Australian Gas Networks
Part of Australian Gas Infrastructure Group

Unaccounted for Gas Benchmarks – 2023 to 2027

Australian Gas Networks - September 2022

1. Executive Summary

A key requirement of operating a Victorian gas distribution network is to employ reasonable endeavors to ensure that the quantity of Unaccounted For Gas (UAFG) in its distribution system is less than the UAFG benchmark set by the Essential Services Commission Victoria (ESCV) and subsequently published in the Gas Distribution System Code of Practice (GDSC).

A key strategy in reducing UAFG within AGN networks is to continue focusing on the replacement unprotected steel mains prone to corrosion and leaks, including sections of medium pressure cast iron and early generation HDPE. Accuracy of gas measurement is also important in reducing UAFG, with Custody Transfer Meters (CTM's) upstream and customer meters downstream continuing to be monitored, tested and analysed for accuracy. Monthly monitoring of UAFG levels is also undertaken to ensure any anomalies are highlighted and investigated in a timely manner.

In calculating UAFG for the upcoming CY2023 – CY2027 period, AGN is aligned with the ESCV's preference of adopting the same approach it took in the previous period (CY2017 – CY2022) - that is the revealed costs approach where a 3-year average of settled (or forecast settled) UAFG data is used to establish benchmarks.

As AGN effectively has three designated networks – i.e. the Declared Transmission System (DTS) networks supplying Metropolitan Melbourne and Regional North; South and East Victoria and the Albury network; and the Non-DTS networks supplying Bairnsdale and Surrounds, the UAFG benchmarks for these independent networks are applied and reconciled separately.

Based on the above, the following UAFG benchmarks for the CY2023 – CY2027 period would apply:

Table 1-1: Calculated UAFG Benchmarks for CY2023-CY2027

Benchmark Category		Proposed Benchmarks[1]	Comment
DTS Networks	Class A	0.3 %	No change from 2017 –2022 period
	Class B	4.33 % **	Increase of 0.33% from 2017-2022 period
Albury	Class A	0.1 %	No change from 2017 –2022 period
	Class B	4.33 % **	Increase of 0.33% from 2017-2022 period
Non-DTS Networks	Class A & B	2.0 %	No change from 2017 –2022 period

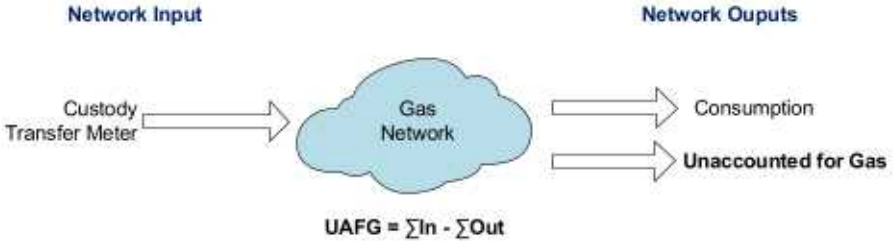
** the 3-year average is based on data from 2017, 2018 and 2019. Although the 2019 UAFG data is not yet settled, it is expected to be so within this current review period.

[1] Assumes the forecast settlement of the 2019 UAFG reconciliation within the commissions review period.

2. Introduction

Unaccounted for Gas (UAFG) refers to the difference between the measured quantities of gas entering the gas network (measured by Custody Transfer Meters or CTM's) and the gas delivered to customers (measured by individual consumer meters). Refer to Figure 2-1

Figure 2-1: Unaccounted for gas flow diagram



The difference or "unaccounted for gas" is calculated and reconciled on an annual basis from data supplied by Australian Energy Market Operator (AEMO).

In Victoria, UAFG is managed via a benchmark process which aims to incentivise gas distributors to take steps to economically minimise the level of UAFG. The current benchmarks for all three Victorian gas distributors along with the reconciliation calculation is outlined in Schedule 1, Part C of the Gas Distribution System Code of Practice (Version 15).

Sources of UAFG and its calculation are based on the following 3 categories:

a) Measurement – errors in physical measuring and/or calculating gas;

b) Fugitive emissions – physical losses of gas (e.g. leaks) and;

c) Systems - errors in UAFG reconciliation modeling, as well as errors within systems that store and process measurement data.

Examples of measurement, fugitive emissions and system sources of UAFG are detailed in Table 2-1, Table 2-2 and Table 2-3 below:

Table 2-1: Measurement Sources of UAFG

Source	Description
Timing mismatch	Timing mismatch is caused by the difference in period of measurement between input and output collected meter data over a defined UAFG period.
Line pack change	Change in the volume of gas within the network (line pack) during the UAFG year.
CTM uncertainty	Levels of uncertainty in CTM's. Due to the large volumes involved, a small percentage error in CTM readings could contribute a large amount of AGN's UAFG.
Meter accuracy	Industrial, Commercial and domestic meter uncertainty.
Meter Index Faults	Meter index does not record gas consumption when meter is passing gas.
Pressure & Temperature Compensation for Meters	Gas delivered at variation to Standard Conditions assumed in billing (atmospheric pressure at sea level, temperature 15°C). Gas delivered at variation to standard set pressures or PCF's assumed in billing.

