Jun 12	Annual 2011-12
All Customers	58,679	23,127	29,104	21,990	27,085	101,306
All Customers	63%	64%	73%	43%	63%	60%

The agreed minimum standard for the number of telephone calls responded to within 20 seconds was met in 2011-12. However, the percentage of telephone calls responded to within 20 seconds did not meet the agreed standard for the full year. Notably, call volumes were considerably higher than the 2010-11 result of 88,888, yet the target of 63 per cent was achieved in seven of the twelve months.

The number of customer complaints

Region	Agreed Minimum Standard	Power and Water's Actual Performance				
		1st Quarter Jul 11 to Sept 11	2nd Quarter Oct 11 to Dec 11	3rd Quarter Jan 12 to Mar 12	4th Quarter Apr 12 to Jun 12	Annual 2011-12
Darwin	n/a	373	355	433	355	1,516
Katherine	n/a	44	27	47	29	147
Tennant Creek	n/a	11	7	7	16	41
Alice Springs	n/a	113	94	109	69	385
All Customers	**5,146**	**541**	**483**	**596**	**469**	**2,089**

Power and Water met the agreed minimum standard in 2011-12. As required by the Code, Power and Water Retail reports complaints in accordance with the Australian Standard (ISO10002-2006)[12] which defines a complaint as *"An expression of dissatisfaction made to an organisation, related to its products, or the complaint handling process itself, where a response or resolution is explicitly or implicitly expected."*

To further improve its service performance, Power and Water engages a specialist market research company to conduct monthly customer surveys.

5. Contact Details

For clarification or further details pertaining to the information contained in this report, please contact Mr Antoni Murphy, Acting Senior Manager Regulation, Pricing and Economic Analysis on (08) 8985 8431 or at antoni.murphy@powerwater.com.au.

[12] The Code refers to Australian Standard 4269:1995, defined as *"any expression of dissatisfaction with a product or service offered or provided"*. This standard has been superseded by ISO10002-2006.