



# **New South Wales 2016-17 Gas networks performance report**

This report was prepared by the NSW Department of Planning & Environment – Division of Energy, Water and Portfolio Strategy. Information on the reporting requirements is available on the Department's website:  
[www.resourcesandenergy.nsw.gov.au](http://www.resourcesandenergy.nsw.gov.au).

ISSN: 1838-8345

**Enquiries:** Enquiries should be addressed to:

Manager, Safety & Technical Regulation  
NSW Department of Planning & Environment  
Level 12, 10 Valentine Avenue  
Parramatta NSW 2150

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## Abbreviations

<b>DPE</b>	Department of Planning and Environment
<b>OFT</b>	Office of Fair Trading
<b>GJ</b>	Gigajoule
<b>IPART</b>	Independent Pricing and Regulatory Tribunal
<b>kPa</b>	Kilopascal: pressure units
<b>KPI</b>	Key Performance Indicator
<b>LGA</b>	Local Government Area
<b>LPG</b>	Liquefied Petroleum Gas
<b>MAOP</b>	Maximum Allowable Operating Pressure
<b>MJ</b>	Megajoule
<b>PJ</b>	Petajoule
<b>SNG</b>	Simulated Natural Gas
<b>TJ</b>	Terajoule
<b>TLPG</b>	Tempered Liquefied Petroleum Gas
<b>UAFG</b>	Unaccounted-for-Gas (difference between gas entering and leaving the system)

**Table 1: Gas units of measurement.  
(a joule is the international unit for measuring energy content)**

1,000 joules (J)	1 kilojoule (kJ)
1,000 kilojoules	1 megajoule (MJ)
1,000 megajoules	1 gigajoule (GJ)
1,000 gigajoules	1 terajoule (TJ)
1,000 terajoules	1 petajoule (PJ)

**Note:** One standard cubic metre of natural gas is approximately 38 MJ. This figure can vary as it relates to the heating value of a particular sample of gas.

# Executive summary

This *2016-17 Gas networks performance report* on the operations of natural gas and liquefied petroleum gas (LPG) distribution networks in NSW has been prepared by the Department of Planning and Environment (DPE), Division of Energy, Water and Portfolio Strategy.

These networks are regulated under the *NSW Gas Supply Act 1996* (the Act) and the Gas Supply (Safety and Network Management) Regulation 2013 (the Regulation). The report consolidates and comments on performance data and information provided by the gas network operators.

Under the Regulation, network operators are required to prepare a Safety and Operating Plan (SAOP), which is lodged with DPE and which governs their operations. The network operator is then audited annually by an independent auditor to assess performance against the SAOP. This process has proven effective in providing safe and reliable networks.

Many factors influence network performance including network scale, age, construction materials and operating regimes. Comparisons in performance across networks and between jurisdictions, must consider the factors that differentiate the networks and influence their performance.

Key performance indicators (KPI) have been developed by DPE to monitor and analyse the network operators' performances against network integrity, reliability, and safety parameters.

Much of the data reported is presented on a year-to-year basis to identify trends and changes in performance.

## **Natural gas networks**

The network operators have demonstrated a high level of performance in the areas of network integrity, reliability, and safety.

DPE acknowledges that the network operators are continually looking at ways to improve their performance, in accordance with the Regulation, and DPE is working with the network operators to achieve the best possible results. It must be noted, however, that some figures in this report differ from those in previous reports. This is the result of the network operators revising or improving the way in which information is recorded and collated.

## ***High-pressure pipelines (unlicensed)***

Jemena Gas Networks (NSW) Ltd, ActewAGL and Albury Gas operate high-pressure unlicensed pipelines (pressure > 1,050 kPa) as part of their networks.

## ***Liquefied petroleum gas (LPG) networks***

Due to the size and complexity of LPG networks, comparison to the natural gas network is not appropriate. The analysis of LPG network information can be seen in Appendix A.

Overall it would appear that the LPG networks are performing well. However due to the nature of their small sizes, incidents which have occurred appear significant with respect to customer numbers and the size of network.

Note: Given the significant differences between LPG and larger natural gas networks, DPE continues to consult with LPG network operators to improve the LPG reporting regimes while taking into account the unique characteristics of the LPG networks.

## Conclusions

The collective improvements across the state-based KPIs indicate that assets are being maintained to a high standard.

Summary of KPIs for the 2016-17 year:

- The NSW gas network increased by 1.2% to 29,297 km. This is the fourth consecutive reporting period with network growth over 350 km.
- The number of consumers connected to natural gas in NSW has risen to over 1.4 million.
- The number of new consumers has continued to grow from reaching 57,367.
- The unaccounted for gas (UAFG) figure for NSW was 2.45%.
- The LPG networks have reported growth of 17 consumers and network growth of 2.6 km.

These results indicate that the network operators continue to manage and grow their assets in a safe and reliable manner.

The department reviews all annual reports and continues to consult closely with the network operators in the ongoing evaluation of the reporting requirements.

# 1. Introduction

This report consolidates performance information and data provided by each of the gas distribution network operators for the 2016–17 financial year in accordance with the requirements of the Annual Reporting Template for network operators.

This report:

- presents DPE interpretation and commentary on the information and data provided by the operators and compares overall performance
- identifies areas of achievement and opportunities for improvement for the NSW gas industry as a whole.

## 1.1 Report structure

This report summarizes data provided by the distribution network operators in accordance with the annual reporting requirements prepared by DPE and has the following structure:

- **Chapter 1** *Introduction*
- **Chapter 2** *Network asset information*
- **Chapter 3** *Network integrity and safety information*. This chapter also presents KPIs, derived from the data provided
- **Chapter 4** *Network reliability and consumer-related information*. This chapter also presents KPIs, derived from the data provided
- **Chapter 5** *High-pressure (unlicensed) pipeline data*
- **Appendix A** LPG industry and LPG networks-reported data
- **Appendix B** Natural gas industry within NSW

## 1.2 Limitations of this report

There are currently eight licensed gas network operators in NSW. Six of these reticulate natural gas while the remaining two operate distribution systems that reticulate LPG. These are all regulated by the Department of Industry in similar fashion under the Act. The annual reporting is carried out in accordance with the requirements of the Regulation.

The focus of this report relates primarily to the natural gas network. The LPG distribution network operators have the same reporting requirements as natural gas network operators; however the analysis of this data is detailed later in this report (see Appendix A). Due to the small size and complexities of these particular networks, licensed high-pressure transmission pipeline systems are not addressed in this report (please refer to the *Licensed Pipeline Performance Report*).

DPE recognises the efforts made by the network operators on improving the quality of information, data and reporting. Where possible, DPE has identified in this report the limitations of the information and data provided.

Where the method of gathering data has changed, direct comparisons may not be an accurate way of assessing the performance of the asset or network operator. In cases such as these, the corresponding data has been removed from the charts and tables.

There are many factors which influence network performance including size, age, construction materials and operating regimes. Therefore, consideration must be given to the factors which may influence the overall performance and the manner in which information is gathered and reported.

## 2. Network asset information

### 2.1 Annual reporting requirements

To assess the overall performance of the gas network a number of factors must be taken into account including:

- network pipe length (less than 1,050 kPa<sup>1</sup>), Graph 2.2
- total gas entering the network
- quantity of gas delivered to custody transfer points
- new regions connected to gas supply.

Network operators are required to report network details by district or groups of districts for network safety and reliability reasons. It is important that any trends occurring in a localised area are identified and reported, rather than being potentially diluted within aggregated data.

### 2.2 Key performance indicator

- Unaccounted for gas (UAFG): Graph 2.1

### 2.3 Natural gas networks—asset information

In 2016-17 the length of the natural gas network grew by 1.2%, reaching 29,297 km as shown in Graph 2.2. Gas delivered from the network is approximately 96.7 PJ or about 2.5 billion standard cubic metres of gas to consumers in NSW.