Incorrect Pressure Correction Factor (PCF)	Customer's consumption is calculated using an incorrect PCF.
Higher Heating Value (HHV) Compensation	Difference in the average HHV between AGN and the declared State-wide value which is used in billing of residential connections.
Meter bypass and theft	Where customers consumption is not recorded through the meter due to the meter bypass being open, service being tapped into prior to the meter, and / or meter being run backwards (where possible).
Company's Own Use	The company's own gas consumption from the network is metered but not declared as sales.

Table 2-2: Fugitive Emissions Sources of UAFG

Source	Description
Transmission losses	Leakage on the transmission network.
Distribution losses	Leakage on the distribution networks, includes mains, services and meters.
Mains commissioning / abandonment	Gas lost due to abandoning and commissioning of transmission pipelines, mains and services
Regulator venting	In built safety mechanism of regulators to control downstream pressure during normal operation conditions by venting regulated pressure to atmosphere.
Equipment losses	Leakage from equipment (valves, fittings, meters, etc) and associated joints. This includes meter regulator units, Field and District Regulators, City Gates and CTMs.
Third party damages	Leakage lost on the network as a result of third party damages.

Table 2-3: Systems Sources of UAFG

Source	Description
UAFG data systems and reconciliation model	Errors within the handling of data between systems and errors within the calculation of the reconciliation amount.
Meter reads	Estimated reads, Incorrect actual reads, reads not accepted by AEMO.
Meters not installed in CCB	Meters not installed in the Customer Care and Billing (CCB) system correctly

3. AGN Network Overview

AGN is a gas distributor supplying over 1.3 million residential, commercial, and industrial customers across South Australia, Victoria, Queensland (mostly Brisbane) as well as smaller towns in New South Wales (including Albury Gas Company and Southern NSW Networks) and the Northern Territory (Alice Springs). The network includes over 1,300 km of transmission pipelines and 25,000 km of distribution mains.

In Victoria and Southern NSW (including Albury Gas Company, but excluding Mildura, Victoria), the regulated AGN network supplies gas to approximately 750,000 end users through a network of more than 12,000 km of distribution mains, and 252 km of transmission pipelines.

Refer to Figure 3-1 for the geographical area of AGN's Victorian and Albury networks.

Figure 3-1: AGN Distribution network area

4. UAFG Performance

The current benchmarks for all three Victorian gas distributors is summarised in the Table 4-1 below:

Table 4-1: UAFG Benchmarks 2018-2022

	Class B Benchmarks <250,000 GJ/Pa	Class A Benchmarks >=250,000 GJ/pa	Non-DTS Networks (Class A & B)
AGN (Victoria)	4.0%	0.3%	2%
AGN (Albury)	4.0%	0.1%	
MGN	5.3%	0.3%	2%
AusNet Services	4.6%	0.3%	2%

Class A customers use more than 250 Terajoules per annum and are typically serviced by the high pressure and transmission networks.

Class B customers use less than 250 Terajoules per annum and are typically serviced by high, medium and low pressure networks.

Under the Victorian UAFG model, retailers are required to purchase sufficient gas to cover customer consumption and actual UAFG. If actual UAFG is greater than the benchmark, the gas distributor is required to compensate the retailers for the UAFG in excess of the benchmarks. Where actual UAFG is lower than the benchmark, the retailers make reconciliation payments to the relevant gas distributor.

Current DTS Class B benchmarks were set by the ESCV using the revealed cost approach which "takes into consideration the actual circumstances that distributors currently face, even when the drivers of UAFG are uncertain". The ESV adopted a 3-year average of the most recent settled data at the time of setting the benchmarks (i.e. 2013 – 2015).

DTS Class A (0.3%) and Non-DTS benchmarks were a continuation of previously established benchmarks.

AGN's current performance against the Class B benchmarks for the DTS connected networks is summarised in Figure 4-1 below. Under the reconciliation model, performance for Class A customers as assumed to match the Class A benchmark (i.e. 0.3%), all UAFG variation existing within the Class B benchmark reconciliation process.

