Multinet Gas Networks
Part of Australian Gas Infrastructure Group

Unaccounted for Gas Benchmarks – 2023 to 2027

Multinet 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 Multinet Gas Networks (MGN) is to continue focusing on the replacement of low pressure cast iron and 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 the UAFG benchmark for the upcoming CY2023 – CY2027 period, MGN has applied the ESCV's preference of adopting the same approach it took in the previous period (CY2017 – CY2022) - that is the revealed costs approach, whereby a 3-year average of settled (or forecast settled) UAFG data is used to establish benchmarks.

As MGN effectively has two designated networks – i.e. the Declared Transmission System (DTS) network supplying Metropolitan Melbourne and the Non-DTS network supplying South Gippsland via BassGas, 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 have been calculated:

Table 1-1: Calculated UAFG benchmarks for CY2023 – CY2027

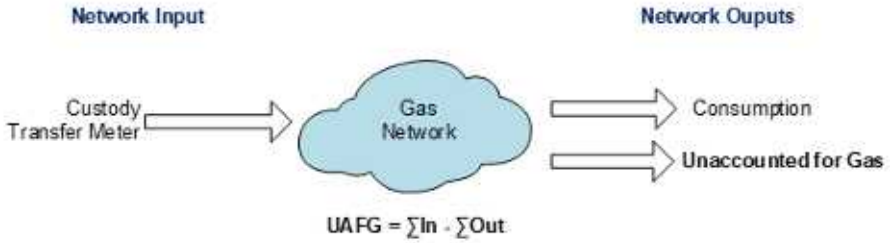
Benchmark Category	Proposed Benchmark	Comment
DTS Network – Class A	0.3 %	No change from 2017 –2022 period
DTS Network – Class B	5.34 % **	Increase 0.03% from 2017 –2022 period
Non-DTS Network – Class A & B	2.0 %	No change from 2017 –2022 period

** 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.

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 customer meters). Refer to Figure 2-1 below.Figure 2-1 Unaccounted for Gas Flow Diagram

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 can be divided into the following three (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 the above UAFG sources - measurement, fugitive emissions and system, 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 MGN'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

Source	Description
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 MGN and the declared State-wide value which is used in billing of residential and small commercial 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 a 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 both 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 CTM's.
Third party damages	Leakage lost on the network as a result of third party damages.

Table 2-3: System 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 SAP	Meters not installed in the SAP billing system correctly

3. MGN Network Overview

Multinet Gas Network (MGN) is one of three primary distributors of natural gas in Victoria, distributing to over 715,000 customers throughout Melbourne's inner, outer-eastern, and south-eastern suburbs. MGN also has two rural based networks that currently cover nine townships in the Yarra Valley located in outer eastern metropolitan Melbourne and five townships in South Gippsland Victoria. Refer to Figure 3-1.

MGN owns and operates 164 km of licensed transmission pressure pipelines and circa 10,000km of distribution mains used to transport gas from the high-pressure transmission network (owned by APA GasNet and BassGas) to residential, commercial and industrial gas users.

Figure 3-1: MGN Distribution Area

MGN's geographic footprint is surrounded by established regions of supply by other distribution businesses.

Figure 3-2 and Figure 3-3 shows the current distribution of high pressure (blue), medium pressure (Green), and low pressure (Black) systems in the network. The high-pressure system dominates the network footprint.

