Government Business Stream

(A Division of UMS Group)

Queensland Natural Gas Distribution Efficiency Study

Study Undertaken on Behalf of the Queensland Competition Authority

Final Report

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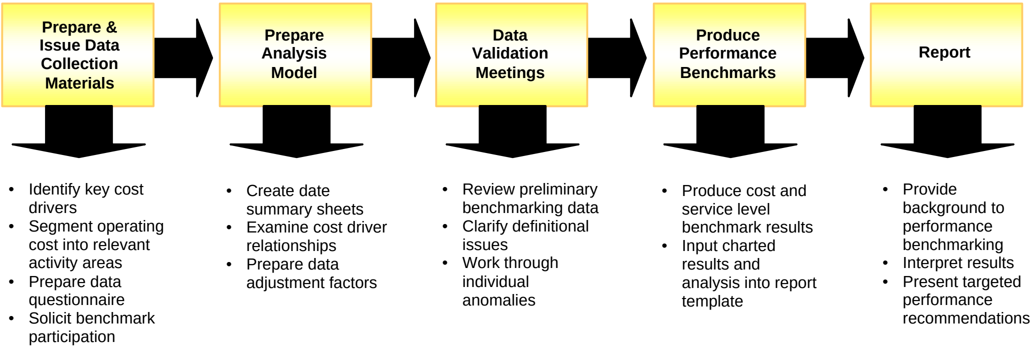
1. APPROACH METHODOLOGY

1.1. Overall Study Approach

UMS Group has provided benchmarking and operational cost driver expertise to this assessment and has worked in conjunction with the QCA to collect and interpret data from the two Queensland gas distributors and other participating companies. Figure 1, below, displays the process and coordination of activities by UMS Group.

Figure 1: Illustrative Chart of Process & Methodology



In conducting the analysis for this benchmarking exercise, UMS Group has drawn upon a number of data and information sources in order to explore the relationships between factors outside the control of a gas distribution business and the operation and maintenance expenditure of that business. Data adjustment can only be made with confidence where data variance is low, relationships are strong and sample size is sufficient. The data captured for Australian companies in the present study has not adequately met these criteria. The Australian gas distribution industry is relatively small and therefore solicitation for participation in this benchmarking exercise was limited to nine network operations; Allgas (QLD), Envestra (QLD), Envestra (SA), Envestra (VIC), Multinet (VIC), TXU (VIC), Great Southern Energy (NSW), Agility (NSW) and Alinta (WA). UMS Group approached each of these companies to be involved in this study, but to date have only received data for Allgas (QLD), Envestra (QLD) and Great Southern Energy (NSW) - see Section 2 for more details. In addition to these Australian companies, UMS Group has secured data for Powerco and NGC (New Zealand) and from TXU (USA) which has been included in the analysis. UMS Group continued to seek participation from other Australian gas distribution businesses prior to the preparation of this final report to the QCA, but was unable to secure the assistance of any further Australian companies.

In order to assess operational performance of the six companies currently involved in this benchmarking study, UMS Group has examined historical data from Australian and New Zealand businesses and also data from the much larger gas industry in the USA. Whilst no direct comparison has been made between the six participating companies and these other historical and international data sources, these sources have been used to examine cost driver relationships in order to develop workload adjustment factors. Such adjustment factors are sought to enable a higher degree of 'like-for-like' comparison of companies within the Australian industry. More detail on this analysis and our benchmarking methodology are outlined in the remainder of Section 1 and in Section 3 of this report.

1.2. Model Outputs, Application, Boundaries and Limitations

1.2.1. Benchmarking Study Model Outputs

UMS Group has extensive experience in performance benchmarking of utility industries on a global scale, having successfully conducted benchmarking analysis for both industry and regulatory bodies. It has been innovative and strident in applying exacting benchmarking standards and many companies have made business decisions on performance improvement based on the results of our benchmarking studies. In the past, the connection between quantitative operational benchmarks and the identification of best practices to close gaps in levels of performance has been of immense value to the users of the information. In regulatory applications, performance information has been used in conjunction with business process, historic and asset-specific information to draw conclusions about the efficiency and effectiveness of network businesses for their operation and maintenance activities.

It is against this experience and background that this Operation Efficiency Benchmarking Model has been developed, and customised to assist the regulatory process - but not determine it. The model represents the best efforts by UMS Group to benchmark operational performance of Queensland Natural Gas Distributors.