Figure 4-1: Network performance – DTS Class B UAFG Performance

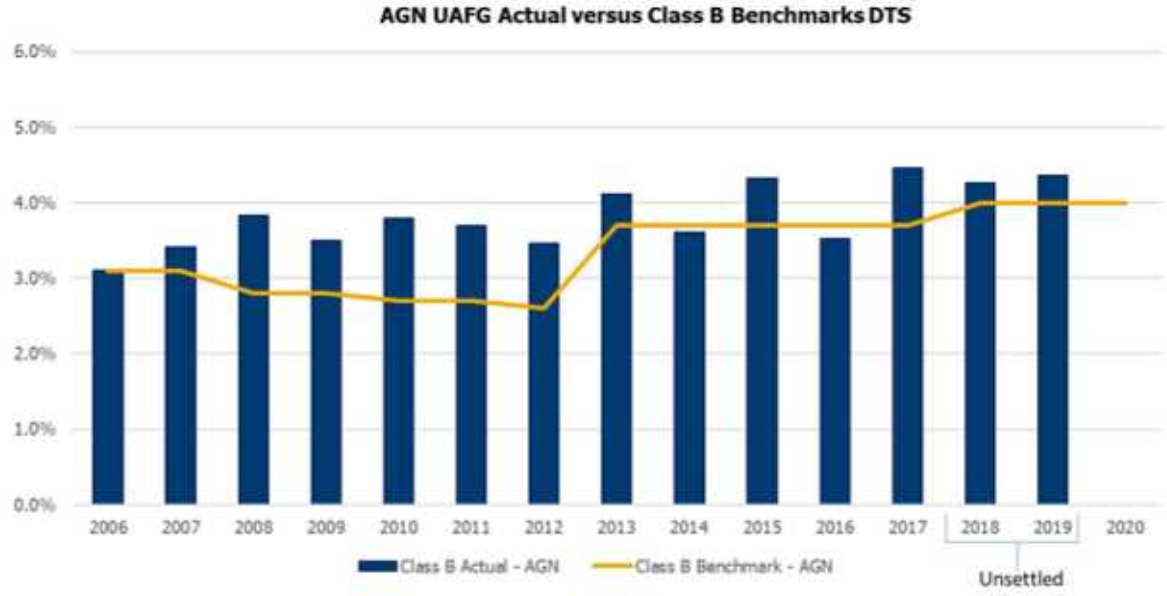
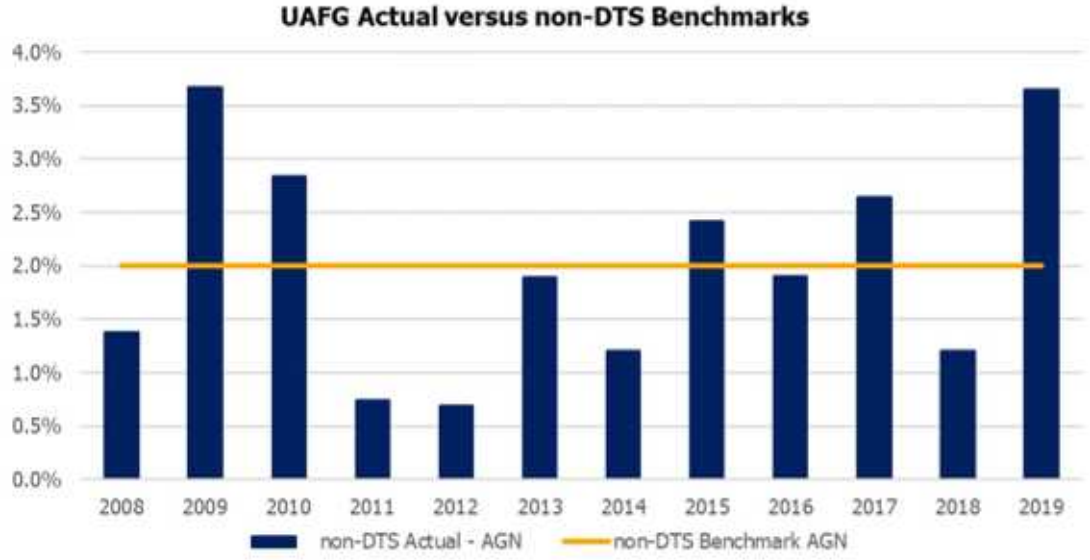


Figure 4-2: Network performance – non-DTS Class A + B UAFG Performance



4.1. Status of UAFG Settlements

Settlement with retailers on UAFG is a time consuming process and there is regular communication between retailers and AEMO to address and resolve all queries regarding UAFG data and calculations distributed to participants. Best endeavours are made by the parties to reach agreement as early as possible however to date AGN is currently working to resolve settlements for 2019 and 2020. Note that the 2019 and 2020 UAFG wash-ups were delayed by virtue of a special revision issued by AEMO in "Settlement Communication No. 466: Notice of Special Revisions for August 2019 to October 2020 in DWGM" which was issued on 26 October 2021.