Figure 3-2: MGN's Metropolitan Gas Distribution Network

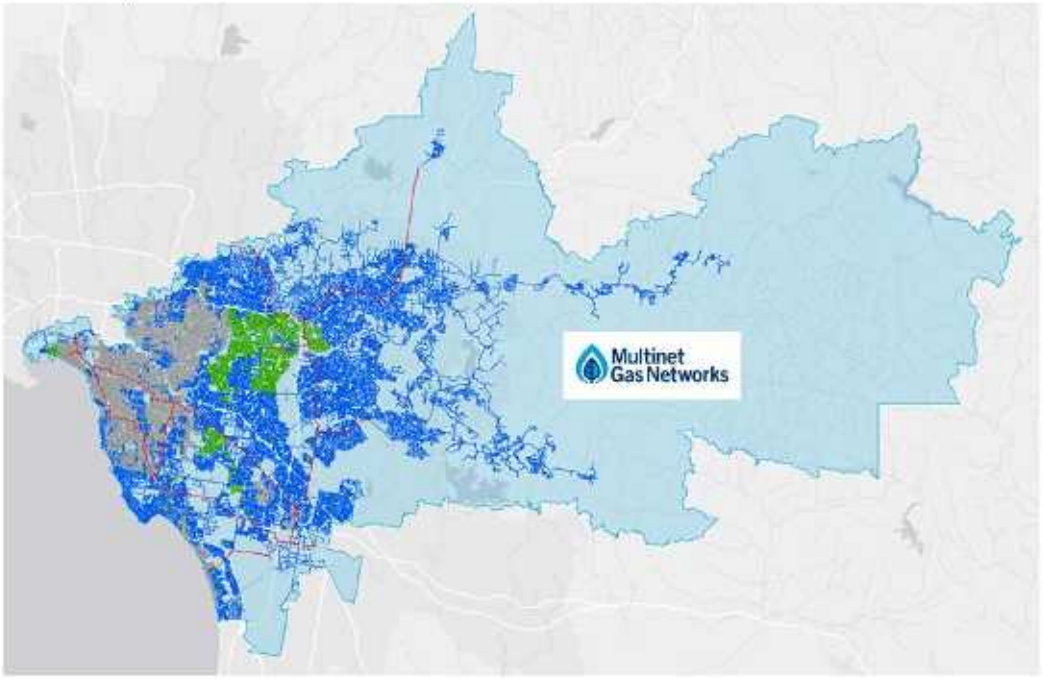
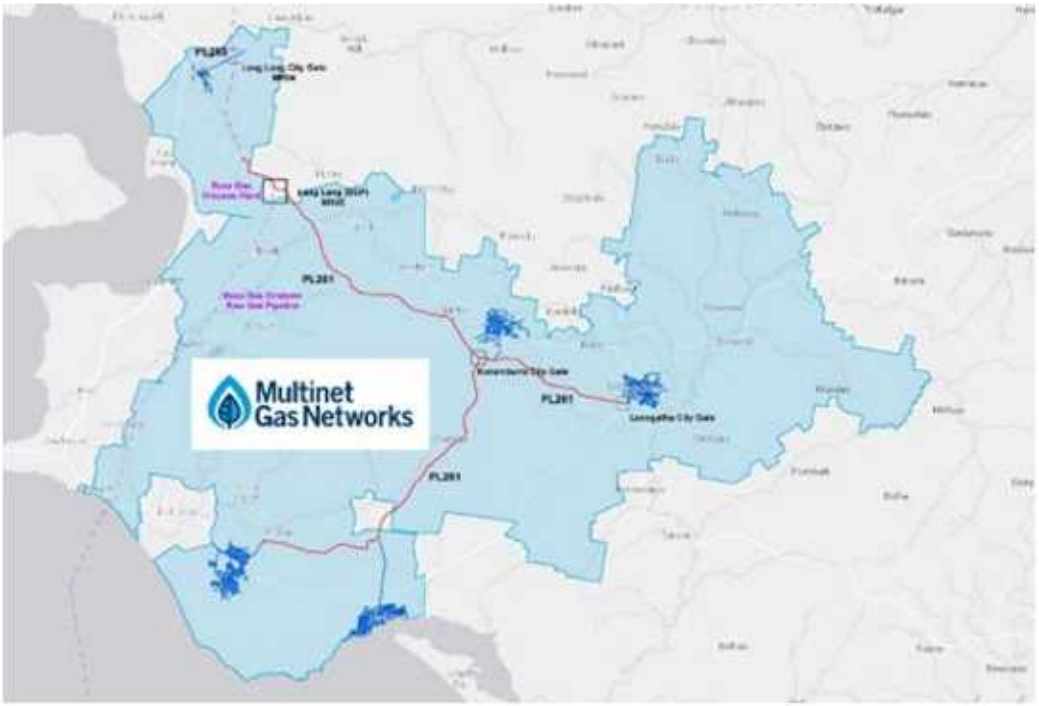


Figure 3-3: MGN's South Gippsland Gas Distribution Network



4. UAFG Performance

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

Table 4-1: UAFG Benchmarks CY2017 – CY2022

	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 TJ/annum and are typically serviced by the high pressure and transmission networks.

