

South Australian Mains Replacement Program

**APGA Safety Award Category 1:
Effective Management of an Ongoing
or Emerging Safety Risk**

Australian Gas Infrastructure Group



“We should all feel incredibly proud of what has been achieved. These are landmark accomplishments that will benefit customers, communities and the energy system for many years to come.”



Craig de Laine
CEO, AGIG

Executive Summary

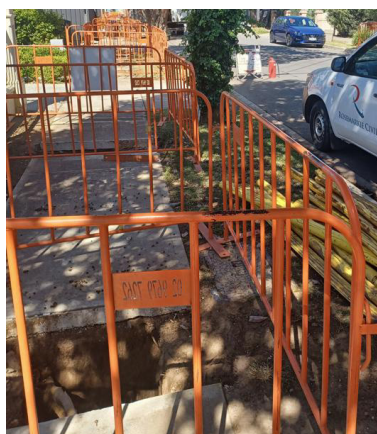
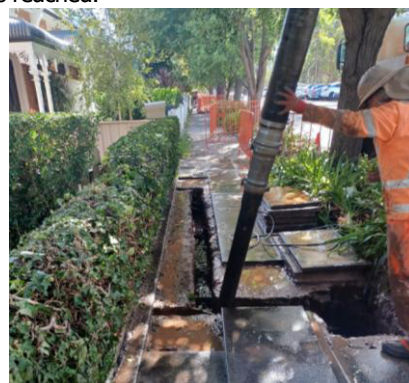
In 2026, Australian Gas Networks (AGN), part of the Australian Gas Infrastructure Group (AGIG), completed a significant milestone through the removal of all legacy cast iron and unprotected steel mains in its South Australian distribution network. This marked the completion of a decades-long safety program targeting the asset classes responsible for the network's greatest failure and leakage risk.

By 2026, every legacy cast iron and unprotected steel gas main has been removed from the South Australian network, and the network's overall risk profile has been brought to a level that is as low as reasonably practicable (ALARP). Central to this result was a delivery model that engineered safety directly into the commercial arrangements and made it a key determinant of future work allocation, aligning commercial incentives so that safe delivery and program pace reinforced rather than competed with one another.

This achievement is the culmination of a multi-decade, risk-based modernisation program in which ageing mains, the network's highest source of failure, leakage and public safety risk, have been systematically replaced with modern polyethylene pipelines. In total the program has rehabilitated approximately 4,200 kilometres of mains and represents significant long-term investment, serving more than 500,000 homes, businesses and essential services across metropolitan Adelaide and regional South Australia.

Crucially for safety, removing these assets has cut the volume of gas escaping into the ground and the surrounding environment. Unaccounted-for gas (UAFG) has fallen from a peak of over 2 PJ per year to approximately 300 TJ per year, and reportable methane emissions have dropped by more than 60% (from roughly 200,000 tCO₂-e in 2005 to around 78,000 tCO₂-e in 2025). The program delivered substantial decreases to fugitive emissions.

The program demonstrates how large-scale asset replacement, combined with a risk-informed control framework and a safety-led delivery model that makes safety performance a condition of future work, can deliver sustained, measurable and durable improvements in public safety. It also shows how those same controls keep delivering value long after the headline milestone is reached.



On-the-ground delivery of the Mains Replacement Program strengthening safety, reliability and performance

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1. >80% decrease in incidents occurred between 2017-2026 (see p6 for further detail)

Background: Strengthening Long-term Network Safety and Integrity

South Australia's gas distribution network has origins dating back to the 1860s, originally supplying town gas. Over time, the network evolved, and by the 1960s a modern natural gas system was established across the state. Much of this infrastructure was constructed using materials standard for the period, including cast iron, unprotected steel, and early-generation polyethylene.

By the late 1970s the gas main replacement activities commenced. Early programs through the 1980s were limited in scale and did not keep pace with the deterioration of ageing infrastructure.

In the early 1990s, the program expanded significantly with delivery rates reaching approximately 300 km per year. This period established key delivery foundations including improved planning practices, workforce capability development and the introduction of new construction tools and methodologies. These early programs, delivered under previous operators, created the platform for the modern program and demonstrated the scale of delivery achievable with appropriate planning, training and incentives.