The current status of UAFG settlements is summarised in Table 4-2 below:

Table 4-2: Status of UAFG Settlements

AGN Network	Year	Status
DTS	2008 -2018	Settled4
	2019 - 2020	Unsettled
	2021 - 2022	NA
Non-DTS	2008	NA
	2009 – 2015	Settled
	2016 – 2019	Unsettled
	2020 - 2022	NA

AGN is awaiting agreement from Origin and several smaller retailers in order to reach final statement stage and settlement for 2019. This is expected to be finalised within the benchmark review period.

Settlement of 2020 data is awaiting final agreement by most retailers and is not expected to be settled within this review period.

The 2021 data is still being compiled, calculated and verified and is not expected to be settled within this review period.

For non-DTS network AGN relies on assistance from AEMO to reach settlement. AEMO liaises with the pipeline owner (Jemena) to provide shipper data which is used to facilitate the wash-up and settlement. This is generally done on a 5 year basis. AEMO advised that it has collected the latest shipper data for the 2016 to 2021 period on 11 August 2022. AGN has responded to AEMO with Class B withdrawal data and is awaiting further advice from AEMO in order to proceed to wash-up and settlement stage.

4.2. Spot Price Exposure

Under the annual reconciliation between gas distributors and retailers, financial payments to (from) retailers for actual UAFG being greater (lower) than benchmark is calculated using the average volume weighted market price (AVWMP), which takes into account wholesale gas spot market prices.

The forecast of wholesale price volatility sits outside the scope of AGN's operations but does impact the cost / benefit analysis of strategies potentially adopted to efficiently reduce UAFG.

5. Key Strategies to Minimise UAFG

AGN has key strategies and programs in place to minimise UAFG. These include the continuation of the LP mains replacement program to eliminate leaks from cast iron and unprotected steel networks; continued monitoring of the testing and calibration of CTM's to ensure metering accuracy and conducting preventative maintenance programs such as leak surveys to pinpoint and repair leaks found on the network.

Below is an outline of the key strategies in place to address each of the three (3) UAFG categories of measurement, fugitive emissions and systems.

5.1. Measurement

5.1.1. Timing Mismatch

Timing mismatch can positively or negatively affect UAFG. Over multiple years the timing error for meter reading mismatches will net out (i.e. balance). AGN maintains compliance with its meter reading obligations as defined by the Retail Market Rules[3] which minimised the impact of timing mismatches on UAFG. This will continue in the next benchmark period.

5.1.2. Line-pack change

Line-pack refers to the volume of gas stored within the networks. The volume of gas (energy) stored within the networks is depended on the network operating pressures.

Based on pressure data received there is no indication that the pressure between the start and the end of the year in the AGN transmission system has any significant variance; therefore line-pack related UAFG is considered to be insignificant. Line-pack related UAFG may be either positive or negative and will net out unless there is a step change in operating pressures within a pressure system.

As part of network safety and reducing UAFG, AGN decreases the operating pressures within its networks to the minimum required to maintain supply to end customers. This approach will continue in the next benchmark period.

5.1.3. CTM Uncertainty & Replacement

For CTMs, a small systematic error can have a large impact on uncertainty on UAFG. All of the CTM's in AGN's network are operated and maintained by APA GasNet[4] who are obligated to carry out testing and calibration in accordance with the Victorian Wholesale Market Rules[5].

Testing is conducted by APA GasNet to ensure CTM accuracy is maintained. AGN receives and reviews test results on an annual basis to ensure accuracy remains within acceptable limits.

Should CTMs be found to be operating outside of their specified capacity range, they are required to be replaced or refurbished to ensure the integrity of data recorded at these locations is not

[3] Retail Market Procedures Version 12.0 (PROJECT-57-30)

[4] APA GasNet (part of the APA Group) are the owners of the Victorian Transmission System (VTS)

[5] AEMO Document No. 281528 for Uncertainty Limits and Calibration requirements in Victoria.

compromised. AGN continues to liaise with APA on a yearly basis on both the maintenance and replacement programs needed to maintain CTM accuracy.

5.1.4. Meter Accuracy

AGN is required by the GDSC to provide an appropriate metering installation at each supply point i.e. connection) on the network. There are requirements to periodically maintain these installations, replace meters when their field life has expired, and provide periodic metering information to retailers for billing purposes.

Meter accuracy limits are maintained by stipulating an initial in-service compliance period. A meter's initial in-service compliance period refers to the "period of time allowed to a meter population or meter type to remain in-service without retesting or replacement".

Through the Field Life Extension (FLE)/Sample testing and the annual "Time expired" Meter Replacement program (for qualifying domestic diaphragm meters), AGN ensures it remains compliant with its obligations to replace meters at the end of their in-service compliance periods.

