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UAFG STRATEGY AND FORECAST

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AA6 UAFG STRATEGY AND FORECAST

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EXECUTIVE SUMMARY

This document discusses ATCO Gas Australia's (**ATCO**) unaccounted for gas (**UAFG**) historical performance and forecast volumes in relation to the strategic initiatives for Access Arrangement six (**AA6**) as well as the pricing strategy to ensure a competitive low UAFG price for the 2025 to 2029 period. As part of ATCO's AA6 proposal, ATCO is required to provide a forecast of its operating expenditure (**opex**). A key component of opex is the cost of replacing UAFG.

UAFG refers to gas supplied into the gas distribution system (**GDS**) that is unaccounted for in delivery to the end customer. UAFG is the difference between the measurement of the quantity of gas delivered *into the gas distribution system* in each period and the measurement of the quantity of gas *delivered from the gas distribution system* during that period. The difference is effectively 'lost' and ATCO is required to replace UAFG under the terms of its Access Arrangement – effectively replacing the gas that belonged to the *Users* (Retailers) of the GDS that has not been delivered to customers.

UAFG is a combination of measurement error, system error and network losses. ATCO manages the UAFG and ensures initiatives are carried out to improve measurement and reduce losses from the GDS. Since 2019, ATCO's UAFG has declined below 2.0% in 12 month rolling total.

ATCO continues programs of work that reduce UAFG such as mains replacement and reducing leaks in targeted locations as well as improving measurement activities. This has resulted in a historically low level of UAFG.

ATCO continues to benchmark well against other gas distribution entities with similar sized networks with respect to its amount of UAFG.

Table 0.1: Proposed Forecast UAFG % annually over AA6

2025	2026	2027	2028	2029
1.81%	1.78%	1.74%	1.73%	1.72%

This document also outlines ATCO's strategy for forecasting pricing of UAFG over AA6. ATCO has put forward estimated pricing of UAFG based on current cost estimate enquiries from retailers, wholesale market rates, transmission tariffs and retail margins.

1. INTRODUCTION

1.1 Background

As part of the AA6 proposal, ATCO is required to provide a forecast of operating expenditure (opex). An element of the opex forecast is UAFG.

UAFG is the difference between the measurement of the quantity of gas delivered *into the gas distribution system* in each period and the measurement of the quantity of gas *delivered from the gas distribution system* during that period. UAFG makes up a material proportion of opex in each access arrangement; therefore, it is in the long-term interests of customers and consistent with good industry practice that ATCO reduces the UAFG rate to as low as reasonably practicable (**ALARP**).

ATCO's UAFG forecast is based on historical data, forecast consumption and a bottom up pricing model. ATCO needs to determine the most accurate forecast volumes of UAFG and determine a price that is commensurate to the current Western Australian (**WA**) gas market for AA6.

Rule 91 of the National Gas Rules (**NGR**) requires that opex "must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services." Rule 74(2) of the NGR states that a "forecast or estimate: (a) must be arrived at on a reasonable basis; and (b) must represent the best forecast or estimate possible in the circumstances".

1.2 Purpose

This report outlines the details of ATCO's forecast UAFG and explains why this proposed level of UAFG meets the criteria outlined in Rule 91 and meets the determination of Rule 74 (2) through historical build up and benchmark performance. The report also outlines the pricing mechanism ATCO proposes for the AA6 submission.

1.3 Scope

The scope of this document covers:

- An explanation around the definition of UAFG, causes of UAFG and how UAFG forecasts impact customers
- ATCO's historical UAFG performance for its coastal (Mid-West and South-West) gas distribution system
- The formulation of UAFG energy forecasts for AA6
- The formulation of UAFG pricing forecasts for AA6.

1.4 Assumptions

- The measurement and loss components of UAFG share a relatively equal share of the UAFG forecast.

2. BACKGROUND

2.1 What is UAFG?

UAFG is the difference between the measurement of the quantity of gas delivered *into the gas distribution system* (receipts) in each period and the measurement of the quantity of gas *delivered from the gas distribution system* (withdrawals) during that period.

UAFG is reported on a rolling 12-month average as a percentage of total receipts into the network. This allows a normalisation of UAFG levels removing any seasonal changes and facilitates benchmarking between peer distribution networks.