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

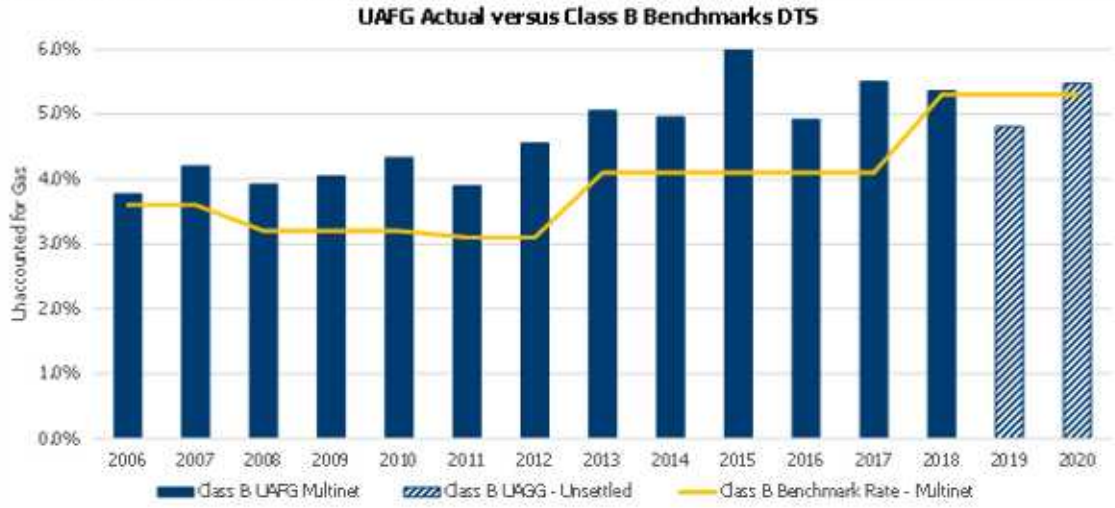
Under the Victorian UAFG model, retailers are required to purchase sufficient gas to cover customer consumption and actual UAFG. If actual UAFG is greater than the benchmark, the gas distributor is required to compensate the retailers for the UAFG in excess of the benchmark. Where actual UAFG is lower 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 ESCV adopted a 3-year average of the most recent settled data at the time of setting the benchmarks (i.e. CY2013 – CY2015).

DTS Class A and Non-DTS benchmarks were a continuation of previously established benchmarks.

MGN's current performance for the DTS network against the Class B benchmarks is summarised in Figure 4-1 below. As shown, MGN has historically operated above UAFG benchmarks as set by ESCV. Most recent performance is more closely aligned to the current DTS – Class B benchmark (5.3%).

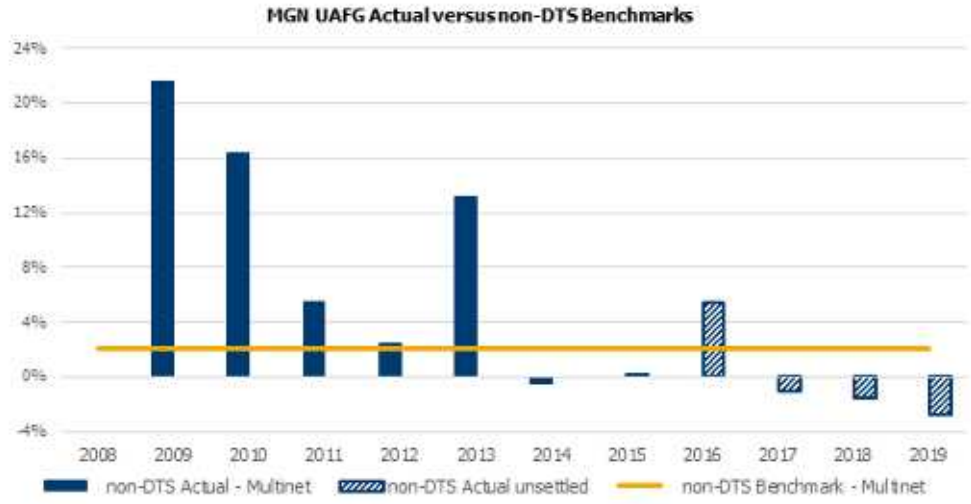
Figure 4-1: UAFG Network Performance DTS Class B



Note: under the reconciliation model, performance for Class A customers is assumed to match the Class A benchmark (i.e. 0.3%), all UAFG variation exists within Class B benchmarks only.