Programs to uphold meter accuracy include:

- Continuation of the annual time expired meter replacement program with more than 153,000 meters forecast for replacement in the 2023/24 - 2027/28 Access Arrangement (AA) period;
- Continuation of annual FLE/Sample testing of qualifying meters ending their service compliance periods;
- Continuation of the faulty meter replacement program and;
- Continuation of a program to remotely read or relocate hard to access meters.

5.1.5. Faulty Meters and Meter Index Faults

Faulty Meter indexes have an adverse impact on AGN's UAFG as the index may stop recording gas during times of usage. Interval customer's usage is recorded daily and monitored closely so any zero consumption is usually picked up early. Basic I&C customers (Industrial & Commercial customers) are of particular concern as they can use more than 10TJ per year and the meters are monthly or bi-monthly read.

In the current period, AGN produced "zero consumption" reports to identify potential meters with faulty indexes, covering both domestic and non-domestic customers. These reports enabled a profile analysis to be undertaken to identify meter types / models disproportionally represented in the "no consumption" data. In addition, site visits were undertaken for known meter indexes which were prone to failure and for all "zero read" meters installed with the largest capacities. Any meter that was found to be faulty was promptly replaced.

For the upcoming period, AGN will continue its approach to identifying faulty and/or non-consuming gas meters. This will include the continuation of site investigations identified from the meter profile analysis.

5.1.6. Pressure and Temperature Compensation for Meters

Gas is sold in units of energy, typically Megajoules (MJ) or Gigajoules (GJ) which is based on gas being measured at "base" or "standard atmospheric conditions" of 101.325 kPa absolute pressure (atmospheric pressure at sea level) and 15°C for temperature. However, since gas is a compressible

fluid it is rarely measured at these conditions with meters measuring volumes at the pressure and temperature presented at the meter, which can be significantly different to the aforementioned "standard" conditions.

To compensate for these differences, a Pressure Correction Factor (PCF) is used to convert the metered volume to an equivalent energy that would exist if the measurement was at base conditions. PCF's take into consideration variations in metering pressure but do not make allowances for variations in temperature and altitude. Any variation away from these base conditions and set pressure correction factors results in inaccuracies within the customers measured energy and hence results in UAFG.

5.1.6.1. Interval I&C customers

Due to the large volume of gas consumed by interval I&C customers, a small variation in temperature and pressure could lead to significant UAFG. As a result, some interval customers have a flow corrector installed on their meter which can record live temperature and pressure and correct the measured volume flowing through the meter accordingly. Pressure and temperature flow correction on Tariff D customers is considered prudent to ensure accuracy. Where deemed appropriate AGN will undertake replacement of flow correctors in the next period when they reach end of life.

5.1.6.2. Basic I&C customers

All I&C customers (including basic and interval meters) undergo periodic inspections, maintenance and overhauls at intervals defined in maintenance plans contained in AGN's Enterprise Asset Management System (Maximo). During maintenance, the regulator pressure set points are calibrated to ensure they operate within acceptable limits. This minimises the amount of "regulator creep" (i.e. pressure creep) that can occur.

5.1.6.3. Domestic customers

In regards to pressure variation for domestic customers, AGN's 'Purchase Specification for Low and High Pressure Domestic Regulators' sets out the requirements for domestic regulators that are approved for use in the AGN network. These regulators are tested against this standard and the results are reviewed to ensure ongoing compliance.

Temperature variation for domestic customers is considered to have a material impact to UAFG. The two (2) factors that influence this are outlined below:

a) Consumption versus gas temperature profiles

The majority of domestic consumption occurs during the winter months whereby the gas temperature at the meter is well below 15°C (sometimes as low as 5°C). In the warmer months gas temperatures can get as high as 30°C however consumption for domestic customers during this time is significantly lower. This results in an adverse effect on UAFG. Previously it has been assumed that ground temperature and the resulting gas temperature at the metering point stays relatively constant, however I&C interval data (with temperature correction) reviewed by Multinet Gas in 2015 has identified gas temperature variations of up to 13°C throughout a 12-month period (CY2015).

b) Increasing Volume of High Pressure Supply Points

UAFG is more pronounced for customers directly supplied from High Pressure (HP) networks where a pressure drop (resulting in a reduction in temperature known as the Joules-Thompson effect) is immediately upstream of the meter. Therefore, the ongoing connection of customers to HP networks (from new connections and LP-HP mains replacement) is incrementally contributing to temperature related UAFG for all basic sites on an annual basis.

5.1.7. Incorrect Pressure Correction Factor

For all basic metered customers Pressure Correction Factors (PCF's) are entered against the meter in AGN's systems at the time of installation. This PCF will remain assigned to that customer MIRN[6] for the duration the customer's MIRN remains valid in the system. Once recorded in AGN's billing system, the PCF is only altered if a pressure upgrade or downgrade is required. As such any errors in the initial entering of the PCF may remain undetected and result in ongoing incorrect billing.