Although the calculation of UAFG is performed by the Australian Energy Market Operator (**AEMO**), ATCO as the distribution operator is responsible for the accuracy of receipts and withdrawals of gas.

2.2 Regulatory framework

ATCO is required to comply with the Retail Market Procedures (WA)[1] (**RMP**). Rule 230 of the RMP covers the calculation methodology for UAFG. ATCO, as the network operator, must calculate UAFG (in energy) using the data supplied by pipeline operators under Part 4.5 & 4.3 of the RMP in conjunction with heating management plans as approved by the Building & Energy Directorate (WA) for its network (which has two or more receipt points of differing gas supplies).

The calculation under this methodology results in a 12-month rolling percentage that is subject to daily revision up to 425 days after the gas has passed through the network to the consumers with the most volatility in results in the first 4 months. ATCO reports UAFG percentages as actuals based on a 4-month delay however payments are based on AEMO's month end volumes and reflect actual consumption 4 months after the yearly financial balances.

2.3 What UAFG means for gas customers

Customers ultimately pay for UAFG volumes and ATCO has a target UAFG allowance issued as part of its approved Access Arrangement. This amount is recoverable in the fixed charges and is seen as an incentive for ATCO to reduce losses and processes under the amount which will be reset every new access period. Where UAFG is above the nominated UAFG value, ATCO must purchase the replacement UAFG as part of its operational costs, which in turn creates an incentive to reduce UAFG volumes. Benefits of reduced UAFG amounts flows on to customers as reduced standing charges, while an increase in UAFG adds financial costs, in purchasing replacement UAFG, and additional carbon emission costs. Lowering UAFG levels has financial impacts but also environmental benefits.

2.4 Factors contributing to UAFG

The sources of UAFG can be grouped into three contributing factors:

1. **Measurement uncertainties:** This can include metering uncertainties, reading errors, and pressure and temperature correction (pressure correction factor).
2. **Network Losses:** This can include mains leaks, meter leaks, theft and third party damages.

[1] Australian Energy Market Operator (2022) "Retail Market Procedures". Available at: https://aemo.com.au/en/energy-systems/gas/gas-retail-markets/procedures-policies-and-guides/western-australia

3. **System Errors**: This can include system calculation processes, calculation rounding, data flows and UAFG calculation methodology.

These factors are discussed in more detail below.

2.4.1 Measurement uncertainties

Measurement errors can arise through either gas receipt metering uncertainties or withdrawal metering uncertainties:

- **Receipt metering uncertainties:** Gas receipts are measured through *gate delivery stations;* owned by transmission pipeline operators. In addition, the 'contract to deliver' gas sits with the retailers. Therefore, the vigilance of witnessing the calibration and accuracy of the flow measurement at gate points is typically out of ATCO's control.

  ATCO maintains positive professional relationships with pipeline operators injecting into the distribution network and as such is invited to witness gate measurement element testing. ATCO does take this opportunity but can only suggest resolution of potential issues as ATCO can report measurement errors to AEMO but not enforce investigation or resolution. Third party transmission operators self-prescribe the upper error limit of 1% to their physical gate point metering. This has been adopted in operational agreements between third party operators and ATCO. Due to the significant gas inflows at receipt points, 1% of actual flows equates to a large proportion of error in terms of energy.

- **Withdrawal metering uncertainties**: ATCO has direct responsibility for the accuracy of gas meters. The accuracy of these meters is governed by Gas Standards (Gas Supply and System Safety) Regulations 2000 (**GSSSR**). Part 3 – Metering, Section 15 (3) of the GSSSR prescribes that meters measure gas consumption within a margin of error of:

  - "plus or minus 2% of the actual volume of gas supplied, if the master meter has a badged capacity of more than 7.5 m3 per hour in air; or"
  - "plus or minus 3% of the actual volume of gas supplied, if the master meter has a badged capacity of not more than 7.5 m3 per hour in air."

  ATCO ensures that meters installed on the GDS comply with the current regulations through ATCO's asset procurement procedures and installation processes.

- **Pressure Correction Factor:** ATCO has more than 800,000 meters that are subject to fixed pressures. A pressure correction factor (**PCF**) is applied to compensate metered values for the applied pressure. Encompassed within this factor is an additional correction factor applied to compensate for temperature, atmospheric pressure and an elevation factor (refer Section 6, Technical Guide to the Western Retail Market). This factor is calculated and applied annually using a 10-year rolling average as approved by Building and Energy.