MGN's current performance for the Non-DTS against Class A & B benchmarks is summarised in 4-2 below. UAFG for these smaller networks is far more erratic and has a smaller impact to UAFG financial reconciliations.

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



4.1. Status of UAFG Settlements

Settlement with retailers on UAFG is a time-consuming process. There is regular communication between retailers and AEMO to address and resolve all queries regarding UAFG data and calculations distributed to participants. Best endeavors are made by all relevant parties to reach agreement as early as possible, however due to a special revision issued by AEMO in "Settlement Communication No. 466: Notice of Special Revisions for August 2019 to October 2020 in DWGM" dated 26 October 2021, the MGN 2019 and 2020 data is still in the process of being settled. Status of UAFG settlements are shown in Table 4-2 below.

Table 4-2: Status of UAFG Settlements from 2008 onwards

MGN Network	Year	Status
DTS	2008 -2018	Settled
	2019 - 2020	Unsettled
	2021 - 2022	NA
Non-DTS	2008	NA
	2009 – 2014	Settled
	2015 – 2019	Unsettled
	2020 - 2022	NA

MGN is still awaiting agreement from Origin on the finalised payment figure for CY2019. This is in the final stages of negotiation and is expected to be settled during this 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 the Non-DTS network, MGN has not been able to reach agreement with retailers since 2014. As AEMO has provided assistance to AGN for its non-DTS networks to facilitate settlement, MGN is also seeking assistance for its non-DTS network in order to progress settlements.

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 MGN's operations but does impact the cost / benefit analysis of strategies potentially adopted to efficiently reduce UAFG.

5. Key Strategies to Minimise UAFG

MGN 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 of Meter Reading

Timing mismatch can positively or negatively affect UAFG. Over multiple years the timing error for meter reading mismatches will net out (i.e. balance). MGN maintains compliance with its meter reading obligations as defined by the Retail Market Rules[1] which has 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 dependent on 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 MGN transmission system has any significant variance. The same can be said for MGN's distribution networks which do not contain any material line-pack. For MGN, line-pack related UAFG is insignificant.

5.1.3. CTM Uncertainty & Replacement

For CTMs a small systematic error can have a large impact on uncertainty on UAFG. In the Metropolitan Melbourne network all of the (18) CTM's in MGN's network are operated and maintained by APA GasNet[2] who are obligated to carry out testing and calibration in accordance with the Victorian Wholesale Market Rules. The two (2) CTM's in the South Gippsland network are owned, operated and maintained by MGN in accordance with the Victorian Wholesale Market Rules[3].

Testing is conducted by APA GasNet to ensure CTM accuracy is maintained. MGN 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 compromised. From 2018 to-date, three (3) CTM's have been subject to upgrade to cater for the growth in network peak demand, with two (2) further sites in the planning stages.

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

[2] APA GasNet (part of the APA Group) are the owners of the Principle Transmission System (PTS) in Victoria.

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

5.1.4. Meter Accuracy

MGN is required by the GDSC to provide an appropriate metering installation at each supply point i.e. connection) off the network. Meter accuracy limits are maintained by stipulating an initial in-service compliance period – that is 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), MGN 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 158,000 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 MGN'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 use more than 10TJ per year and the meters are monthly or bi-monthly read.

In this current period, MGN 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. This allowed MGN to accelerate the removal of circa 10,000 small meter type / models which were disproportionately represented. In addition, site visits were undertaken for known meter indexes which were prone to failure, as well as "zero read" meters with the largest capacities. Any meter that was found to be faulty was promptly replaced.

Moving forward, MGN 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 result in inaccuracies within the customers measured energy and hence results in UAFG.

5.1.6.1. Interval Metered I&C customers

Due to the large volume of gas consumed by interval metered I&C customers, any small variation in temperature and pressure could lead to significant amounts of UAFG. Many interval metered customers have a flow corrector installed which records actual temperature and pressure in order to correct the measured volume of gas flowing through the meter. MGN is currently in the process of upgrading all interval metered I&C customer sites with flow correctors, thereby improving billing accuracy and reducing any discrepancies in UAFG.

