



Gas Loss Analysis and Improvement Strategy Report 2020-2024

Gas Loss Across the CGD Network



Examine

- Gas losses across CNG and PNG segments in the City Gas Distribution Network
- Loss Trends
- Contributing Factors



Identify & Recommend

- Areas for improvement
- Future action plan
- Challenges encountered
- Resolutions of Challenges
- Directions for improvement
- Contain and Reduce system wide losses
- Align with Net Zero objectives
- Monitoring Mechanism



Focus Areas

- Environment Impact
- Sustainability

Data Collection



Standardized format across all geographic areas

SI	GA ID	GA Name	Segment	Year	Intake	Billed	Own use	Loss	% Loss
			Overall						
			CNG						
			PNG						
			PNG D						
			PNG C						
			PNG I						

Analysis done based on Data submitted by entities in response to the format





Methodology



Data Analysis

Historical data analysis from 2020-2024, including segment-wise and entity-wise performance metrics



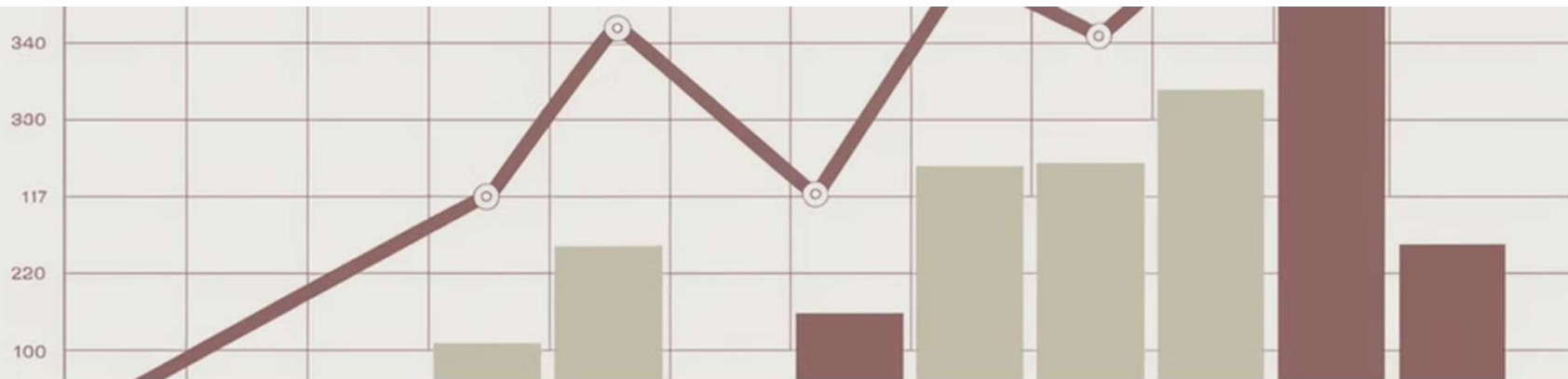
Pattern Recognition

Seasonal and geographic pattern analysis, technical and operational factor assessment



Sustainability Assessment

Environmental impact assessment and sustainability alignment evaluation



Executive Summary

1 Overall Performance

Average overall losses decreased from **2.96%** in 2020-21 to **2.33%** in 2023-24*.

However, entity specific analysis reveals significant variations

2 Segment Variations

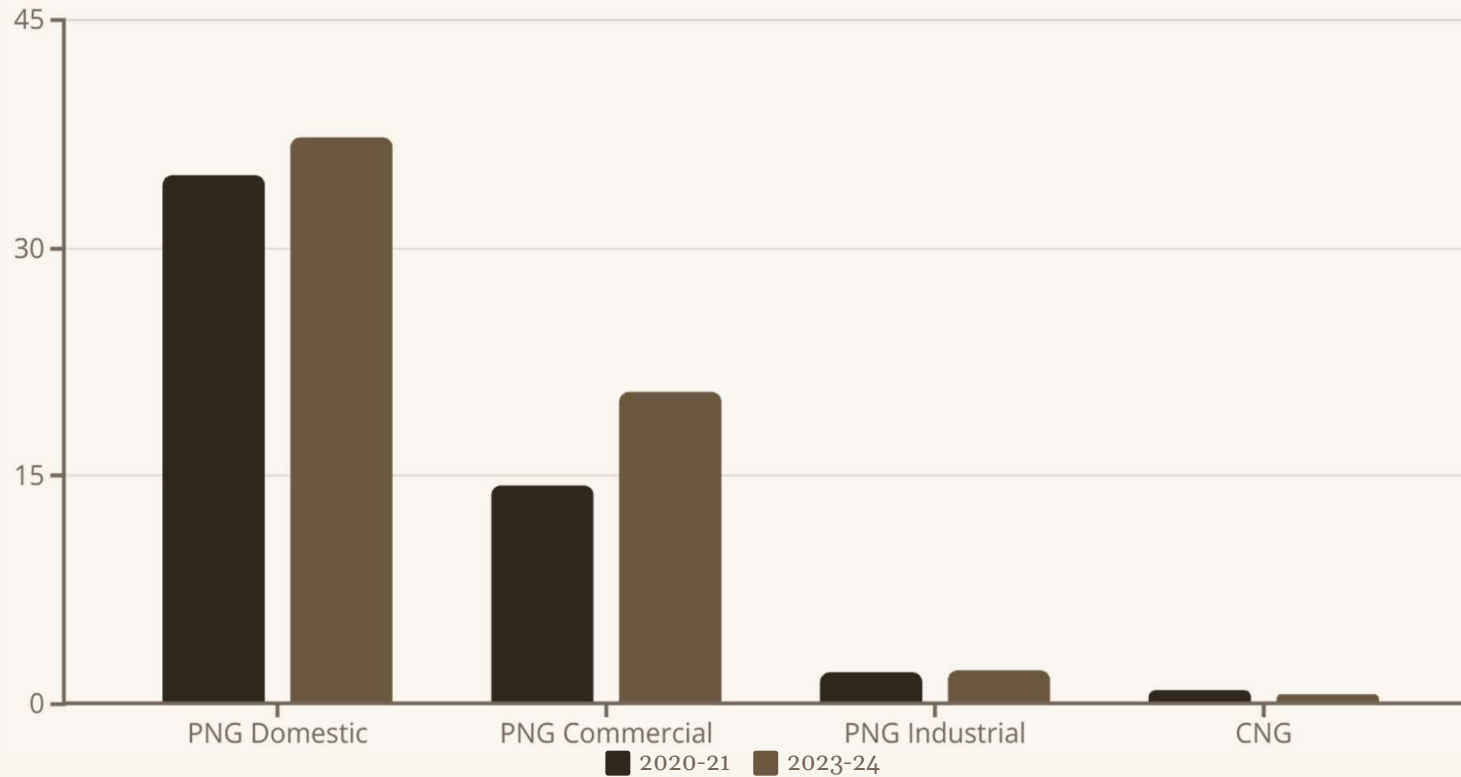
CNG segment shows excellent performance (**0.81% - 0.64%**)