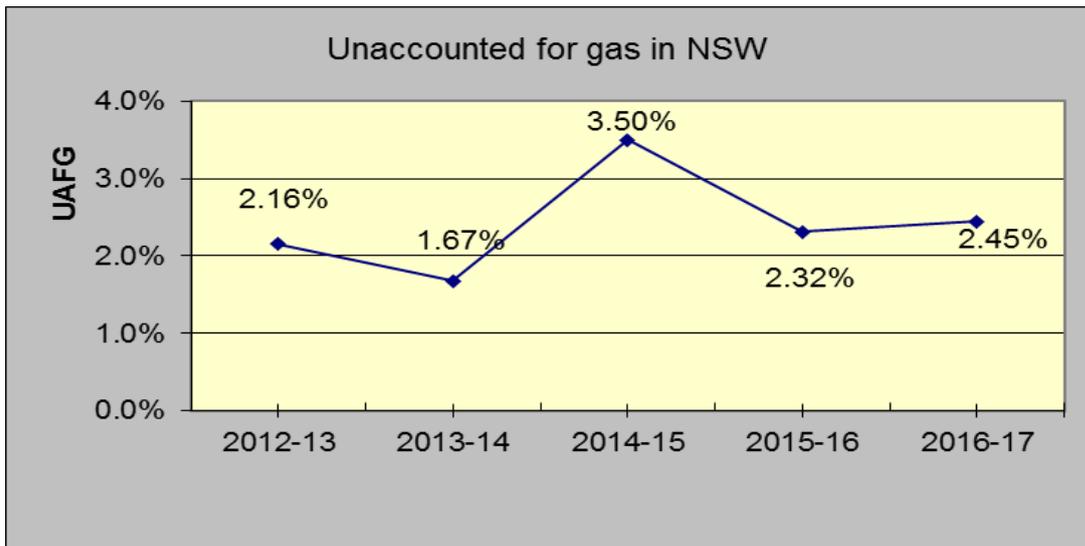
**Table 2.1 Natural gas networks in NSW: summary statistics**

Reporting period	Network growth in NSW in km	Gas entering the network in PJ	Gas delivered in PJ	Percent unaccounted for gas (UAFG) %
2012–13	298	114.6	112.0	2.16
2013–14	351	109.2	107.4	1.67
2014–15	389	113.0	109.1	3.50
2015–16	352	112.4	109.6	2.32
2016-17	354	99.2	96.7	2.45

In 2016–17, NSW gas network experienced increase in gas demand compared to last year. Total gas delivered by NSW network was 96.7 PJ.

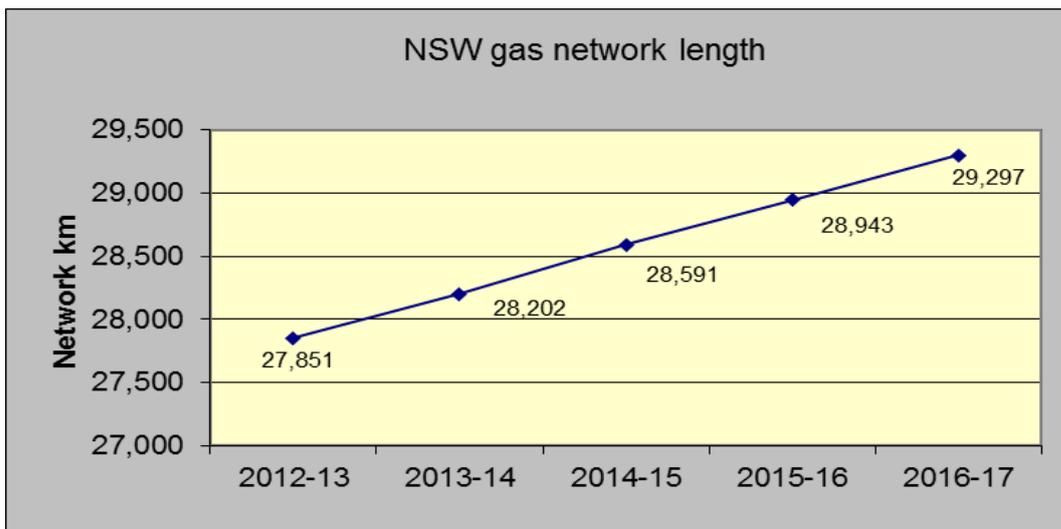
<sup>1</sup>. Operating pressure classes are: (1) Pressure less than or equal to 1,050 kPa and (2) Pressure greater than 1,050 kPa.

**Graph 2.1**



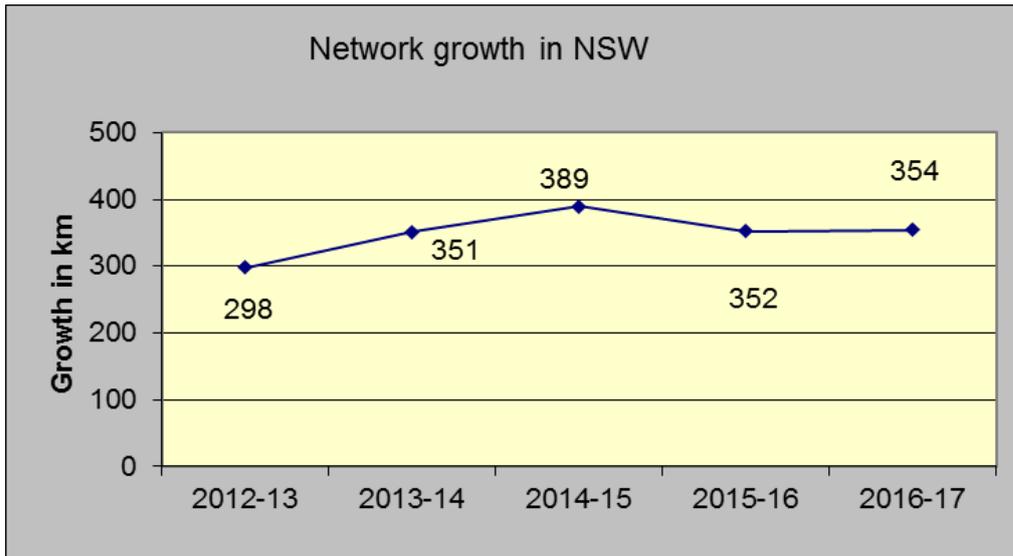
The unaccounted-for gas figure is used as an indicator for the soundness of the network. It is calculated from the amount of gas entering the network compared to the amount of gas delivered.

**Graph 2.2**



The length of the network shows if the assets are still increasing and is also used as a KPI indicator.

**Graph 2.3**



Network growth indicates the kilometres the assets have grown.

### **2.3.1 New regions**

No new regions have been reticulated in this reporting period, therefore consumer growth is within the existing networks areas.

### **2.4 Conclusion**

The total length of the gas networks in NSW has increased by approximately 354 km. This is the fourth reporting period with network growth over 350 km. The overall length of the NSW gas networks is currently 29,297 km.

The amount of unaccounted for gas (UAFG) has been reported as 2.45% of gas entering the system. This is a measure of how secure the gas network is.

## 3. Network integrity and safety information

### 3.1 Annual reporting requirements

This information measures with the level of product loss through escapes and from third party activity. It is an indication of how secure the assets are and how activity around the assets affect performance. It also deals with the preventative measures associated with leak surveys, including:

- number of gas leaks reported to network operator by third parties, by pressure class
- kilometres of pipe subjected to leak surveys
- number of leaks found during leak surveys
- number of recorded mechanical damage incidents to gas networks, by type and source, and by pressure class and location
- number of emergency exercises or simulations conducted
- number of calls to a 'one-call' system (Dial Before You Dig) received about work near networks.