  Meters using external measurement elements like pressure and temperature correction (i.e., industrial customers) compensate measured volumes on a live basis in place of correction factors. Meters using volume correction within the distribution network account for approx. 50% of total withdrawals. ATCO uses standard industry practices in equipment selection and calibration methods to maintain accuracy of flow correction instrumentation. It can therefore be concluded that the metering uncertainties are weighted towards fixed PCF metering where metering is less sophisticated. On this basis, UAFG can increase as domestic metered networks grow. All these metering uncertainties contribute to the UAFG volumes. ATCO continually tries to improve measurement processes to ensure the metered volumes are as close to consumed volumes as possible.

Temperature variation from the 10-year average will result in a higher or lower than average UAFG. If the yearly average ambient temperature is higher than the 10 year average the result will be a low UAFG. If we have a yearly average ambient temperature that is lower than the 10 year average a high UAFG result will be produced.

The summer of 2021 – 2022 broke all previous records not only for the hottest temperatures but also the number of heat waves and days above 38°C. Followed by a mild winter this has resulted in a lower than normal UAFG for this period. ATCO is currently reviewing the PCF methodology to check that this is the best process moving forwards.

2.4.2 Network losses

Network losses include mains leaks, meter leaks, third party damages, and operational usage and are also known as fugitive emissions.

- **Mains and Service leaks:** Mains and services leaks account for a significant proportion of UAFG. As pipework ages, it is typically the joints or fittings that are susceptible to leaks. Leak rates are often reported as the number of leaks per length of pipe, however the actual amount of gas leaking from a particular location depends on a number of factors including orifice size, network pressure, above or below ground and fault type (e.g. damage, corrosion etc.). It is up to ATCO as the network operator to maintain mains and services and minimise leaks. ATCO continues to carry out initiatives to minimise these, as described below.
    - ATCO has a rigorous leak detection program and has embarked on many pipeline replacement projects to replace cast iron and other aging assets. ATCO has also conducted a community gas safety campaign to encourage customers to report gas smells (leaks) normally reported at the meter and in the street that are dealt with as per procedures attached to KPI reporting.
    - ATCO is actively involved in Before You Dig Australia (BYDA) including Board representation. ATCO works closely with BYDA on Third Party Damage prevention strategies and campaign and actively engages in strategies to reduce third party damage that can cause either small leaks or large network breaks. ATCO has also assisted in the development of a third party underground asset detection process along with attending and organising contractor training sessions. This total asset approach and asset replacement program is having a positive impact on the level of UAFG percentages.
    - Operationally as ATCO expands and maintains the network, activities such as commissioning new mains or other activities release limited amounts of gas to the atmosphere when purging for safety reasons. These contribute to UAFG, however ATCO procedures ensure these activities are minimised to achieve the operational objective and do not overly contribute to UAFG.
- **Meter Leaks:** Meter leaks typically occur at the ‘above ground’ joints and fittings that join the meter and consumer pipework with the GDS. Fittings include the meter, valve, regulator, screwed fittings and test point. The majority of these leaks are publicly reported and ATCO attends a customer’s property to carry out required repairs.
- **Theft:** This is considered to be a growing issue due to the inherent hazards of unskilled work with gas, but still relatively uncommon. ATCO works with retailers who suspect theft activity as well as following up on theft identified by ATCO field personnel conducting work such as routine meter change and reactive fault activities. It is difficult to estimate how much this contributes to UAFG.

2.4.2.1 *National Inventory Determination*

The Department of Climate Change, Energy, the Environment and Water through their National Inventory Report 2021[2] determined that UAFG was approximately 30 to 40% of total UAFG. For reporting on emissions, a leakage factor is required, representing the proportion of UAFG that is attributed to leakages in the distribution system. This factor was 0.55 (representing network losses to be approximately 55% of total UAFG). However, in 2020, an internal review of literature, including the 2017 Zincara Review for Victoria's Essential Services Commission[3] and public submissions by other distribution companies, concluded that the proportion of UAFG attributable to leaks was in the range of 35–40 per cent. Based on available reported UAFG gas breakdowns from the annual reports of relevant companies, the Australian Energy Regulator, and the Zincara review, the estimate for the leakage proportion of total UAFG was set to 37.3% from 2017/18 onwards.