PNG segments demonstrate higher losses, i.e. **4.75% to 6.07%**

3 Improvement Strategy

A structured three-phase improvement strategy aims to achieve entity wide losses at par with the best performer and then strive to go below **2% within 36 months**, with special attention to environmental impact and sustainability goals.

Key Insights: Segment-wise Performance

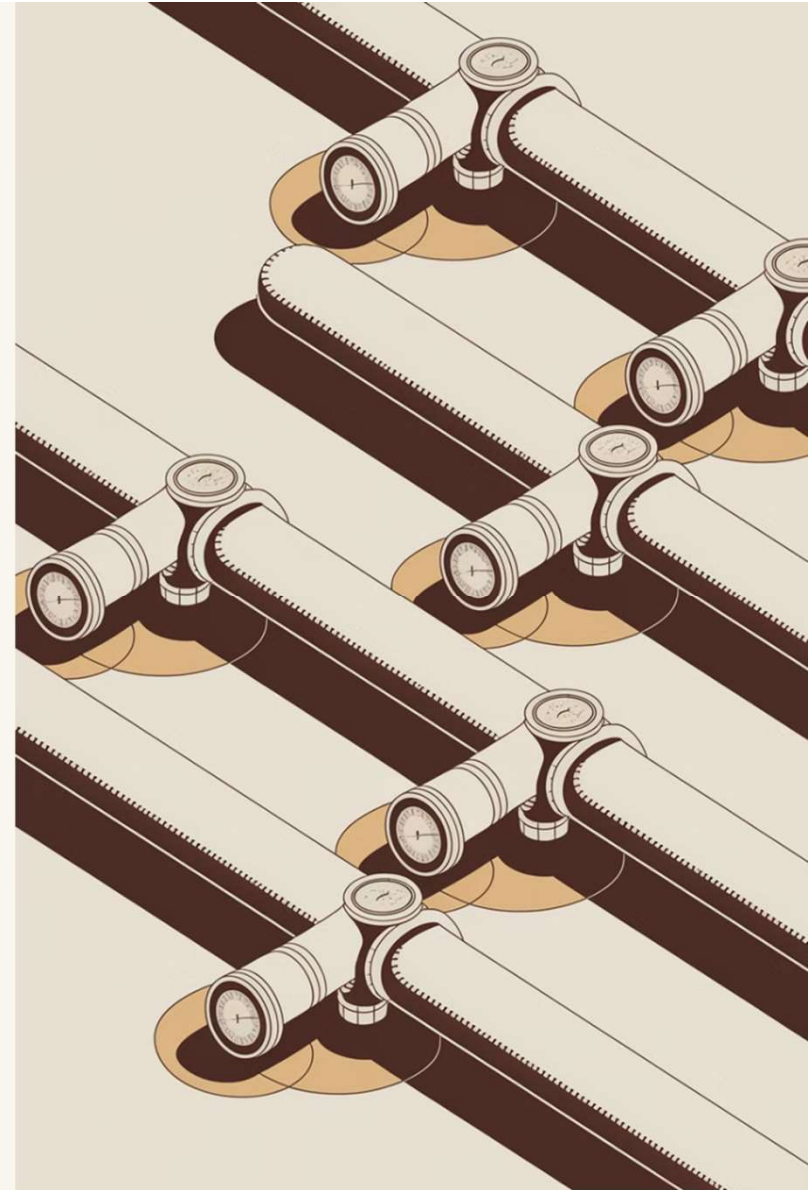


Stark contrast in performance across different segments.