### 3.2 Key performance indicators

The key performance indicators adopted by the Energy Branch for monitoring network integrity and safety include:

- gas leaks per 10 km of pipe reported by third parties, Graph 3.1
- gas leaks per 1,000 customers as reported by third parties, Graph 3.1
- leak surveys as a percentage of total pipe length, Graph 3.2
- leaks found per 10 km of pipe surveyed, Graph 3.2
- mechanical damage incidents per 10 km of pipe, Graph 3.3
- mechanical damage incidents per 1,000 consumers
- number of emergency exercises.

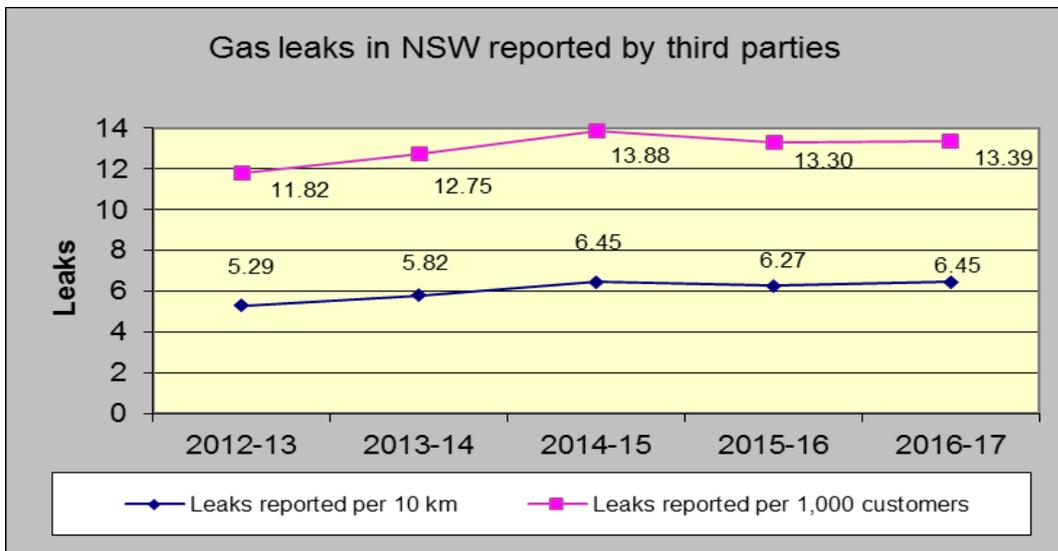
This data is presented in Table 3.1 and in the accompanying graphs.

**Table 3.1 Network integrity and safety for NSW.**

Reporting period	Percentage of network leak surveyed	Leaks found per 10 km	Mechanical damage per 10 km	Mechanical damage per 1,000 consumers	Emergency exercises
2012–13	19.57	18.15	0.73	1.73	6
2013–14	16.44	11.90	0.79	1.90	3
2014–15	19.38	11.01	0.81	1.96	4
2015–16	20.86	20.62	0.76	1.87	4
2016-17	21.65	7.74	0.85	2.12	5

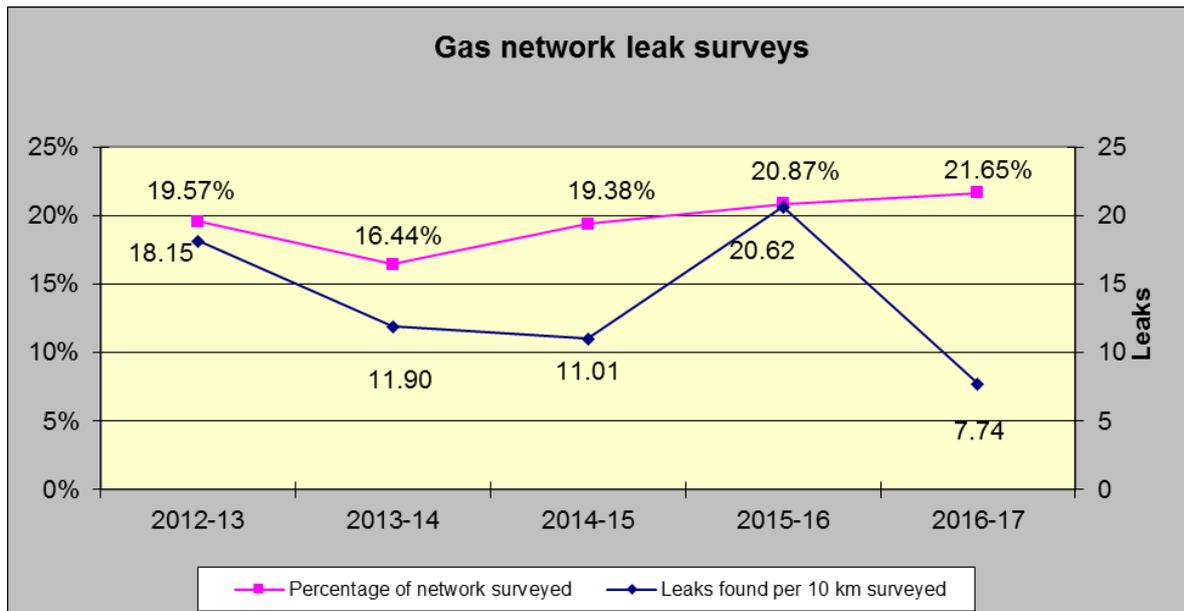
Blue columns also in graphs below.

**Graph 3.1**



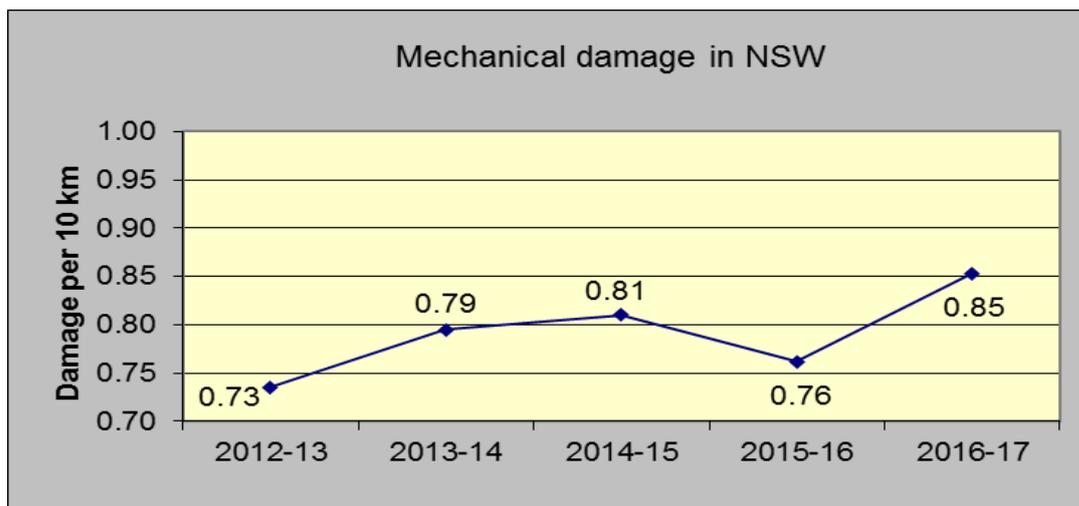
Reported gas leaks from third parties helps indicate what areas have leaking assets.

**Graph 3.2**



Leak surveys are carried out on the networks in areas identified to be not as sound as other assets.

**Graph 3.3**



Mechanical damage indicates third-party activity and contact with network assets. It also allows the network operator to find out if the third party contacted Dial Before You Dig.