Despite this progress, by the early 2000s a significant proportion of legacy cast iron and unprotected steel mains remained in service. These assets were increasingly contributing to higher leakage rates, safety risk and declining network performance.

This context drove the transition to a modern, risk-based mains replacement initiative, focused on systematically reducing safety risk, improving network integrity and addressing fugitive emissions associated with ageing infrastructure.

AGN's South Australian distribution network supplies more than 500,000 homes, small businesses and industrial customers across metropolitan Adelaide and regional South Australia. The diversity of these customers highlights the critical role of reliable and safe gas supply. Households rely on gas for cooking, heating and hot water. Small businesses such as cafes and restaurants depend on it to operate and contribute to local economies. Essential services, including hospitals and aged care facilities, rely on consistent and dependable energy to support some of the community's most vulnerable members.

At the same time, large industrial users depend on gas to maintain production and support South Australia's broader economic activity. Programs like the Mains Replacement Program play a vital role in future-proofing the network and helping to ensure that gas can be delivered safely into the future, supporting the continued growth of South Australia.



Acknowledgment of Country

Australian Gas Infrastructure Group acknowledges the Traditional Custodians of the lands upon which we live and operate, and we pay our respects to Elders past, present and emerging. We recognise Aboriginal and Torres Strait Islander peoples' historical and ongoing connection to land and waters, and ³ we embrace the spirit of reconciliation.

Safety Context and Risk Identification

The case for intervention rested on a clear understanding of how an ageing distribution network fails and why those failures matter. As cast iron and unprotected steel mains age, they become more prone to cracking, fracturing and joint failure, each of which can release gas into the ground and the surrounding environment.

Before controls were scaled, AGN developed a clear, evidence-based understanding of the risk:

- Ageing mains presented an increasing risk of asset failure, including leaks and fractures. Cast iron and unprotected steel were identified as the highest-risk classes due to their age, characteristic failure modes and proximity to populated areas.
- Analysis of network performance showed rising unaccounted-for gas, with leakage from ageing assets a major contributor. At peak, UAFG exceeded 2 PJ per year, with approximately 80% attributed to fugitive emissions from the network.
- Legacy mains were losing an estimated 800 to 1,000 GJ per kilometre each year. Every one of those leaks represented a safety consideration as well as an environmental and economic loss.

Rising UAFG was treated as more than an efficiency or emissions metric. It was a direct indicator of declining network integrity, signalling where gas was escaping and where the likelihood of a safety event was greatest. Because roughly 80% of UAFG was attributable to fugitive emissions, reducing it would deliver a safety benefit and an environmental benefit at the same time. This dual benefit framed the program from the outset and reinforced the case for systematic, rather than reactive, intervention.

Together, this characterisation established the safety, economic and environmental case and directly informed the prioritisation logic described in the following section. It also aligned the program with strategic pillars, including 'A Leading Employer' through its focus on 'Health and Safety', 'Customer Focussed' through 'Public Safety', and 'Sustainable Communities' through reduced emissions and a more resilient network.

Our Vision

To deliver infrastructure essential to a sustainable energy future

Our Strategic Pillars

Customer Focussed

Public Safety
Customer Experience
Cost Efficient



A Leading Employer

Health and Safety
Employee Experience
Skills Development



Operational Excellence

Profitable Growth
Benchmark Performance
Reliability



Sustainable Communities

Enabling Net Zero
Environmentally Focussed
Socially Responsible



"These milestones are a testament to the dedication, expertise and perseverance of our South Australian teams. For more than 20 years, our people have worked to deliver a safer, more reliable network for customers, while also laying the foundations for the future of renewable gas."



Craig de Laine
CEO, AGIG

A Systematic, Risk-Informed Approach

Risk-Based Program Design

The program moved beyond reactive replacement to a structured, whole-of-network prioritisation of risk. Assets were systematically assessed against material, age, pressure, historical performance and proximity to customers and the public. This enabled targeted intervention, ensuring the highest risk assets were addressed first while optimising delivery efficiency.

Control Strategy

A comprehensive control framework was implemented which aligned with ISO 31000 and AS/NZS 4645, ensuring risks were managed to ALARP. Primary controls included:

- Targeted asset replacement to permanently remove risk
- Inline camera inspection and reinforcement to mitigate risk in polyethylene mains
- Ongoing monitoring and inspection programs

These were supported by additional measures including enhanced leak surveys, pressure management, odourisation and targeted engineering controls to reduce the likelihood and consequence of gas releases.