For interval customers the PCF is registered with AEMO at the time of installation, but the same risk exists for sites that do not have ongoing pressure correction.

AGN has ongoing processes to ensure the correct PCF is allocated to MIRN's when initially installed and review procedures to identify misallocations.

5.1.8. HHV Compensation

Higher Heating Value (HHV) is defined as the amount of heat released by a specified quantity of gas once combusted. This is essentially the conversion from gas volume to energy. The HHV value takes into consideration the molecular composition of the gas. HHV values used in billing are calculated using a flow weighted statewide average across the three major injection points for Victoria; Bass gas, Iona, and Longford. Any variations in gas composition received at the meter from the declared state-wide average influences UAFG.

For the DTS networks, most of the gas that AGN receives comes from both Longford and Bass Gas. A review of the difference between the AEMO declared state-wide average and an estimated AGN HHV based on receiving 100% of gas from Bass Gas and Longford appears to be stable with variations having minimal impacts on UAFG.

AGN will continue to monitor HHV values in Victoria with particular interest in AEMO's proposed implementation of heating zones in Victoria and the potential impacts to measured UAFG.

5.1.9. Meter Bypass and Theft

Although uncommon, theft of gas can occur. Examples of theft include:

- I&C customers opening the bypasses around a meter to reduce the metered consumption; or
- Domestic customers installing plumbing lines to bypass their meter.

All I&C customers are on regular maintenance where the bypass valve is checked to ensure that it is tagged and locked. There are very few cases of theft / meter bypass reported each year and as such there is no evidence to suggest that these are a significant contributor to UAFG.

Domestic customers are all on manual meter reading cycles which also aids in identifying modified metering installations.

[6] Meter Identification Reference Number

5.2. Fugitive Emissions

5.2.1. Transmission Losses

As per the requirements of AS2885 and AGN's Pipeline Integrity Management Plan (PIMP), leakage surveys are conducted annually on transmission pipelines.

Leakage on the transmission network is minimal (if not negligible). Most leaks on the transmission network occur through valve stem seals and are minor in nature

5.2.2. Distribution Losses

5.2.2.1. Mains Replacement

The Mains Replacement Program's objective is to improve safety, with the additional benefit of improving supply reliability to gas customers by replacing ageing mains and services. This activity replaces the older cast iron, unprotected steel and PVC mains that have the highest leakage rates and therefore contribute to UAFG.

In the current AA period, AGN had forecast to replace 297 km of mains across the low pressure, medium pressure and reactive mains replacement programs. In delivery of the program, AGN are required to report monthly to Energy Safe Victoria (ESV) on replacement volumes undertaken.

AGN is expected to replace the 297 km of low pressure mains remaining by the end of the current AA period and complete its LP replacement Program.

For the upcoming AA period (FY23 to FY28), AGN is seeking to continue the minor replacement of mains on the network and has proposed:

- Protected steel mains replacement & testing: 11.7km of replacement and sample 50 further locations
- HDPE Mains inspection & testing: Camera inspection and repair of 16.4 km of DN50 and 40 HDPE 575 located in the Albury, and sample a further 100 locations. Reinforce where necessary.

This is in addition to reactive replacement of mains and services which is undertaken when it is not possible to efficiently repair an identified gas leak .

5.2.2.2. Leakage Survey

AGN carries out annual leakage survey on areas of their network that have a high population and building density. Refer to 400-PL-QM-0002_15 Leak Management Plan for more information regarding Leakage Survey.

Leakage survey compliance is tracked at a corporate level with 100% of leak survey completed since the measure was implemented in 2018. AGN will continue to maintain compliance with its leak management plan into the next benchmark period.

5.2.2.3. SCADA Control / Monitoring of Field and District Regulators

AGN monitors and controls particular areas of its gas network in real-time using its SCADA system.

For the HP networks, by utilising real-time pressure data at various fringe points, the outlet pressure of regulating stations can be continually controlled (i.e. minimised) while still maintaining minimum required fringe pressures. By optimising the pressure in the network at all times, the volume of

UAFG due to leakage is reduced, whilst ensuring customers are supplied at pressures in accordance with the GDSC.

Regulator pressure settings are reviewed yearly with a regulator schedule published in an effort to optimise network pressures at all times.

5.2.2.4. Mains Commissioning / Abandonment

Any quantity of gas used to commission any new asset is not metered and therefore directly contributes to UAFG. Past studies into the contribution of gas lost due to commissioning / abandonment has been quantified to be 0.004% of UAFG and is not considered material.

5.2.2.5. Regulator Venting

All regulators (with the exception of LP customer regulators) have a built-in safety mechanism which vents gas to atmosphere to prevent over pressurisation of downstream fitting lines. Venting of small volumes of gas may occur during normal operating conditions. Regulators that are found to be venting more than normal are considered defective and are replaced.