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 MGN's Enterprise Asset Management System (SAP). 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 on the MGN Network.

5.1.6.3. Domestic customers

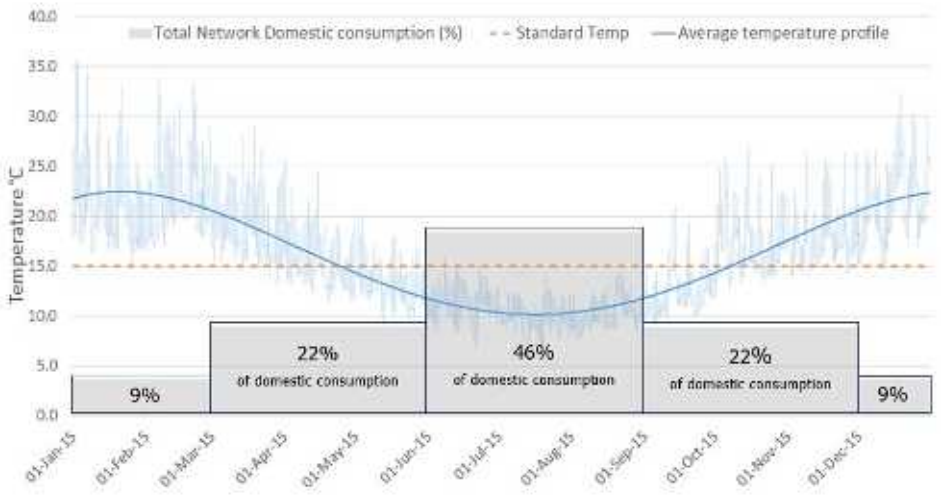
In regard to pressure variation for Domestic customers, *ES-GM-4305 Low and High pressure Domestic Regulators*, sets out the purchase specification for domestic regulators that are approved for use in the MGN network. These regulators are tested 6 monthly against this standard and the results are reviewed to ensure compliance with this specification.

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 MGN's UAFG. Previously it has been assumed that ground temperature and the resulting gas temperature at the metering point stays relatively constant, however a review of I&C interval data (with temperature correction) has identified gas temperature variations of up to 13°C throughout a 12-month period (CY2015). This profile is provided in Figure 5-1.

Figure 5-1 Average temp. profile for 10 I&C sites across various geographical location in Melbourne



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 customers, PCF's are entered against the meter in SAP at the time of installation. This PCF remains assigned to that customers Metering Installation Reference Number (MIRN) for the duration the customer's MIRN remains valid in the asset database. Once recorded in SAP, 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.

Within the current period, an investigation was initiated to review and rectify the causes of PCF errors in MGN's SAP asset database for I&C Customers (basic and interval sites). This investigation identified several system improvements aimed at reducing PCF errors, resulting in enhancements to the SAP system and the implementation of updated work instructions.

In 2017 a targeted program was carried out to identify incorrect PCF's for domestic customers and project the extent of the issue using a statistically significant sample testing program. The sample size was of 1,500 domestic installations or ~0.2% of the domestic customer base. The targeted program identified 28 customers with incorrect PCF's applied in the system with identified errors likely to be legacy errors, made during the installation of domestic regulator in the field. This investigation highlighted errors in PCF allocation are rare, with impacts to UAFG (positive and negative) minimal.

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

For the non-DTS networks, gas quality is measured by AEMO at Pakenham and as there is only one input into the system (Bass Gas) there is minimal variation in actual HHV values at the meter to the calculated HHV value declared by AEMO.

MGN 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 on manual meter reading cycles which also aids in identifying modified metering installations.

5.2. Fugitive Emissions

5.2.1. Transmission Losses

As per the requirements of AS2885 and MGN'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 objective of the mains replacement program is to improve safety, maintain network integrity, and 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, the AER approved allowances to replace approx. 543km of mains across the low pressure, medium pressure and reactive mains replacement programs. In delivery of the program, a monthly report is provided to Energy Safe Victoria (ESV) on replacement volumes undertaken.

MGN achieved its mains replacement target (543km) at the end of year 4 (2021) of the current AA period and is forecasting to replace 621km of mains the end of the period; a 78km positive variance.