2.4.3 System errors

System errors occur as a result of errors in system calculation processes, calculation rounding and UAFG calculation methodology.

- **System calculation processes:** ATCO, via the AEMO UAFG calculation processes, declares the energy content of the delivered gas based on various calculations. ATCO measures the metered volumes of gas at customer premises as uncorrected volumes then converted by algorithms to a corrected volume, which is then converted to an energy value and provided for Retailers to bill customers as energy in mega joules (**MJ**). These processes are all subject to rounding and averaging calculations that add to the uncertainty of measurement.
- **Calculation rounding:** Rounding errors do contribute to UAFG levels however this can fall either positive or negative and is assumed to balance out over a longer period (12 month rolling). Some exceptions on small sub-networks within ATCO's GDS are identified but being a small network it has little impact on the overall UAFG total.
- **UAFG calculation methodology:** The UAFG calculation method sits with AEMO (RMP 230). This method relies on the quality of inputs and is estimated on the current gas day and reconciled back as the billed network deliveries are received (approx. 12,000 reads per working day over approximately a 90-day period). This process under the RMP is reconciled for 425 days. Therefore, depending on the timing of the results this calculation delay will influence the accuracy of these results.

3. UAFG PERFORMANCE

3.1 Historical UAFG

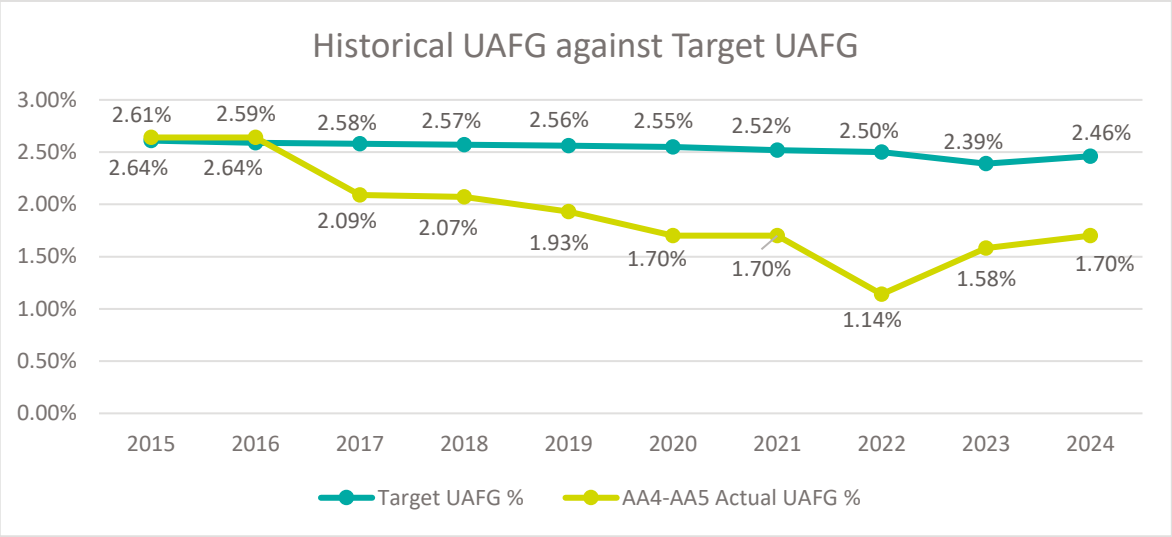
Figure 1 shows the historical performance of UAFG levels in ATCO's GDS. Included were the target rates provided as part of the AA4/AA5 submission.

Note: The hot summer and milder winter of 2021-2022 contributed to the decline in UAFG during that period.

[2] Department of Climate Change, Energy, the Environment and Water (2023) "National Inventory Report 2021" Volume 1. Available at: https://www.dcceew.gov.au/climate-change/publications/national-inventory-report-2021

[3] https://www.esc.vic.gov.au/electricity-and-gas/tariffs-and-benchmarks/unaccounted-gas-benchmarks/unaccounted-gas-benchmarks-review-2017#tabs-container2

Figure 1: Historical performance of UAFG levels against target UAFG over AA4/AA5



The actual UAFG loss until 2022 has remained below the AA5 forecast due to the cumulative impact of UAFG management initiatives such as leak repair and measurement enhancement. ATCO's ongoing improvement efforts continue to yield positive outcomes in reducing UAFG, while the effect of fluctuating environmental factors like seasonal temperature variations on gas measurement is being investigated.