While CNG shows consistently low losses, PNG Domestic and Commercial segments demonstrate significantly higher loss percentages, indicating areas for focused improvement.

Overall CGD Performance Trends

- 1** — **2020-21**
Overall loss percentage: 2.96%
Baseline year for performance assessment
- 2** — **2021-22**
Overall loss percentage dropped to 1.93%
Significant improvement from baseline year
- 3** — **2022-23**
Slight increase in overall loss percentage
Reversal of positive trend from previous year
- 4** — **2023-24**
Overall loss percentage: 2.33%
Improvement from baseline but higher than 2021-22



Overall Entity Performance Variation and Concerns

1 Concerning Trend

Some entities showed increasing losses over time, with one entity's losses rising dramatically from 8.99% to 15.13% over three years, indicating potentially serious operational issues.

2 Consistent High Losses

Several entities persistently maintained high loss percentages around 9–10%, suggesting systemic problems that require comprehensive intervention strategies.

3 Best Performer

Some CGD entities consistently maintained exceptionally low losses (1–1.3%), demonstrating that operational excellence is achievable across the network with proper systems in place.

4 Data Gap

Data gaps were also observed, with some entities unable to report suggesting inadequate monitoring mechanisms or inconsistent data collection processes that needs to be addressed.



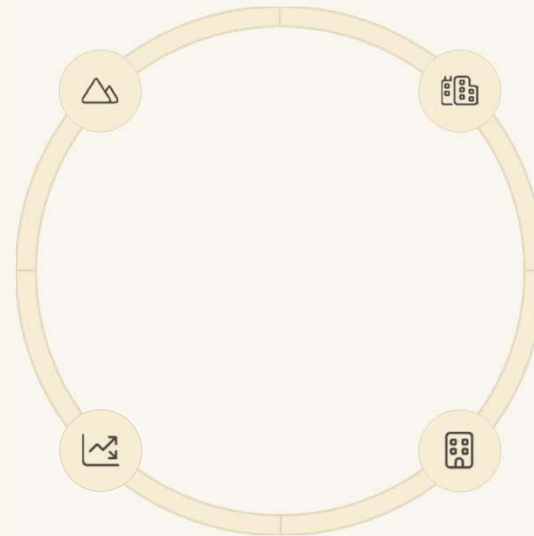
Regional Performance Patterns

Challenging Terrain

Entities operating in difficult geographical conditions showed consistently **higher losses**, indicating that terrain-specific strategies are needed.

Infrastructure Age

Clear correlation between network age and loss percentages, with newer infrastructure generally showing better performance metrics.



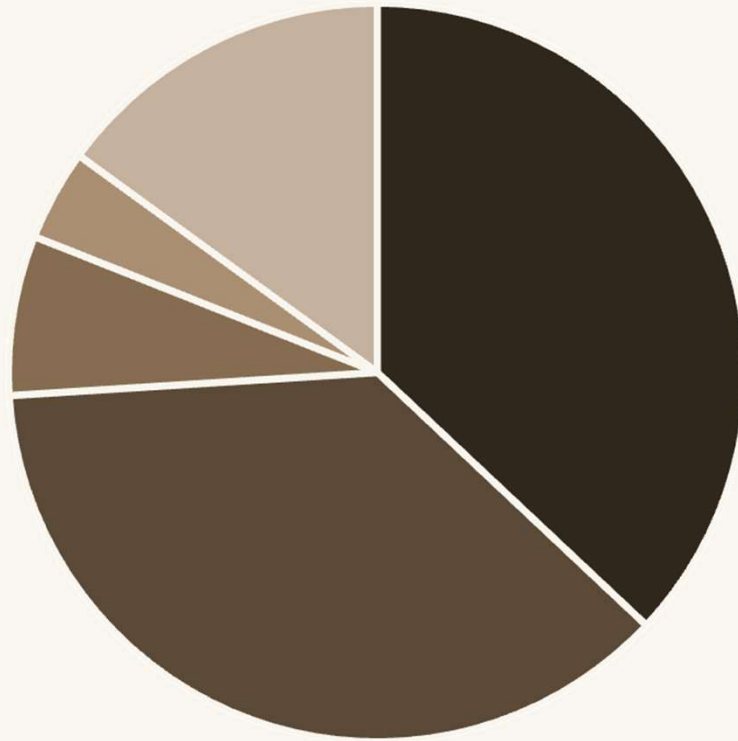
Metropolitan Areas

Operators in major cities generally demonstrated **better performance** with lower losses, likely due to better infrastructure and monitoring capabilities.

Developing Markets

Entities in emerging markets showed **higher losses** compared to established markets, suggesting the need for enhanced technical support and knowledge transfer.

Overall Category Distribution (2023-24)



0-2%

2-5%

5-10%

10-20%

Other

Distribution of entities across different loss categories.

37% of entities maintain losses under 2%, while another

37% fall in the 2-5% range.

This indicates that while many entities are performing well, there's significant room for improvement across the sector.