For the upcoming AA period (FY23 to FY28), MGN is seeking to continue it mains replacement program and has proposed:

- 704km of low-pressure replacement;
- 86km of early generation HDPE replacement and;
- 31km of MP Steel replacement.

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

5.2.2.2. Leakage Survey

Leaks on the network contribute to UAFG. MGN carries out annual leakage survey on areas of the network that have a high population and building density. Refer to EC-LS-5201 Leakage Survey – Gas Distribution and Transmission pipelines 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. MGN 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

MGN 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.

Field and District Regulator pressure settings are reviewed yearly with a regulator schedule published in an effort to optimize network pressures at all times. In known areas of high leakage, particularly on MP networks, MGN looks to reduce regulator pressure settings where possible to minimise leakage volumes throughout the network.

Managing leakage on the LP network during overnight periods is of particular importance as there is minimal usage in the system during this time. As such a program has been put in place to better monitor District Regulator settings against the scheduled pressure. This program is ongoing.

5.2.2.4. Mains Commissioning / Abandonment

Any quantity of gas used to commission any new asset is not metered and directly contributes to UAFG. Past studies into the contribution of gas lost due to commissioning / abandonment has quantified its impact at 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.

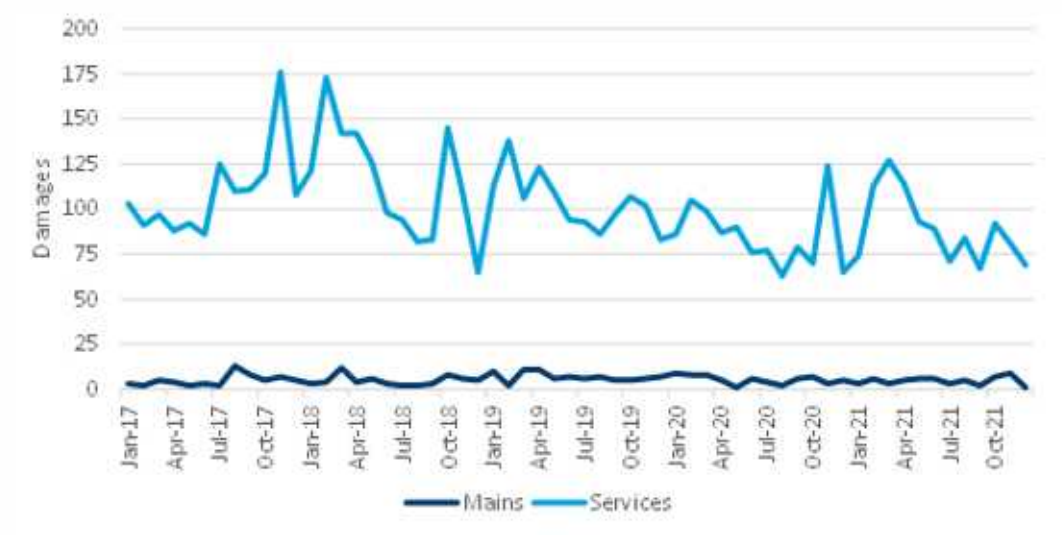
MGN Engineering Standard ES-GM-4305 - Low and High Pressure Domestic Regulators sets out the purchase specification for domestic regulators. These regulators are tested 6 monthly against this standard and the results are reviewed to ensure compliance with this specification.

5.2.2.6. Third Party Damages

Third party damages are known to occur 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.

There is approximately a 20:1 ratio between service and mains damages on the MGN network, as highlighted in Figure 5-2 below. Efforts in the current period, include MGN's participation in the ESV led Gas Asset Damage Mitigation Project, has seen a decline in service damages, hence contribution to UAFG. MGN will continue to focus on reducing the incidence of third party damage in the next benchmark period.

Figure 5-2: 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 MGNs asset database, to AEMO's Market Information Bulletin Board (MIBB) and multiple retailers' internal systems. For MGN, 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

The correct billing of customers relies upon accurate data in MGN metering database. This includes not only accurate meter readings but the appropriate pressure correction factor and heating values. MGN continually monitors, reviews and audits meter reading data, as well as meters, to ensure the data supplied to the market is as accurate as possible.