3.2 UAFG Management

ATCO continues to manage UAFG in the GDS through a number of continuous improvement initiatives, and has achieved further reductions in UAFG through:

- Additional accuracy verification tests at third-party interconnections (gate stations) to validate the least metering error possible.
- Strong focus on mains replacement in areas experiencing above-average leakage rates.
- Ensuring accuracy of metering data in the billing system and using the latest data.
- Increasing leak survey and leak elimination activities while utilising better techniques and technology to ensure better sensitivity and precision.
- Theft mitigation.
- Ongoing review of large consumer metering and commercial meter change program.

3.2.1 Accuracy verification testing

ATCO regularly attends gate stations to witness the testing of these facilities by the asset owners, to ensure the test processes and results do not identify issues requiring corrective actions and/or revisions to inflow data.

3.2.2 Mains replacement

ATCO increased the mains replacement program in AA5 and continued in AA6. The reduction in unprotected metallic mains and mains with high leak rates have continued to reduce UAFG.

3.2.3 Leak survey and leak elimination

ATCO has a comprehensive leak survey and leakage response/repair strategy that ensures all detected and reported leaks are attended to in a timely manner. Timely repair of leaks assists in minimising UAFG.

In AA6, ATCO will be increasing leak survey and leak elimination activities while utilising better techniques and technology to ensure better sensitivity and precision in locating leaks on the GDS.

3.2.3.1 Picarro Leak Survey

In 2022, ATCO conducted a successful trial of Picarro gas leak detection technology. The Picarro system equips a vehicle with specialised sensors and gas analysers, allowing the operator to drive parallel (i.e., on the road) the distribution networks and remotely identify leaks. The technology can deliver analytical insights, scalability (allowing ATCO to adjust the leak survey program), and data for mains replacement, enhancing our understanding of network vulnerabilities.

3.2.4 Pressure correction factor reviews

The pressure correction factor used for billing a consumer is important in determining the volume of gas used by that customer. If it is incorrect, it will contribute to UAFG. This correction can be positive or negative depending upon the atmospheric temperature. Hence in the summer there is a lower UAFG whereas the UAFG will increase in winter.

ATCO undertakes annual reconciliations of the PCF recorded in ATCO's billing system to ensure the components of the PCF (including pressure and temperature) are as accurate as possible.

3.2.5 Theft mitigation

Theft of gas contributes to UAFG. To combat theft, ATCO investigates sites where consumption of gas may have changed based on historical usage or where a third-party report has identified an issue.

The quarterly visit by a meter reader identifies instances where a customer has been using gas illegally, via a stolen meter, or via a bypass function, as well as providing a check for the internal administration of meter connection services.

3.2.6 Ongoing review of large gas consumers

ATCO reviews the gas usage of every interval metered customer every day of the year. ATCO has built dedicated applications to allow the Data Management function to review, investigate anomalies and dispatch personnel if required. Due to the size and potential impact on UAFG, interval-metered data (i.e. for large consumers) is analysed on an individual meter basis to identify changes in consumption patterns that could result in UAFG.

3.2.7 Oversized metering

ATCO identified a number of oversized meters in 2018 and 2019 for replacement and the process for identifying and 'right sizing' similar installations has been imbedded into business as usual activities.

3.3 UAFG Benchmark Performance

Figure 2 and Figure 3 shows the UAFG of other gas distribution businesses throughout Australia and suggests that ATCO has one of the lowest UAFG levels amongst its peers. ATCO will continue to implement initiatives to reduce UAFG to continue these leading metrics.