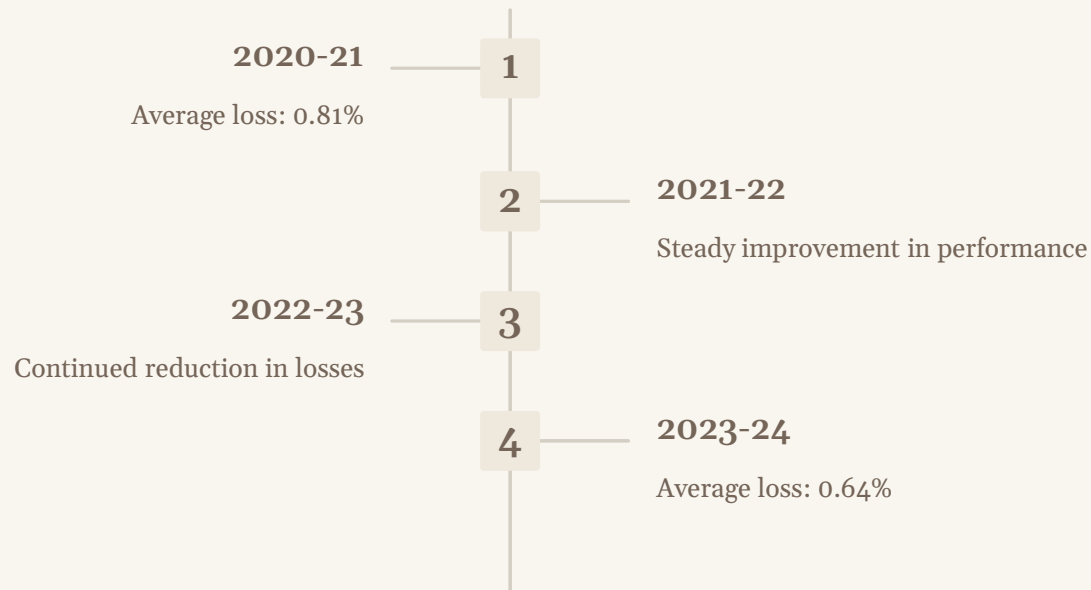
Areas of Concern in Overall Performance



These concerning performance metrics require immediate attention through targeted interventions to prevent further degradation and bring overall system performance in line with industry benchmarks. Prioritizing these entities for immediate action will yield the most significant improvement in system-wide performance.



Overall Performance in CNG Segment



CNG Segment: Performance Overview



Key Concerns in CNG Segment

1 Entity 1

Showing high losses of 5.94%, significantly above the segment average

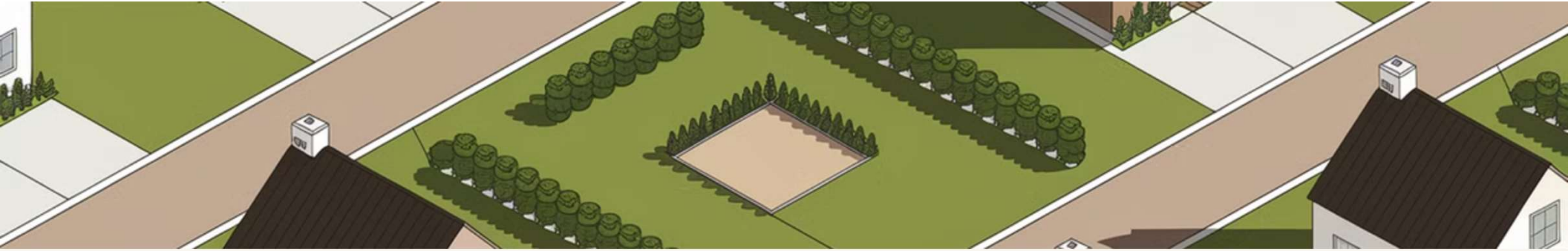
2 Entity 2

Reporting 4.49% losses, indicating need for improvement

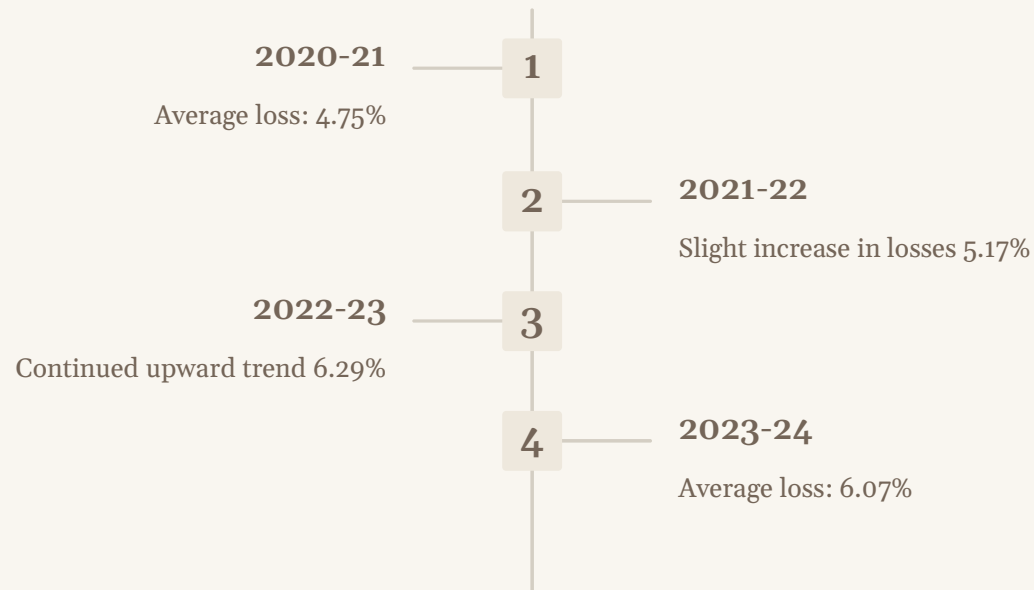
3 Entity 3

Reporting negative losses (-1.96%), suggesting potential monitoring or reporting errors