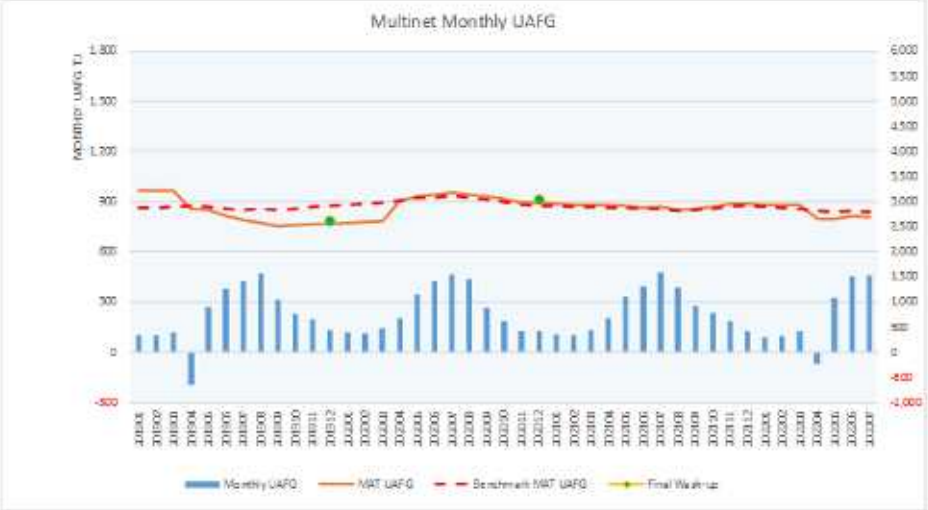
5.3.2. UAFG Monitoring

MGN monitors UAFG on a monthly basis to ensure UAFG levels are stable and remain close to benchmarks. MGN has developed several internal models to track UAFG utilising AEMO reports and internal basic meter data generated from its SAP ISU billing platform. The AEMO interval meter data is aligned to MGN's basic meter data to provide an accurate visualisation of how UAFG is tracking throughout the year. The longer-term trends are also monitored to ensure there are no dramatic changes in the moving annual total (MAT) UAFG volumes.

In addition, MGN monitors injections into its networks on a weekly basis. This reporting provides an insight into gas entering the network and highlights any unexplained anomalies which cannot be explained by weather drivers or known customer behaviour changes. The report is distributed to and reviewed by management weekly.

An example of MGN's monthly reporting charts is shown in Figure 5-3 below.

Figure 5-3: Multinet Monthly UAFG (2019 – 2022)



Note the graph provides:

- a high-level summary that reports current MAT UAFG and variances against benchmarks;
- three-year history to highlight monthly and rolling annual UAFG data to identify and highlight trends; and
- a comparison of actual UAFG "wash-ups" results against the model's prediction.

6. Calculated Benchmarks for CY2023 – CY2027

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

Table 6-1: CY2023 - CY2027 Calculated UAFG Benchmark for DTS Network Class B

Year	2017	2018	2019	Three Year Average
UAFG	5.88% (settled)	5.34% (settled)	4.80% (forecast)	5.34%

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 been maintained at 2.0%. In addition, the DTS Network – Class A remained at 0.3% 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 and the Non-DTS benchmark remains the same for the upcoming period. Therefore, it seems reasonable to apply the same methodology for these benchmarks.

MGN's calculated benchmarks for both the DTS and Non-DTS networks are outlined in Table 6-2 below:

Table 6-2: Calculated CY2023 to CY2027 UAFG Benchmarks

Benchmark Category	2023	2024	2025	2026	2027
DTS Network – Class A	0.3%	0.3%	0.3%	0.3%	0.3%
DTS Network – Class B	5.34%	5.34%	5.34%	5.34%	5.34%
Non-DTS Network – 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 MGN 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 MGN to reduce UAFG in the network include a comprehensive mains replacement program to replace leaking cast iron and unprotected steel mains, continually ensuring accuracy of meters, undertaking preventative maintenance measures such as leak detection, as well as monthly monitoring of UAFG to highlight any anomalies and track UAFG against benchmark levels. Moving forward into the next period CY2023 – CY 2027, MGN are aligned with ESCV's preference to use a 3-year average benchmark of 5.34% per annum for DTS Network Class B, with DTS Network – Class A and Non-DTS Network Class A & B remaining unchanged at 0.3% and 2.0% respectively.