Figure 2: UAFG benchmarking levels against other gas distribution businesses4

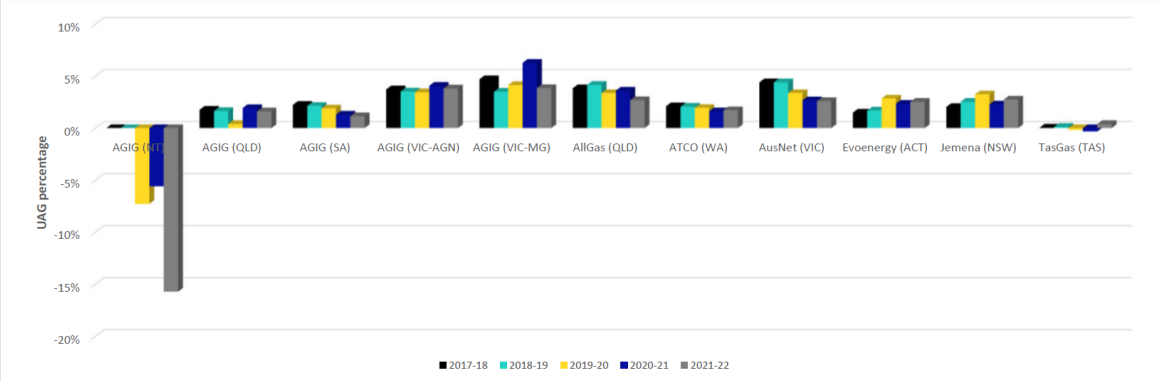
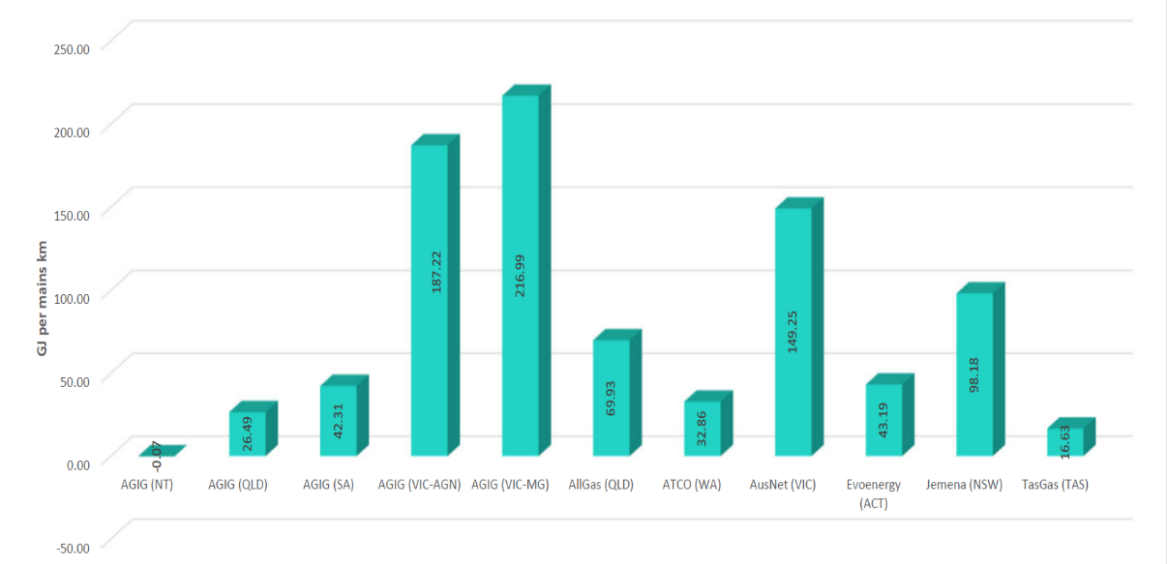


Figure 3: UAFG per km of main benchmarked against other gas distribution businesses



4 Data taken from the "Natural Gas Distribution Benchmarking Report 2021-22" circulated by Energy Networks Australia.

4. PROPOSED UAFG FORECAST

The UAFG in the coastal distribution network has remained below the AA5 forecast due to a combination of factors such as environmental conditions, leak repairs, mains replacement initiatives, and advancements in gas metering technology. Warmer weather typically leads to a lower UAFG percentage as proportionately less volume is delivered via meters. Individual meter create the potential for UAFG due to measurement error or leaks.

The seasonal swing of UAFG is influenced by fluctuations in atmospheric temperature, as seen in the historical low point in 2022. ATCO is actively evaluating the gas measurement process to mitigate the impact of environmental factors on gas measurement accuracy.

Both external and internal audits have been conducted in AA5 period to ensure the integrity of gas measurement, with recommendations for continuous enhancement. While current processes are deemed compliant, ATCO Gas remain dedicated to achieving gas measurement accuracy and excellence by constantly seeking opportunities for improvement in systems and procedures.