Overall Performance in PNG Segment



Key Concerns in PNG Segment

1 Entity 1

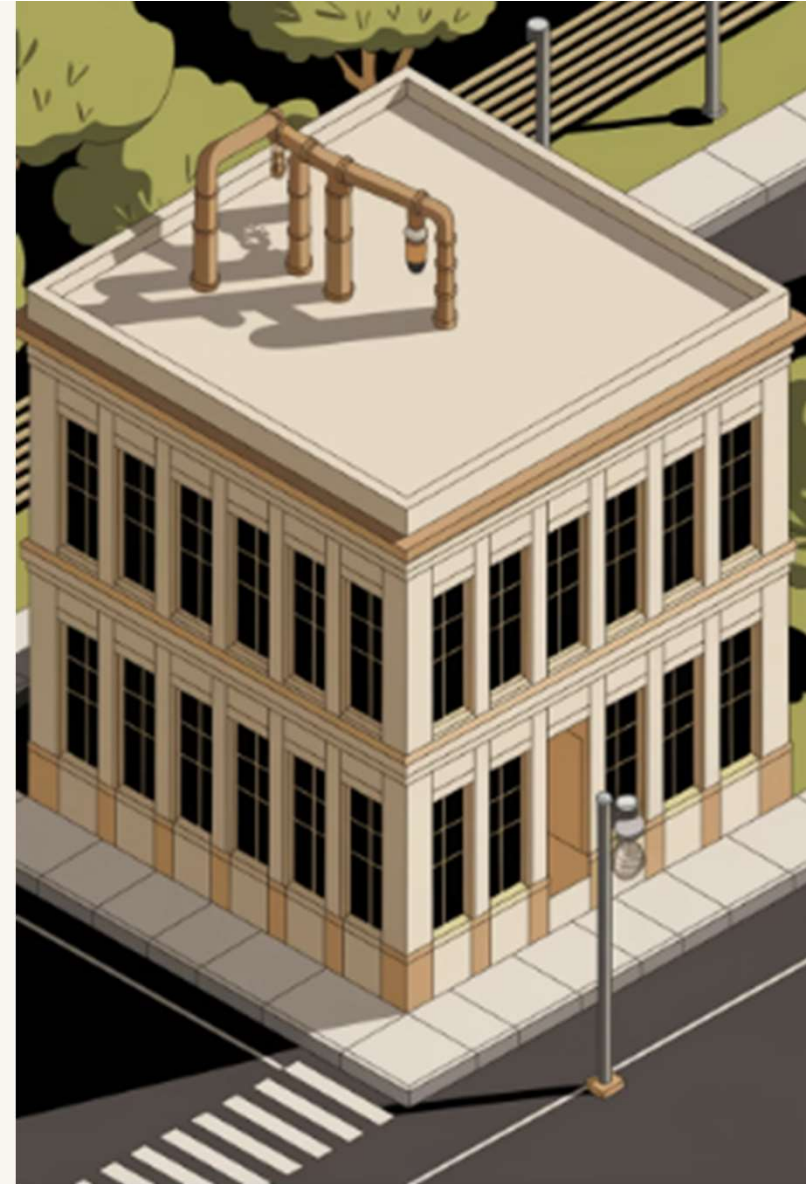
Showing high losses of 35.51%, significantly above the segment average