**3.2.1 Natural gas— networks surveys**

It is not a requirement for operators to survey their entire gas networks each year, but they should survey 100% of their network within a span of 5 years. The amount of network surveyed in 2016-17 was 21.65%.

**3.3 Conclusion**

The network operators have been working with third-party contractors to reduce impacts over the reporting periods. The number of one-call contacts has increased. It is a legislative requirement under the Act to contact Dial Before You Dig before excavation work occurs.

Both the number of gas leaks reported per 10 km and per 1,000 customers remain at a consistent and acceptable level.

## 4. Network reliability and consumer-related matters

### 4.1 Annual reporting requirements

This data indicates the gas network's reliability and odorant level compliance. It also indicates the network operators' ability to respond to incidents within a specific time period. The consumer-related numbers are used to assist in the KPI analysis in relation to how many consumers are affected by these events: Measurements include:

- number of consumers connected to the network (total number), Graph 4.1
- number of new consumers connected to the network (total number), Graph 4.2
- loss of supply (duration, total unplanned consumer hours lost—five or more customers)
- loss of supply (number, total unplanned numbers of loss of supply instances—five or more customers) Graph 4.3
- poor supply pressure (total number of instances)
- odorant levels not to specification (total number of instances)
- number of incidents or emergencies responded to, Graph 4.4
- incidents or emergency responses not within 60 minutes of notification (total number).

### 4.2 Key performance indicators

The KPIs adopted by the Energy Branch for monitoring network reliability and safety are:

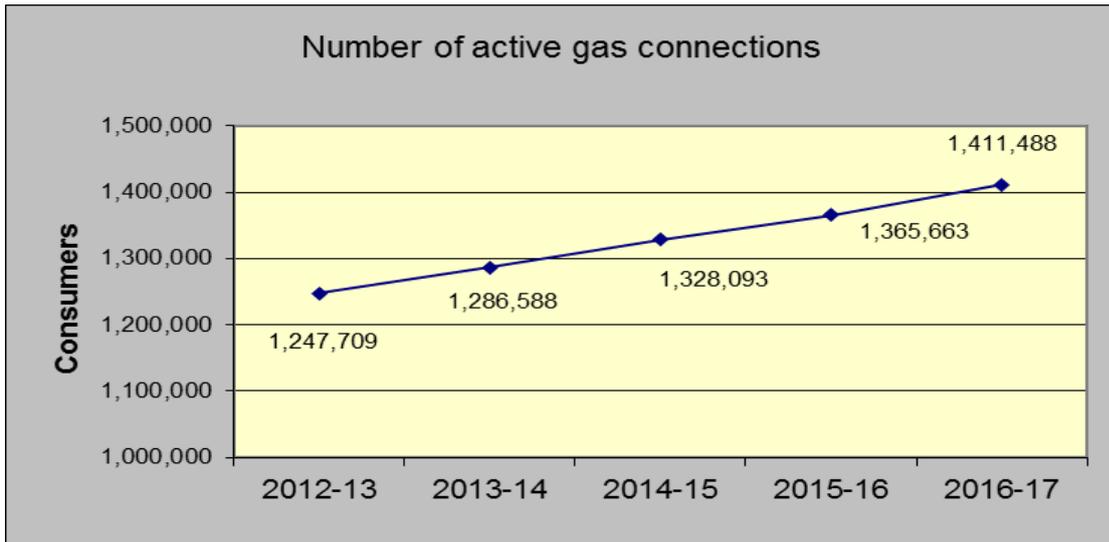
- loss of supply (total unplanned consumer hours lost— 5 or more customers) per 1,000 customers), Graph 4.3
- percentage of calls responded to within 60 minutes, Graph 4.5

**Table 4.1 Reliability and consumer-related matters**

Reporting period	Unplanned consumer hours lost per 1,000 consumers	Unplanned loss of supply incidents per 1,000 km	Number of out of spec gas or odorant levels reports	Number of incidents/emergencies per 1,000 consumers	% incidents/emergencies responded to within 60 min.
2012–13	18.94	1.90	12	2.33	98.70
2013–14	137.15 *	2.09	3	2.47	98.78
2014–15	5.53	2.24	3	2.39	98.95
2015–16	12.18	1.31	3	1.98	99.27
2016-17	12.34	1.30	6	1.96	98.73

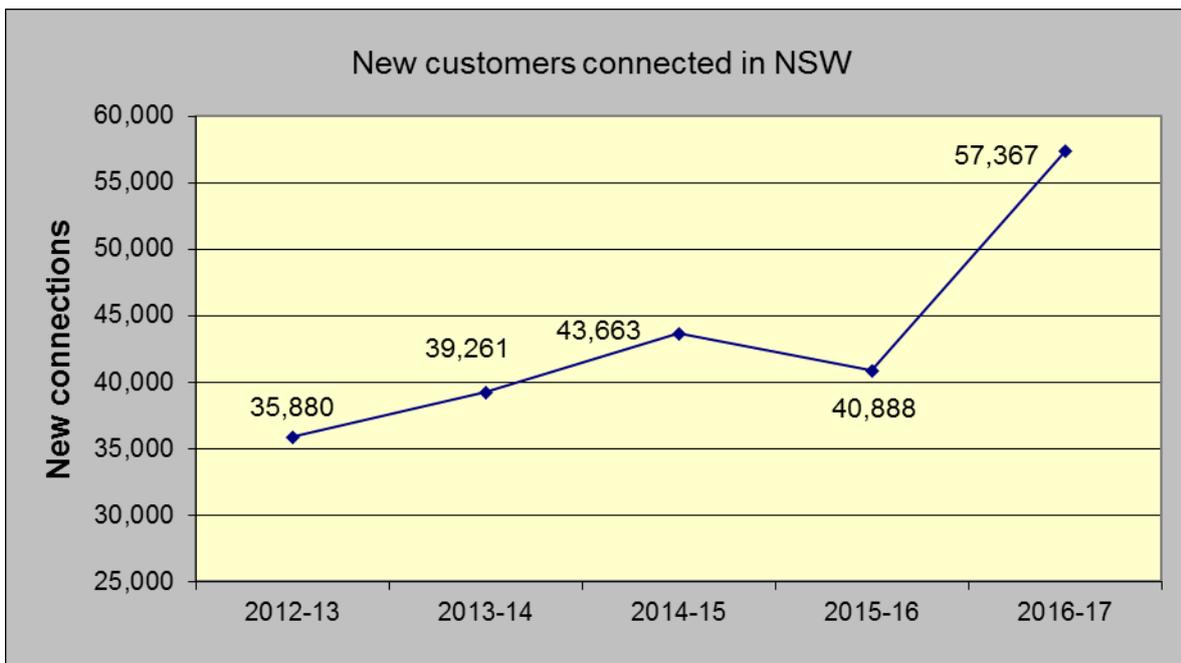
\*A bushfire in the Blue Mountains on 17 October 2013 affected 760 customers and caused a significant increase in hours of lost supply.