Delivery Model and Safety-Led Procurement

The program established a structured, safety-led delivery model to support scalable execution.

A panel of six prequalified contractors was created, all meeting strict competency and safety requirements.

This approach ensured delivery capacity was diversified while maintaining consistent safety standards.

Work was packaged geographically and competitively tendered across the panel. Contractor selection was based on:

- Safety performance
- Capacity to deliver
- Commercial competitiveness

Innovation and Technical Excellence

The program's most transferable innovation is not a single technology but the way safety was engineered into the commercial model. Safety performance was made a key determinant of future work allocation for contractors. Combined with visibility of future work opportunities, this aligned commercial incentives from both parties driving significant improvements to the safety of workers while delivering the project.

This was underpinned by a centralised performance database capturing safety, quality and delivery metrics for each contractor giving AGN an objective, auditable basis for allocation decisions and continuous improvement.



Pictured: Teams in the field working to upgrade legacy pipes.



Measurable Safety Outcomes

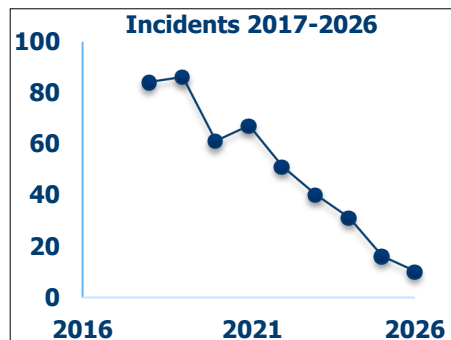
By 2026, the program had removed all cast iron and unprotected steel mains from the network, permanently eliminating the asset classes responsible for the highest share of failure and leakage risk. The overall risk profile has been reduced to ALARP.

Performance Management & Assurance

Contractor performance was actively managed through a centralised database capturing safety, quality and delivery metrics. A forward pipeline of work was shared with contractors, aligning incentives and encouraging sustained high performance. Extensive assurance activities were undertaken, including in 2025 alone:

- 231 audits of completed work
- 118 FLA audits
- 459 Pre-starts
- 366 management interactions (contractor to AGN management personnel)
- 187 Procedure Reviews

As safety became a key determinant of future work allocation, contractors responded with improved behaviours, contributing to a significant reduction in incidents and asset strikes over time.

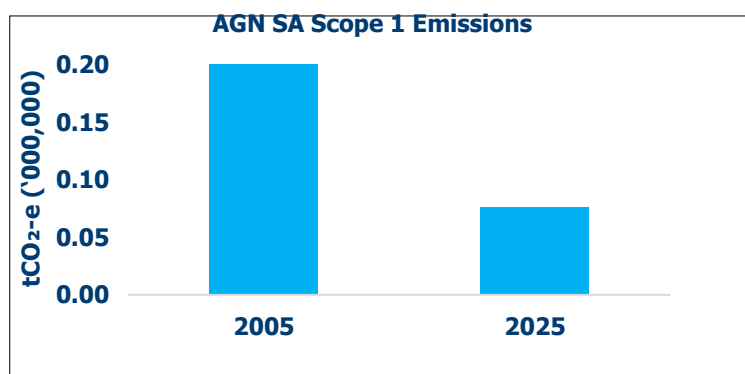


A Safety Cultural Change Plan was implemented in CY'21 to drive improvements in safety performance, with new initiatives introduced each year to support continuous improvement. This has led to significant improvements across capital delivery, including reductions in both incidents and injuries

Leakage and Emissions Reduction

Prior to the program, leakage from legacy mains was a significant contributor to network performance, with estimated losses of approximately 800 to 1,000 GJ per kilometre per year. UAFG peaked at over 2 PJ per year, with the majority attributed to fugitive emissions.

Through systematic asset replacement and targeted interventions, UAFG has reduced to approximately 300 TJ per year, representing a step-change improvement in network integrity. This has directly contributed to a reduction in methane emissions, with reportable emissions decreasing from approximately 200,000 tCO₂-e in 2005 to around 78,000 tCO₂-e in 2025, representing a reduction of more than 60%.



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