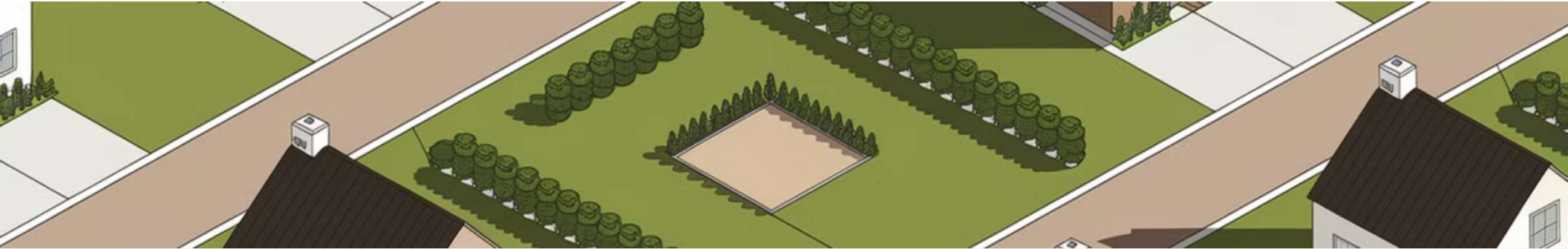
2 Entity 2

Reporting 29.46% losses, indicating drastic measures for improvement

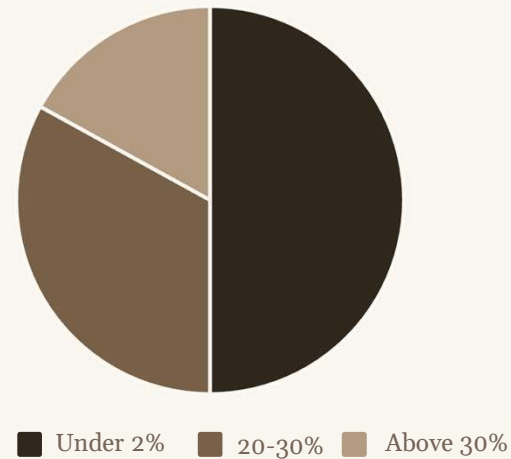
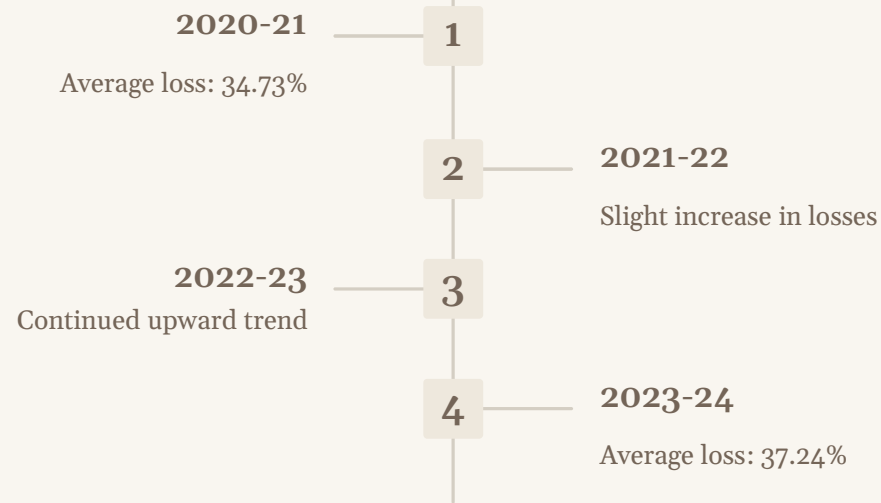
3 Entity 3

Reporting negative losses (-0.12%), suggesting potential monitoring or reporting errors





Performance in PNG D Segment



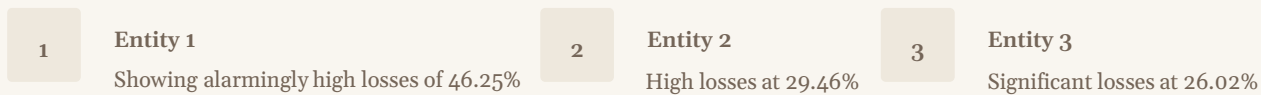
The PNG segment shows concerning performance

Only 50% of entities maintaining losses under 2%.

Alarming, 33% of entities fall 20-30% category loss range,

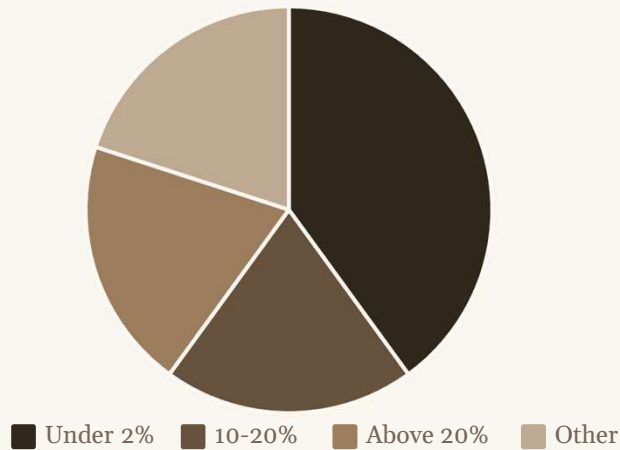
17% show losses above 30%, indicating significant challenges in this segment.

Key Concerns in PNG D Segment



Performance in PNG C Segment

- 2020-21**
Average loss: 14.35%
- 2021-22**
Increase in losses
- 2022-23**
Continued upward trend
- 2023-24**
Average loss: 20.56%



The PNG Commercial segment shows mixed performance

40% of entities maintaining losses under 2%.