**Graph 4.1**



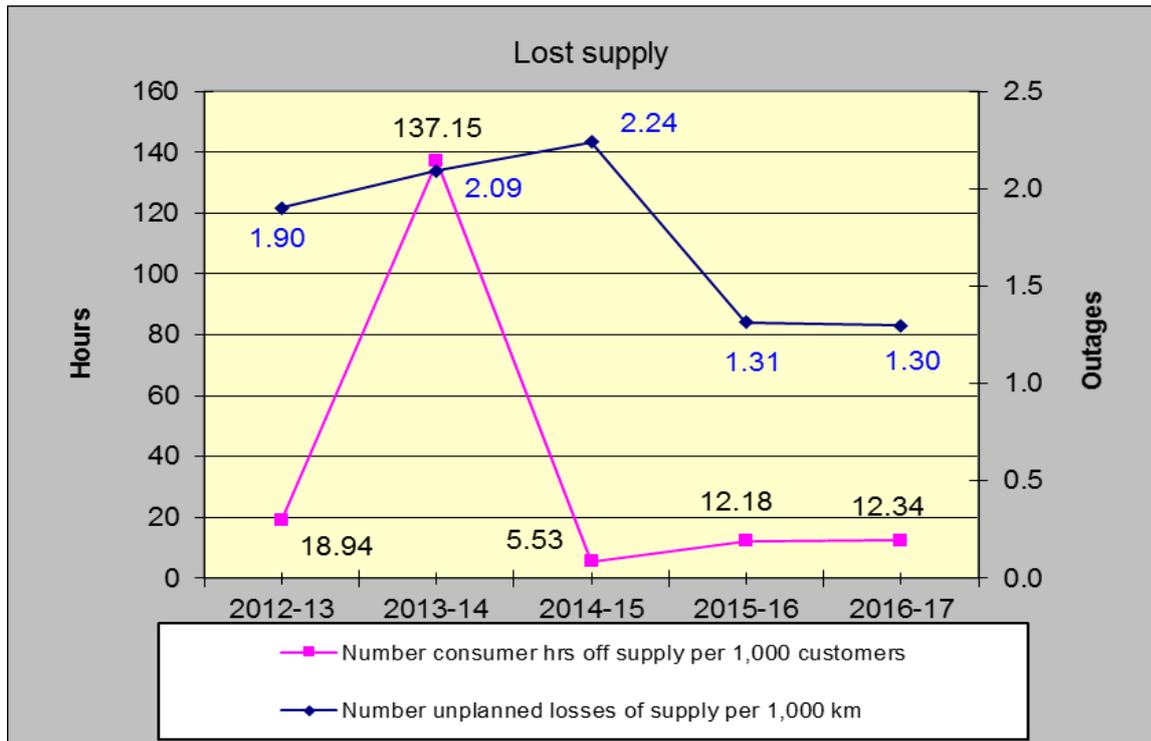
Active gas connections are the number of supply points taking gas at the time of this report. This information is also used in KPI calculations.

**Graph 4.2**



The number of new customers indicates the growth on the networks.

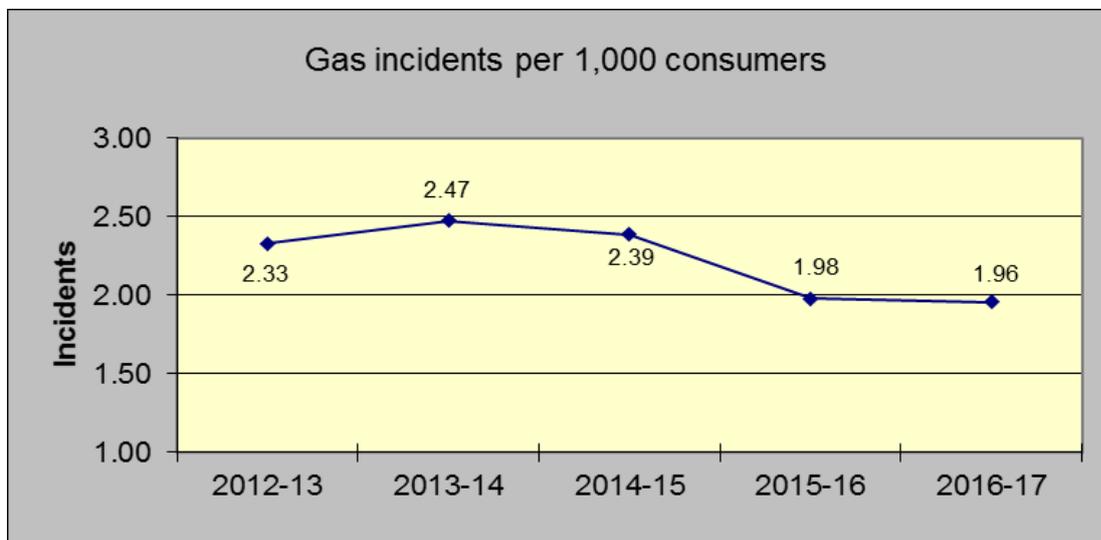
**Graph 4.3**



This graph indicates how often the network loses supply and the time required to re-establish supply.

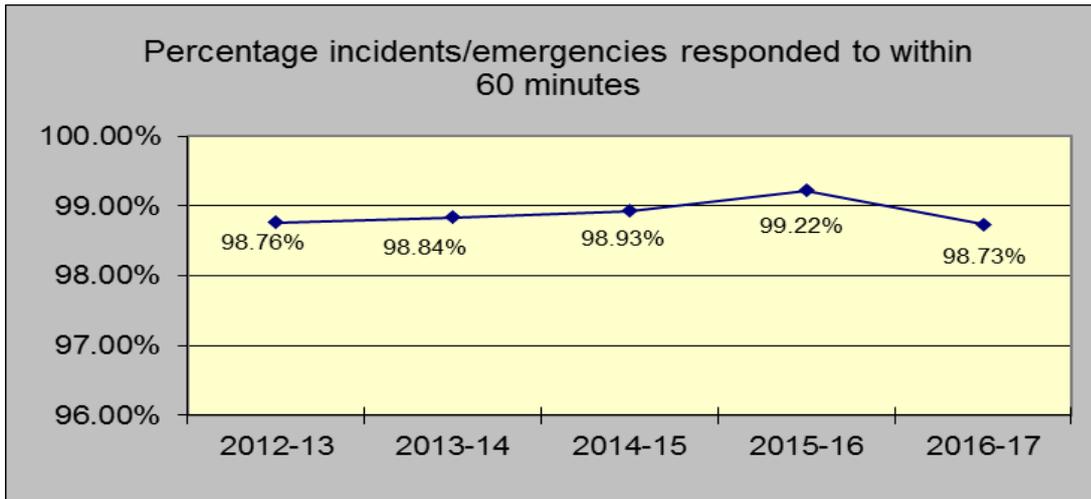
Note: The hours of lost supply per 1,000 consumers in 2013–14 includes data from a severe bushfire incident in the Blue Mountains in that year. The figure discounting the bushfire data was 12.23 hours.

**Graph 4.4**



The graph shows the number of incidents in relation to consumers.

**Graph 4.5**



Incident response gives a guide to the ability of network personnel to respond and the time required.

### **4.3 Conclusion**

The number of consumers connected to gas networks has increased by more than 57,000, bringing the total to over 1.4 million consumers.

The reliability indicators show that network operators continue to provide a reliable supply of gas to consumers and there were less than 2 incidents per 1,000 gas consumers in NSW.

The response times to emergencies and incidents remain strong, with more than 98% being responded to within 60 minutes over the last five reporting periods.

## 5. High-pressure (unlicensed) pipeline activities

### 5.1 General

Jemena (Sydney), Jemena (Coastal), ActewAGL and Albury Gas operate high-pressure pipelines (>1050 kPa) as part of their network activities. Network operators are required to review matters such as pressure, location, land use, security and risk assessments on a periodic basis as defined under Australian Standard *AS 2885: Pipelines—Gas and liquid petroleum*.

The Department's annual reporting requirements requested the following information:

- accidents, escapes and ignitions
- integrity assessment/monitoring
- operational performance.

NSW has approximately 179 km of mains operating in the network that are running at pressures above 1,050 kPa. These distribution mains contain a larger amount of energy and are important feeders to the distribution network. This is why they require a more in-depth review of operation and safety aspects to the public, personnel and environment.

### 5.2 Accidents, escapes and ignitions

The following issues are covered within this section:

- incidents
- loss of containment (LOC)
- ignitions
- injuries involving the pipeline
- damage involving the pipeline.