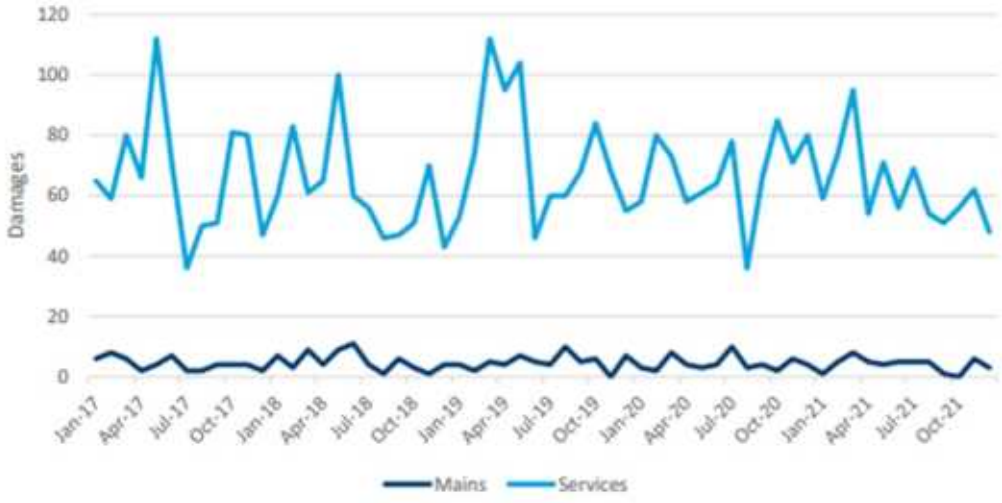
AGN's Standard for Low and High pressure Domestic Regulators sets out the purchase specification for domestic regulators. These regulators are tested against this standard and the results are reviewed to ensure compliance with this specification.

5.2.2.6. Third Party Damages

Third party damages are a common occurrence on gas distribution assets. The damage can be superficial without any detrimental long-term damage to the asset, while other damages can result in leakage of gas which results in UAFG. While a third-party damage can occur on any part of the network, the majority are related to service damages by consumers and contractors (e.g. fencing contractors) working without proper knowledge of the location of the buried gas assets.

Efforts in the current period, include AGN's participation in the ESV lead Gas Asset Damage mitigation project, has seen a decline in service damages, hence contribution to UAFG. AGN will continue its focus to reduce the incidence of third party damage in the next benchmark period.

Figure 5-1 Third party damages – 2017 to 2021



5.3. Systems

From the initial meter readings (and estimations) through to the UAFG reconciliation, a large amount of data is handled and passed between a number of systems and owners from AGNs asset database, to AEMO's Market Information Bulletin Board (MIBB) and multiple retailers internal systems. For AGN, it is important its asset database is accurate and up-to-date, and that regular monitoring of UAFG is undertaken to ensure levels continue tracking close to benchmark.

5.3.1. Billing Systems

The correct billing of customers relies upon accurate data in AGN's billing systems. This includes not only correct meter readings but the appropriate correction factor applied to customer billing. AGN continually monitors, reviews and audits metering data constants such as pressure correction factors to ensures there is consistency between its enterprise asset management system (Maximo) and its billing system (Customer Care and Billing (CCB)).

5.3.2. UAFG Monitoring

AGN places a significant emphasis on the analysis and mitigation of UAFG across each of its networks. UAFG is reviewed by AGN at both senior management and Board levels in recognition of the safety, cost and environmental impact this item has on our business and customers. AGN has gas distribution networks in Victoria, South Australia, New South Wales, Queensland and the Northern Territory. Consequently, AGN have a national perspective when considering UAFG and can leverage a "best practice" approach that incorporates outcomes across all of our networks. That is, the extensive number of networks owned by AGN across Australia means that the experience gained in addressing UAFG in one network can be leveraged to address a similar issue in another network elsewhere in Australia.