20% fall in the 10-20% loss range,

20% show losses above 20%,

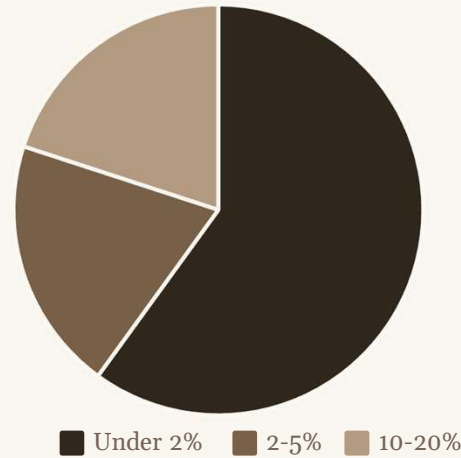
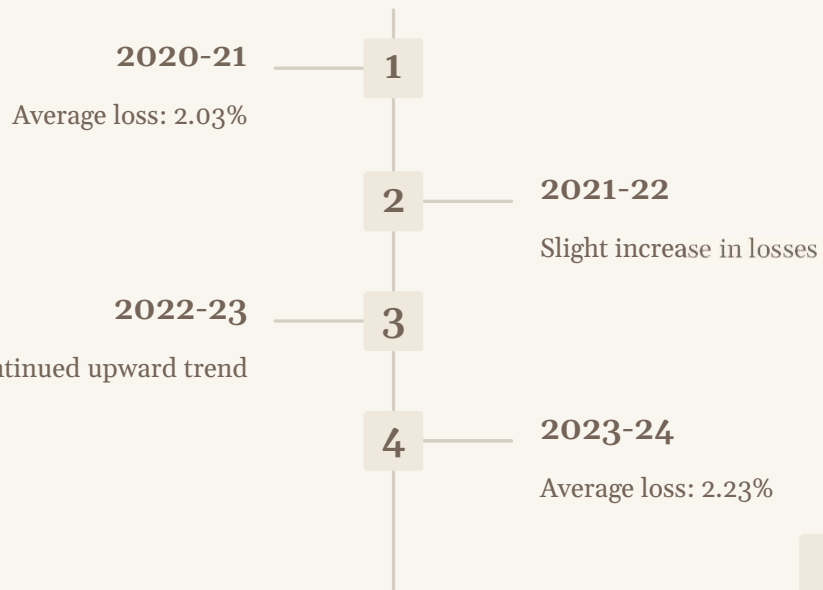
indicating significant room for improvement in this segment.

Key Concerns in PNG C Segment

- Entity 1**
Showing high losses of 26.02%
- Entity 2**
Significant losses at 10.48%
- Overall Trend**
Increasing trend in overall segment losses from 14.35% to 20.56%



Performance in PNG I Segment



The PNG Industrial segment shows relatively better performance

60% of entities maintaining losses under 2%.

However, 20% fall in the 2-5% loss range, and

another 20% show losses in the 10-20% range, indicating some areas for improvement.

Key Concerns in PNG I Segment

- Entity 1**
Showing high losses of 13.19%
- Slight Variations**
Minor fluctuations in performance of other entities
- Limited Improvement**
Minimal progress in reducing losses over the years

Loss Contributing Factors: Technical

1 System Leakages

Aging infrastructure and poor maintenance leading to gas leaks

2 Metering Inaccuracies

Faulty or uncalibrated meters resulting in incorrect consumption readings

3 Equipment Venting

Uncontrolled or excessive venting during maintenance or operations

4 Operational Losses

Inefficiencies in gas handling and distribution processes



Loss Contributing Factors:

Operational Patterns

Demand Periods

Losses observed during times of lean gas demand, potentially due to system build up

Geographic Variations

Significant differences in loss patterns across different geographic regions

Infrastructure Age

Strong correlation between the age of infrastructure and higher loss percentages

Maintenance Practices

Impact of regular and proactive maintenance on loss reduction clearly evident

Understanding these contributing factors is crucial for developing targeted interventions that address the root causes of gas losses rather than merely treating symptoms.

Both technical and operational factors must be addressed in a comprehensive improvement strategy.