Reporting period	Incidents	Loss of containment	Ignitions	Injuries	Damage
2012–13	0	0	0	0	0
2013–14	0	0	0	0	0
2014–15	0	0	0	0	0
2015–16	2	0	0	0	0
2016-17	3	0	0	0	0

### 5.3 Integrity assessment/monitoring

The following issues are covered within this section:

- Integrity assessment
- pipeline patrols
- supervised activity around the pipeline
- field inspections
- cathodic protection (CP) and coating defects.

Reporting period	Supervised activities per km	Activities that contacted operator (%)	Defects requiring repair per 1,000 km	CP units operating correctly (%)	Pipeline covered by CP systems (%)
2012–13	30.06	100	0	100	100
2013–14	41.38	95.86	0	100	100
2014–15	41.15	95.71	0	100	100
2015–16	42.27	97.25	0	95	100
2016-17	36.07	98.11	0	100	100

### 5.4 Operational performance

The following issues are covered within this section:

- loss of operation
- details of any unplanned or abnormal incidents that could have a long-term effect on the safety of the pipeline.

Reporting period	Hours pipeline not operational	Number of “unplanned” incidents /km
2012–13	0	0
2013–14	0	0
2014–15	0	0
2015–16	0	0
2016-17	0	0

### 5.5 Conclusions

The gas networks’ high-pressure pipelines (>1,050 kPa) have operated with no losses of containment or serious incidents reported in the 2016–17 reporting period. Supervised activity around the gas assets has increased, with 98.11% making contact through the one-call system.

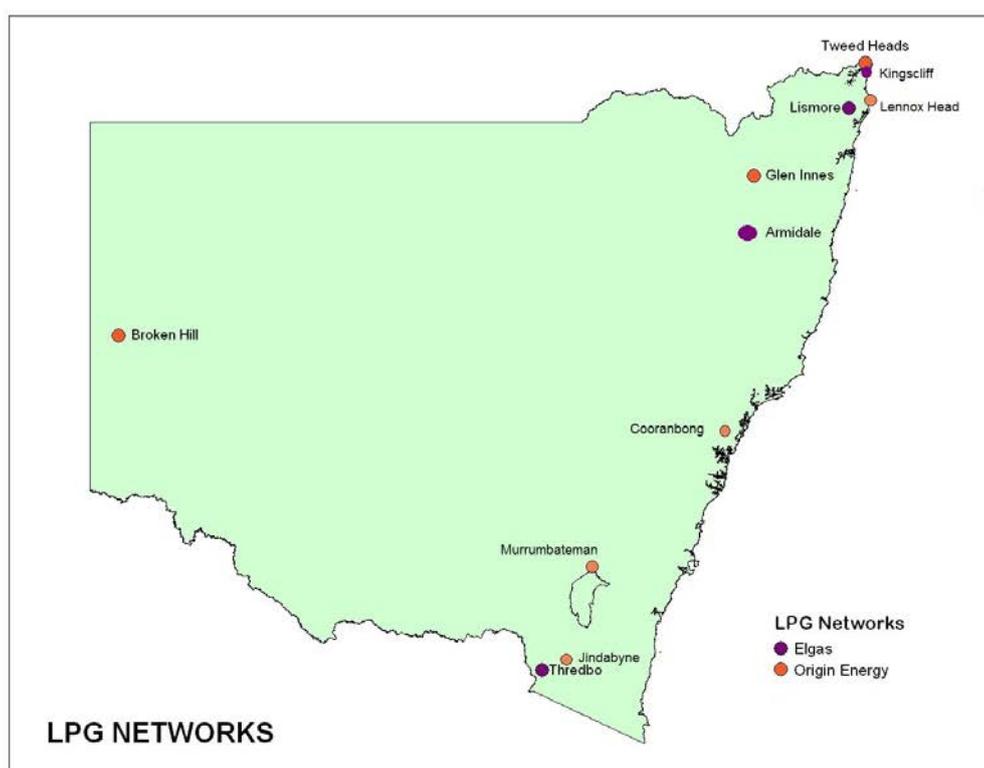
## Appendix A: LPG networks in NSW and networks performance data

There are a number of liquefied petroleum gas (LPG) distribution systems supplying gas to consumers within NSW. LPG is transported to these sites by road and is therefore favoured for small stand-alone distribution systems.

LPG may be reticulated in several forms, such as TLPG, SNG, Butane or as direct LPG. The significance of this, however, is that gas appliances must be approved for use with the particular type of gas being reticulated within a network.

There were two licensed distributors of LPG in NSW who reported to DPE. The locations of these networks are illustrated in Figure A.1. The networks are briefly described below and network data provided by the operators is presented in this section.

**Figure A.1 Location of LPG networks in NSW**



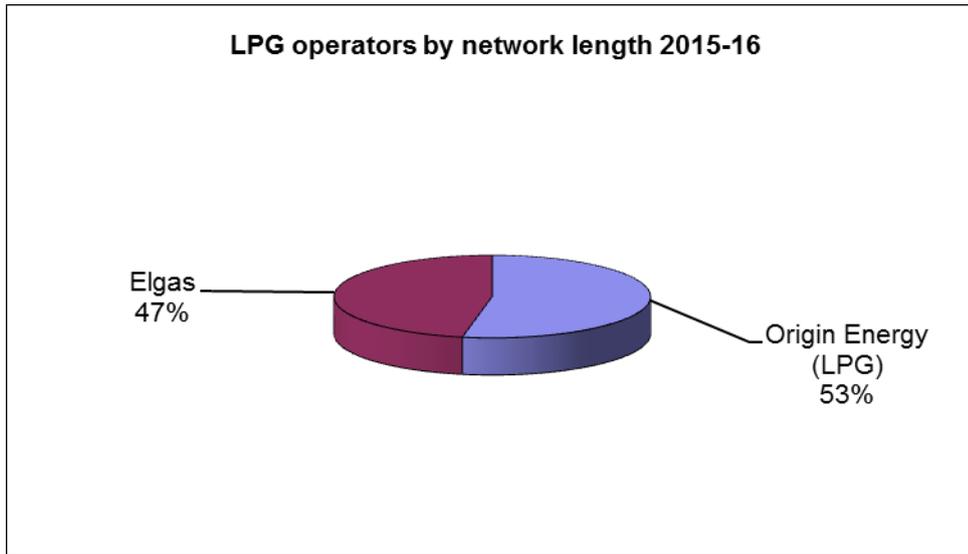
### ***Origin Energy LPG Ltd***

Origin Energy has distribution districts in Glen Innes, Broken Hill, Tweed Heads (Banora Pt.), Jindabyne, Cooranbong, Lennox Head and Murrumbateman. Origin's LPG network at Glen Innes is now the largest in NSW.

### ***Elgas Reticulation Ltd***

Elgas has four LPG distribution networks that are located in Lismore, Thredbo, Armidale and Kingscliff.

**Figure A.2 Relative sizes of LPG networks**



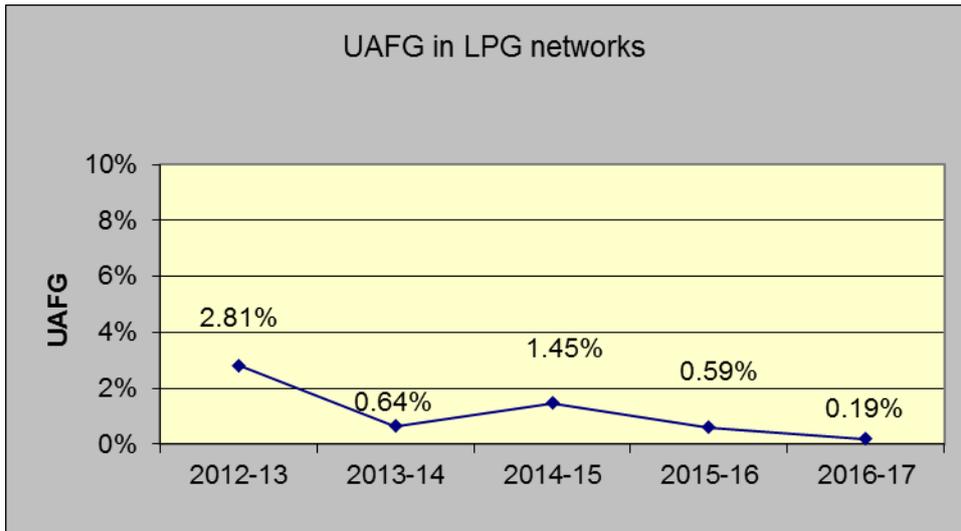
**LPG networks—asset information**

NSW LPG distribution networks delivered 157 TJ of gas through approximately 135 kilometres of pipes in 2016–17. The networks have increased in both total consumers and network length.