4.1 AA6 UAFG volume and percentage forecast

Projected UAFG volume assumptions for the AA6 period are as follows:

- The baseline gas demand forecast used in the model run are provided by an independent third party, Core Consulting.
- Leak rates are assumed to be constant as preventative mains replacement programs counterbalance the uncontrolled leaks resulting from an aging network.
- No allowance has been made in this forecast model to account for unpredictable environmental conditions.

Error! Reference source not found. Below is ATCO's forecast UAFG % over AA6.

Table 4.1: Forecast gas demand and UAFG volume annually over AA6 (2025-2029)

Forecast	2025	2026	2027	2028	2029
Total Gas Inflow (TJ)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Demand Gas Consumption (TJ)	28,340	28,299	28,594	28,392	28,199
UAFG Volume (TJ)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
UAFG %	1.81%	1.78%	1.74%	1.73%	1.72%

% UAFG = UAFG volume / total gas inflow

Total gas inflow = UAFG volume + demand gas consumption

4.2 AA6 UAFG pricing forecast

4.2.1 Commitment to Reduce Fugitive Emissions

The ATCO Gas Australia Sustainability Strategy outlines a number of targets and initiatives to reduce ATCO's impact on Climate Change. One particular commitment is to ensure renewable gases or low carbon alternatives (to natural gas) can be utilised within the GDS.

Introducing renewable gas into the GDS will not alter the volume of UAFG forecasted as per section 4.1. However, pricing for UAFG replacement will vary during the AA6 period due to ATCO's Strategy to replace a portion of UAFG with biomethane as a renewable gas. Sections 4.2.2 and 4.2.3 provide a summary of the proposed forecast volumes and pricing of natural gas and renewable gas, respectively.

4.2.2 Proposed Mechanism for Natural Gas

Following a recent tender process, the price for natural gas is the most commercial offering made by a retailer, for the full five-year period. The price per unit of natural gas UAFG (per unit of energy, typically gigajoule (**GJ**)) is made up of:

- Wholesale cost (i.e. the natural gas wholesale market price).
- Transmission tariff (i.e. the cost of transportation of natural gas to the ATCO GDS).
- Retailer charge (i.e. the retail margin to purchase natural gas).

Table 4.2 provides assumptions on the pricing related to natural gas including wholesale, transmission and retail costs in 2025.

Table 4.2: Price components for Natural Gas in 2025

Price component (for 2025)	Description
[redacted]	Retail Margin (remaining proportion) including load factor ($real as at 1 January 2025)
[redacted]	Transmission tariff ($real as at 1 January 2025 (regulated - fixed)[5]
[redacted]	Forecast natural gas unit price ($real as at 1 January 2025)
[redacted]	Deflation index from December 2024 (January 2025) to December 2023
[redacted]	[redacted]

To maintain consistency with the tariff model, which utilises 2023 cost, an [redacted] per GJ natural gas unit price has been applied in the AA6 forecast UAFG pricing calculation. A deflation index has been applied to the December 2024 / January 2025 unit price to calculate the December 2023 cost.

Whilst the expectation in ATCO's draft submission in September 2023 was a very volatile and variable natural gas pricing, (following quotes received in the initial natural gas tender process in 2023), the Best and Final offers made by two of the three retailers were made with a much lower price than expected as well as the removal of all variable pricing elements (minimum and maximum daily penalties, etc.).

Table 4.3: Forecast natural gas volumes and unit pricing over the AA6 period ($Real as at 31 December 2023)

	2025	2026	2027	2028	2029
Price of natural gas per gigajoule ($/GJ)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Volume of natural gas (TJ)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

4.2.3 Proposed Mechanism for Renewable Gas

The proposed mechanism for volume and pricing renewable gas is detailed in the Renewable Gas Delivery Strategy. ATCO have forecasted partial replacement of UAFG with renewable gas within the AA6 period. ATCO are forecasting that biomethane will be utilised as replacement UAFG in AA6 and the forecast prices and volumes are based on initial commercial discussions with Delorean Corporation, who ATCO have entered into a Memorandum of Understanding (MOU) with to produce biomethane. Based on planning to date, it is forecast that biomethane will be available to ATCO from 2027. The unit price and forecast volume for this renewable gas is given in Table 4.4.

The required expenditure, infrastructure plans and specific details related to the volumes and pricing of renewable gas are available in the Renewable Gas Delivery Strategy.