Approach: Governance Structure



Task Force

Establish Gas Loss Reduction task force



Working Groups

Create segment-specific working groups



Reporting Frameworks

Develop comprehensive reporting frameworks



Review Mechanisms

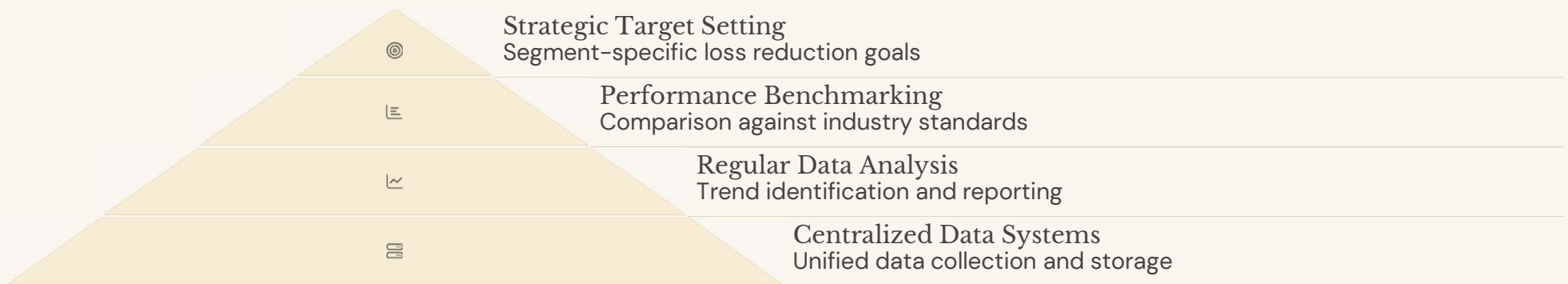
Set up regular review mechanisms



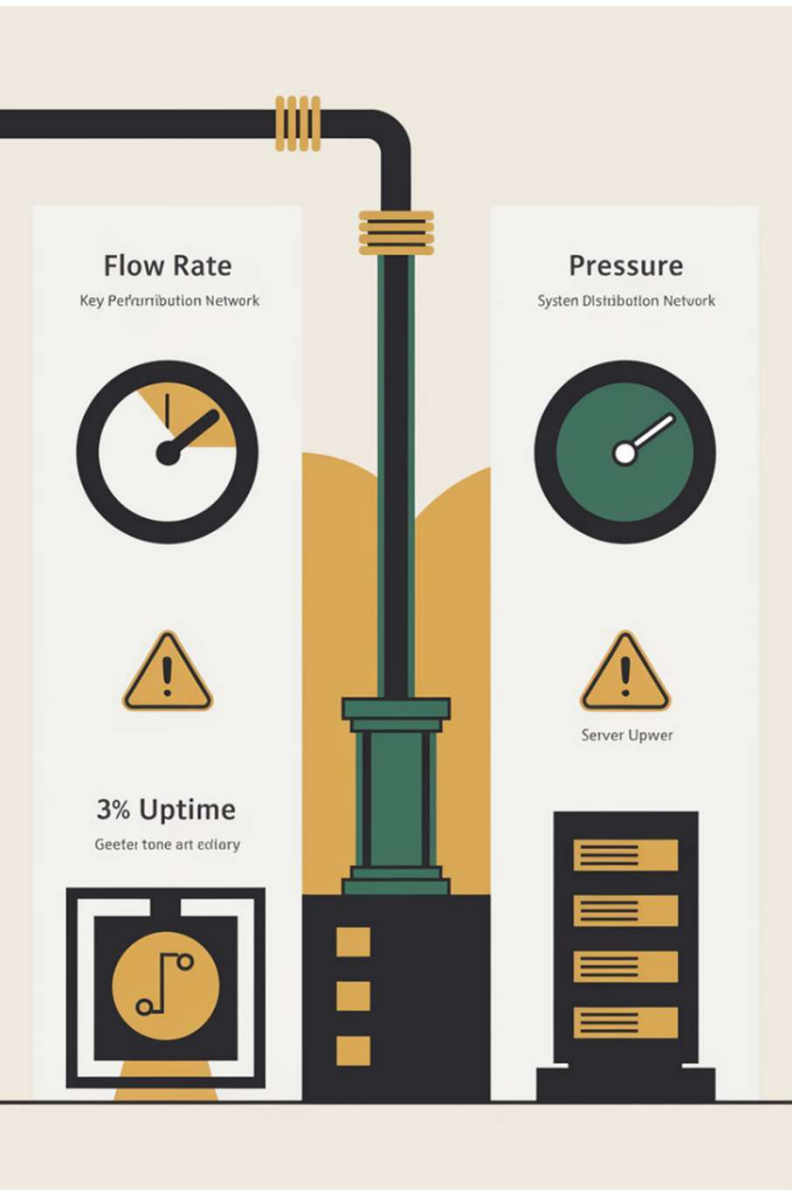
Quick Wins

- 1 Pilot Programs**
Launch pilot programs for loss reduction in critical areas
- 2 Basic Monitoring**
Implement basic monitoring and review mechanisms
- 3 Staff Training**
Begin initial staff training on loss reduction techniques
- 4 Data Collection**
Start comprehensive data collection for detailed analysis

Data Management & Analysis Framework



A robust data management framework forms the foundation for sustainable improvement efforts. By centralizing data collection, establishing regular analytics protocols, implementing benchmarking practices, and setting clear targets, entities can drive continuous improvement through data-driven decision making.



Monitoring & Performance Management

Key Performance Indicators

Establish **comprehensive KPIs** for each segment with clear targets and reporting protocols. **Performance metrics** should include both technical parameters and financial impact measures.

Regular Review Cycle

Implement monthly **operational reviews**, **quarterly performance assessments**, and annual **strategic evaluations** to maintain momentum and **ensure accountability at all levels**.

Continuous Improvement

Develop mechanisms for capturing **lessons learned**, implementing **best practices**, and **driving innovation** across all entities to create a culture of excellence.

The monitoring framework should balance the need for detailed operational insights with strategic performance tracking, ensuring that both day-to-day operations and long-term improvements are effectively managed.



Three-Phase Improvement Strategy

Phase 1: Short-term (0-6 months)

Establish governance structure, implement quick wins, and begin basic monitoring to create immediate momentum

Phase 2: Medium-term (6-18 months)

Execute infrastructure updates, enhance process improvements, and implement comprehensive monitoring systems

Phase 3: Long-term (18-36 months)

Identify and Complete system modernization, deploy advanced analytics, and establish predictive maintenance to achieve sustained performance excellence

This phased approach balances the need for immediate results with strategic long-term improvements, creating a sustainable path to reduce overall losses below 2% within 36 months while aligning with environmental goals.



Conclusion and Next Steps

Significant Improvement Potential

Analysis reveals substantial opportunities to enhance system performance and reduce losses

Structured Implementation Path

Three-phase strategy provides a clear roadmap to achieve losses at par with Industry best preferably below 2% within 36 months

Balanced Approach

Success requires integrating immediate operational improvements with strategic infrastructure modernization

By implementing this comprehensive strategy with a strong focus on environmental sustainability and operational excellence, the City Gas Distribution Network can significantly reduce losses while aligning with broader net-zero objectives.

Thank You



Sustainability isn't a goal but adding a responsibility that we uphold everyday in every walk of life