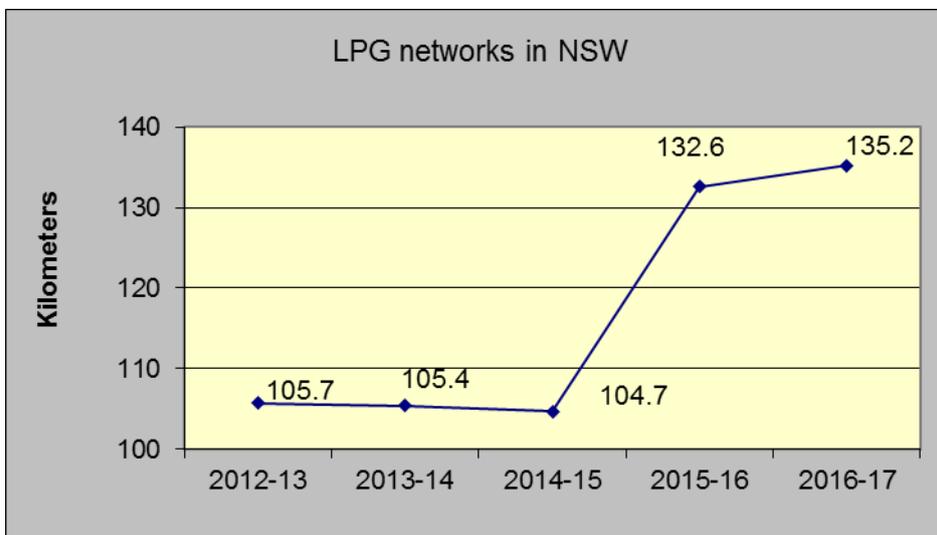
**Table A.1 Consumption information for LPG networks**

	Quantity gas entering network (TJ)	Quantity gas delivered (TJ)	UAFG (%)
2012–13	171	166	2.81
2013–14	130	129	0.64
2014–15	277	273	1.45
2015–16	140	140	0.59
2016–17	157	157	0.19

**Graph A.1.1**



**Graph A.1.2**



**Table A.2 Customer information for LPG networks**

	New consumers connected to the network	Total consumers connected to the network
2012-13	37	1,861
2013-14	181	1,831
2014-15	142	1,790
2015-16	149	2,229
2016-17	17	2,246

Blue column is also in graph of LPG consumers below.

Graph A.2.1

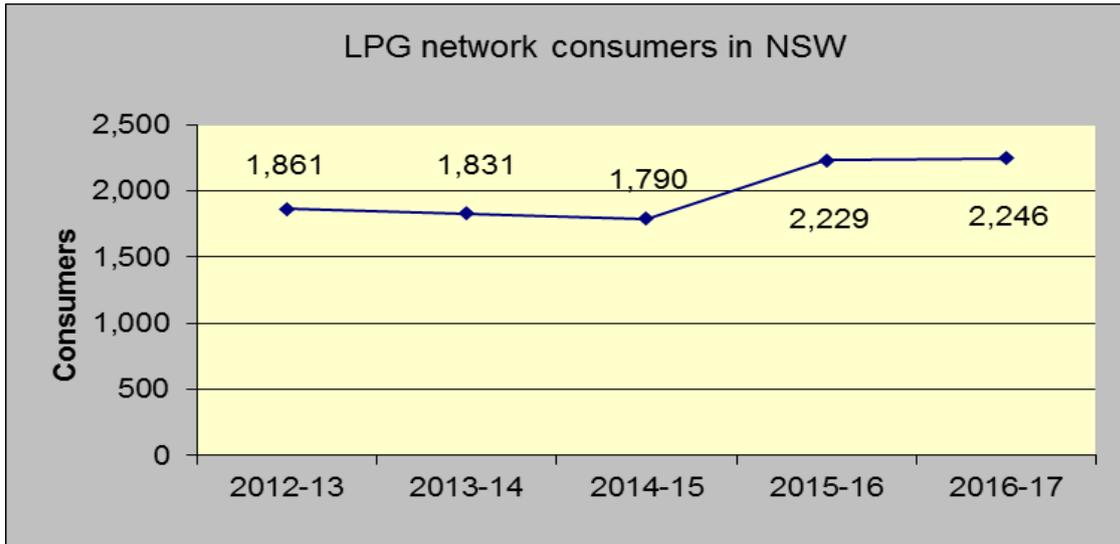
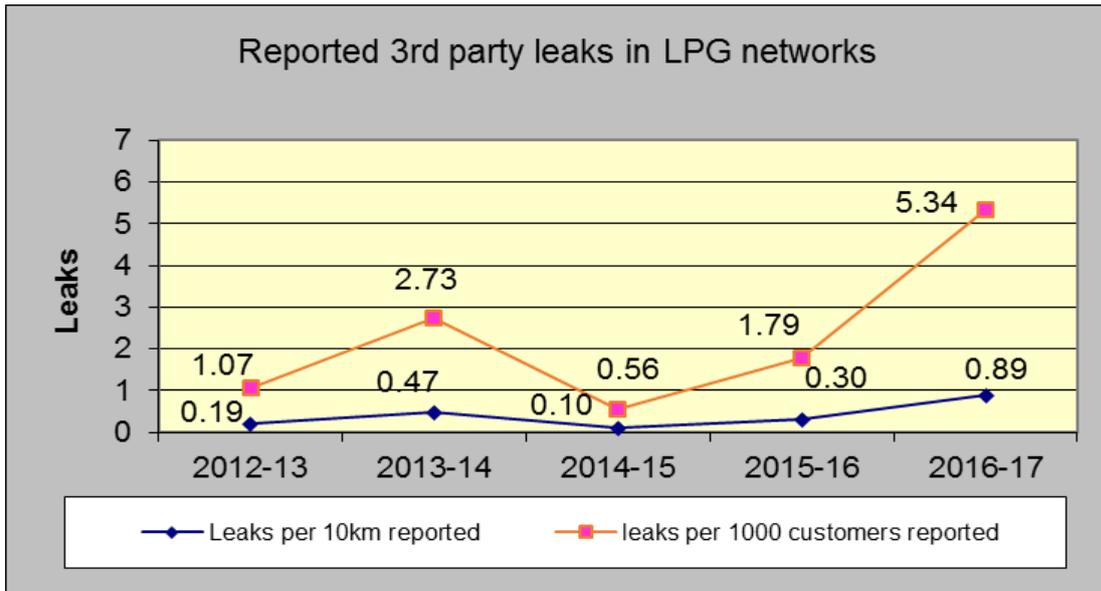


Table A.3 Network integrity and safety information: LPG networks

	Leaks per 10km reported by third parties	Leaks per 1,000 customers reported by third parties	Percent of network subject to leak surveys (%)	Leaks found per 10km of pipe surveyed	Mechanical damage incidents per 10km by third party	Emergency exercises conducted
2012-13	0.19	1.07	46.93	3.43	0.28	2
2013-14	0.47	2.73	41.94	1.58	0.28	4
2014-15	0.10	0.56	74.40	2.82	0.19	4
2015-16	0.30	1.79	25.95	1.48	0	2
2016-17	0.89	5.34	35.58	1.04	0.3	3

Blue columns also in graph below.