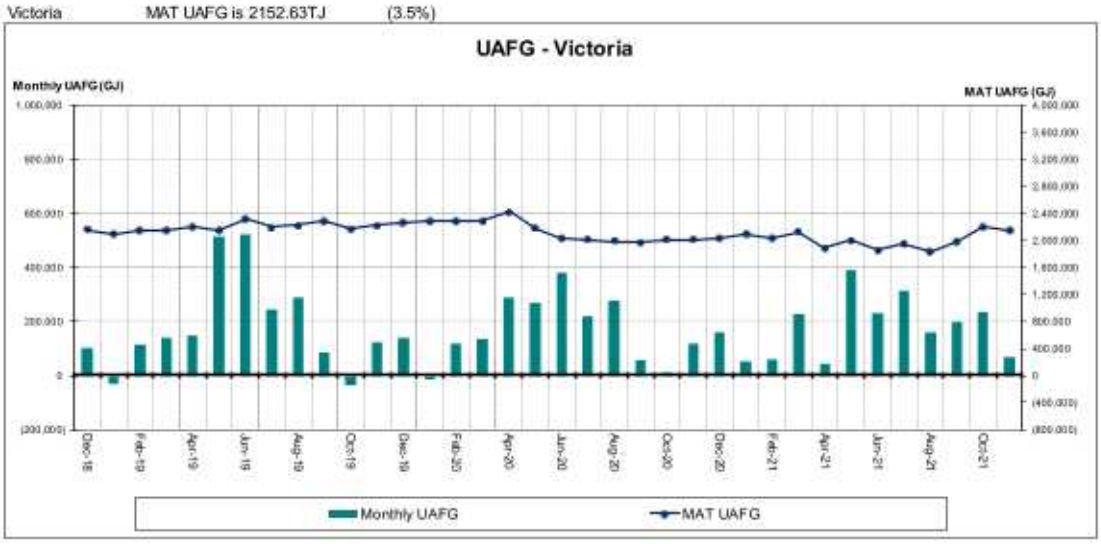
On a monthly basis, a UAFG report is prepared for all of AGN's networks, including the Victorian and Albury gas networks. This UAFG report compares the rolling moving annual total UAFG against the regulated benchmark position. The report contains, amongst other matters, the following components:

- a high level summary that reports current moving annual total UAFG and variances;
- tabulated volume and percentage statistics for the seven major zones in the Victorian distribution network;
- graphs of three-year history to highlight monthly and rolling annual UAFG data to identify and highlight trends; and
- summary data on progress of UAFG "wash-ups".

The report is compiled and analysed on a monthly basis and is reviewed by senior management, with particular attention paid to sub-networks where trends indicate anomalies, or the possibility of erroneous inputs, potential pipeline faults, theft, or other unusual factors. The results of this analysis are used to optimise execution of AGN's UAFG management strategy.

An example of the UAFG graphs prepared on a monthly basis is presented in Figure 5-3.

Figure 5-3 Example of Monthly AGN UAFG graph



6. Calculated Benchmarks for CY2023 - CY2027

Consistent with the ESCV's 2017 Final Decision methodology, AGN has applied a 3-year average using the most current information for calculating the DTS Network Class B and Albury Class B Benchmarks, as calculated in Table 6-1 below.

Table 6-1: DTS Networks UAFG Data and three-year average

Year	2017	2018	2019	Three Year Average
UAFG	4.45% (settled)	4.19% (Settled)	4.36% (forecast)	4.33%

It is noted the ESCV's Final Decision on UAFG benchmark for the current period found the data relating to Non-DTS Network – Class A and B, to be unreliable. As a result, the UAFG benchmark was maintained at 2.0%. In addition, the DTS Network – Class A and Albury Class A Benchmarks remained unchanged at 0.3% and 0.1% respectively due to the accuracy and stability of network data.

It is considered the same environment that led to ESCV's setting of DTS Network – Class A, Albury Class A and the Non-DTS benchmark remains the same for the upcoming period. Therefore, it seems reasonable to apply the same methodology for these benchmarks.

AGN's calculated benchmarks for the DTS, Albury and Non-DTS networks are outlined in Table 6-2 below:

Table 6-2: Calculated CY2023 to CY2017 UAFG benchmarks

		2023	2024	2025	2026	2027
DTS Networks	Class A	0.3%	0.3%	0.3%	0.3%	0.3%
	Class B	4.33%	4.33%	4.33%	4.33%	4.33%
Albury	Class A	0.1%	0.1%	0.1%	0.1%	0.1%
	Class B	4.33%	4.33%	4.33%	4.33%	4.33%
Non-DTS Networks	Class A & B	2.0%	2.0%	2.0%	2.0%	2.0%

7. Conclusion

As a Victorian gas distributor, it is the responsibility of AGN to employ reasonable endeavors to ensure that the quantity of UAFG in its distribution system is less than the UAFG benchmark set by the ESCV. The key strategies employed by AGN to reduce UAFG in the network include a comprehensive Mains Replacement Program to replace leaking mains, continually ensuring accuracy of meters, undertaking preventative maintenance measures such as leak detection, as well as monthly monitoring of UAFG to highlight anomalies and track UAFG against benchmarks.

Moving forward into the next period CY2023 – CY2027, AGN are aligned with ESCV's preference to use a 3-year average benchmark of 4.33% per annum for DTS Network Class B and Albury Class B Benchmarks; with DTS Network – Class A (0.3%), Albury Class A (0.1%) and Non-DTS Network Class A & B (2%) benchmarks remaining unchanged.