Table 4.4: Forecast renewable gas volumes and unit pricing over the AA6 period ($Real as at 1 January 2025)

	2025	2026	2027	2028	2029
Price of Biomethane per gigajoule ($/GJ)	-	-	[redacted]	[redacted]	[redacted]
Volume of Biomethane (TJ)	0	0	[redacted]	[redacted]	[redacted]

4.2.4 AA6 UAFG costs

Two tender processes were run in late 2023 and early 2024 and the most commercial quote has been selected and contractual negotiations are underway to enter into a five-year supply agreement. A unique new contractual element needed to be incorporated, allowing ATCO to procure biomethane when it is available from a third-party retailer, with the remaining UAFG requirement “topped up” with natural gas.

The forecast total annual cost of UAFG is provided in Table 4.5. This reflects the sum of:

- the assumed volume of UAFG (section 4.1),
- multiplied by the assumed cost of each of:
  - natural gas (Table 4.5); and
  - biomethane (Table 4.4)

for the forecast volume that ATCO proposes to purchase to replace UAFG.

Table 4.5: Forecast UAFG annual costs over AA6

AA6	2025	2026	2027	2028	2029	Total
[redacted]						
[redacted]						
[redacted]						
[redacted]						
Total UAFG Cost (AU$)	$5,956,760	$5,859,600	$5,882,638	$5,910,424	$5,946,525	$29,555,947

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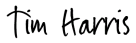
5. DOCUMENT APPROVAL

	Title	Name	Signature	Date
Owner:	Manager Network Control	Ann Chong		31-May-24
Reviewer:	General Manager Matt Marshall	Matthew Marshall		31-May-24
Reviewer:	General Manager Business Development	Lou Cuddihy		31-May-24
Approver:	Financial Controller - Gas	Tim Harris		03-Jun-24

6. DOCUMENT HISTORY

Rev	Date	Amended By	Reason for Change
0	30/06/2023	Ann Chong	Document Updated for AA6. New Appendices created.
1	30/05/2024	Ann Chong	2023 actual UAFG % calculated and updated based on RIN submission. 2024-2029 UAFG forecast model run is in accordance with the latest AEMO UAFG data and Core Consulting forecast gas demand, and the data are correct as of the time of calculations (15 May 2024). Updated Section 4.1 and 4.2 Updated Appendix A Updated Executive Summary

APPENDIX A. PROPOSED UAFG MANAGEMENT PLAN

This UAFG strategy framework provides a comprehensive overview of the present status of UAFG management, along with a forward-looking perspective. It outlines a series of proposed actions aimed at bridging the gap and achieving the desired outlook for UAFG management.

	Current State	Actions to Close Gaps	Future State
Gas receipt and delivery measurement accuracy improvement	• Significant negative UAFG recorded in summers (11/2021-03/2022) • Seasonal temperature variations • Varying gas usage profile • Interval meter accuracy ±2% and NSL meter accuracy ±3% • Industrial customers / gate station oversized meter • End of life meters need retiring, not refurbishment	• Apply daily flow weighted pressure correction factor • Tracking meter accuracy before and after refurbishment • Use new technology meter at EOL • Review meters age profile • Replace oversized meters	• Stabilise UAFG w.r.t atmospheric temperature • Ensure commercial meter accuracy is stable and consistent over 5 years period for turbine and 10 years period for rotary and diaphragm • More accurate meters
Customer billing methodology	• Application of one annual temperature & pressure correction factor in NSL gas billing calculation • North gas is flowing South • Under billing in winter & over billing in summer	• Apply daily flow weighted pressure correction facto to attenuate UAFG seasonal swing • Review the feasibility of segregating North network from the South network, weighted against gas supply security	• Ensuring customer is billed correctly to gas zone. • North Metro and South Metro gas zones containment, no North gas flowing South.
Greenhouse Gas emission reduction	• Effective leak detection & repairs initiatives • Routine leak survey program • Ongoing mains replacement program • Timely reactive faults response to SOGs / broken mains & services • Hydrogen injection into NG network to 3,000 domestic customers • UAFG is low compared to other gas operators in Australia	• Introduction of Picarro leak survey car • Renewable gas injection into the natural gas network to offset UAFG (through	• UAFG replacement using renewable gas • Biomethane blending into the natural gas network • Maintaining leak rate across the gas distribution network