Graph A.3.1



**Conclusion**

The LPG networks across NSW comprised of more than 135 km of pipelines and 2,000 consumers. The information contained in this report suggests the LPG network operators continue to operate their networks in a safe and reliable manner.

Due to their smaller sizes, small fluctuations in the LPG networks figures can have a significant impact on their KPIs. Hence the need to record the LPG network figures as a separate category.



A second transmission pipeline links NSW with Victoria from Longford along the eastern seaboard. There is a third, but smaller, inter-connect pipeline between Calcairn in NSW and the Victorian border. Some gas is sourced within NSW.

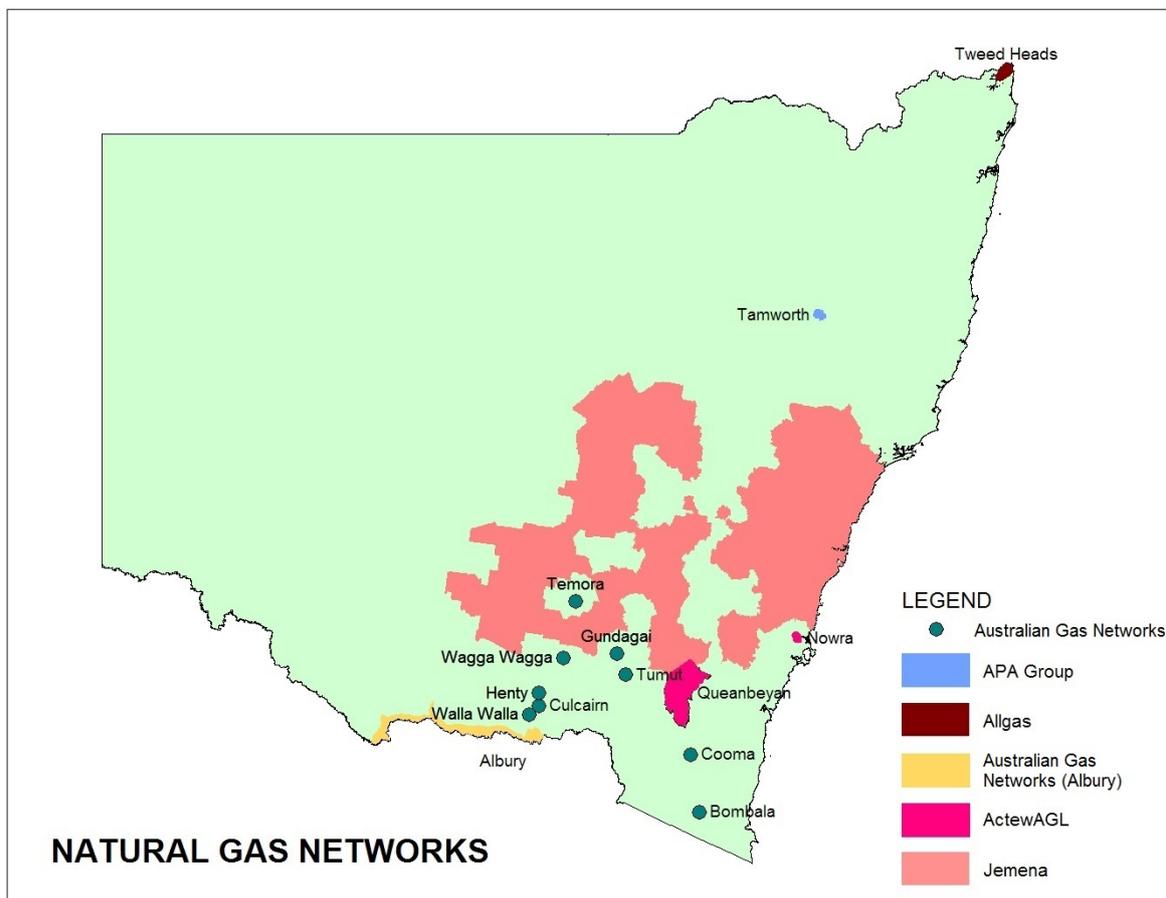
A gas storage facility at Hexham has also been developed. The facility has a storage capacity of 1.5 PJ. It enhances the gas supply in the greater Newcastle region.

The NSW retail gas market has been progressively opened up to competition since 1996, giving consumers the choice of gas supplier. The market has been fully contestable since January 2002.

The scope of this report is limited to the distribution networks. The natural gas distribution network in NSW is the conduit for the reticulation of natural gas and supply to consumers in the state. The greater NSW network is divided into smaller distribution networks and operated by authorised operators.

There were six authorised natural gas network operators in NSW during the reporting period. The locations of these networks are illustrated in **Figure B 2**. The networks are briefly described below.

**Figure B.2 Location of natural gas networks in NSW.**



### ***Jemena Gas Networks (NSW) Ltd***

The principal reticulator of natural gas in NSW is Jemena Gas Networks (operated for and on behalf of Jemena Gas Networks by Jemena Asset Management). The Jemena Gas Network in NSW is divided into five large natural gas distribution networks:

- Jemena (Sydney North)
- Jemena (Sydney West)
- Jemena (Country)
- Jemena (Sydney South)
- Jemena (Coastal)

Jemena (Sydney) Network broadly services the area bounded by Palm Beach and Hornsby to the north of Sydney, Sutherland Shire and Bankstown to the south and west to Lithgow. This network is large and complex. The Jemena (Coastal) Network broadly services the Hunter and Newcastle, the Central Coast and Illawarra regions and the Jemena (Country) Network covers a large area in central NSW and services the Southern Highlands, Central Tablelands, Central West, Riverina and South-West Slopes regions.

Jemena Gas Networks also owns natural gas transmission assets in NSW.

### ***ActewAGL Distribution (ActewAGL)***

ActewAGL gas distribution network is also operated by Jemena Asset Management (on behalf of the ActewAGL Distribution Partnership). ActewAGL is a joint venture between the ActewAGL Retail Partnership and the ActewAGL Distribution Partnership. The ActewAGL Distribution Partnership comprises Jemena ATA Pty Ltd and the ACT Government owned ACTEW Corporation. ActewAGL has two networks in NSW: one located at Queanbeyan/ Bungendore and the other network at Nowra. ActewAGL also has a substantial network in the ACT.

### ***Australian Gas Networks Ltd***

Australian Gas Networks Ltd holds two Natural Gas Reticulator Authorisations in NSW, one for The Australian Gas Networks (Albury) Ltd and one for Australian Gas Networks (NSW) Pty Ltd.

- Australian Gas Networks (Albury) Ltd network supplies Albury, Thurgoona, Lavington, Jindera, Howlong, Moama, Tocumwal, Finley, Barooga, Mulwala and Corowa.
- Australian Gas Networks (NSW) Pty Ltd network supplies Wagga Wagga, Culcairn, Tamara, Walla Walla, Cooma, Tumut, Henty, Bombala and Gundagat.

### ***APA Group***

The APA Group holds two distribution systems in NSW: the Central Ranges Pipeline Pty Ltd (APA Group); and APT Allgas Energy Pty Ltd.

- Central Ranges Pipeline Pty Ltd owns a gas network in the Tamworth distribution district area which is operated by Jemena Asset Management.
- APT Allgas Energy Pty Ltd is owned by APA. Allgas has one distribution district in NSW, which includes the local government area of Tweed Heads and has significant Queensland gas operations.