The benchmarking methodology used here-in is, where possible, two-dimensional in that it deems that a best performer for a particular activity is one that has simultaneously achieved below median cost results and above median service level, for that activity.

1.2.2. Regulatory Application

Whilst benchmarking can be used for regulatory purposes, the customary use of benchmarking by management is to establish targets for future performance levels and provide strategies that can be implemented to achieve those targets. In a regulatory setting, benchmarking is normally used to judge past performance. This retrospective application of what was initially designed as a diagnostic tool requires a different viewpoint when it is used to judge reasonableness in a regulatory setting.

Past performance reflects decisions made given the information that was available at that time. It can be acknowledged that less than optimum decisions can still be prudent and fall within the band of reasonableness given the context in which they were made. Therefore, when interpreting benchmark performance data, the Regulator must seek an understanding of industry issues driving business decisions and of the key cost drivers that fall outside the control of the businesses. Many of these cost drivers are highlighted in this report. These points considered, benchmarking, when conducted and used carefully, is widely recognised as an acceptable method to compare historical costs and service levels of companies.

1.2.3. Model Limitations

There are many factors that can influence expenditure levels. The following factors may or may not influence expenditure levels however they have not been quantitatively accounted in this benchmarking analysis:

- System Configuration – system configuration is linked to historical engineering, asset strategy and capital expenditure decisions. Our operational efficiency assessments do not adjust for all differing system configurations, however, system configurations that can be significantly linked to operational expenditure have been taken into consideration when analysing results. Specifically, UMS Group has adjusted for the percentage of unprotected iron pipe installed and the gas pressure profile of the network. We have not been able to adjust for several factors which may contribute to operating expense;
    - system age
    - ground conditions
    - pipe coatings
    - bedding materials
    - wrap (if used)
    - pipe wall thickness
    - jointing
    - backfill materials

  There are studies currently underway in the water industry to analyse and quantify the impacts of these variables on pipe maintenance costs and pipe reliability, but results are not currently available for the gas industry.

- System Performance – has been assessed in conjunction with cost data and therefore there has been no additional adjustment to cost data to account for system performance or reliability.
- Operating and Capital Expenditure trade offs – analysis of the trade-offs between operating and capital expenditure is outside the scope of this operational assessment but comment is made in the report regarding the implications of results to capital expenditure.
- Cost and service levels trade offs – internal service level trade-offs and Customer service measures are not assessed in this study. Internal service levels may include such factors as response time to requests, bills posted on time, absenteeism, performance reporting, etc. Some activity areas are interdependent and overall operational efficiency can therefore be hindered by poor internal service levels. Further analysis would be required to quantify these trade-offs.

1.3. Benchmarking & Sub-functional Performance Relationships

1.3.1. What is Benchmarking?

Benchmarking is a measurement technique used to compare the business performance and practices of a company to a group of its peers (competitors). Overall company performance as well as the performance of specific activities can be evaluated using this technique which is used extensively in industry.

Benchmarking is often the primary tool used to analyse a performance "problem" or to validate how well a company is performing. Addressing performance problems also requires an understanding of the nature and source of the performance "gap." This is accomplished by comparing the performance and practices of the company to a group of peer companies. By examining various aspects of performance, a company is able to develop a view of where it stands in performance, relative to others, and to identify the magnitude of the "performance gap." Knowing how other companies are able to achieve superior results provides a basis for the company to take the necessary actions to improve its own future performance.

Today, benchmarking is a legitimate and widely accepted tool for managing business performance. It provides a framework for management to drive business performance improvements in a predictable and logical way.

1.3.2. Cost & Performance

Business Performance has two components: the level or quality of service and the associated cost. These two components are interdependent and in evaluating either, it is necessary to assess the other as well. High service levels are desirable, but if achieved simply by spending more money, then it cannot be said that overall business performance is necessarily better. Similarly, driving costs lower by sacrificing service level does not produce better business performance.

Conventional wisdom suggests that there is a direct correlation between service and cost and that the only way to improve service is to increase costs. However, benchmarking results have demonstrated that this conventional perspective is not always correct. Figure 2 illustrates the relationship between service level and cost. As shown, the horizontal axis depicts costs and the vertical axis depicts service level. The diagonal band represents the conventional view that there is a direct correlation between service and cost. For example, a sub-function of company A is shown as being low cost and providing low levels of service. In order for Company A to improve its service level, this relationship suggests that it would have to increase its cost.

Investigating the best performing companies often demonstrates that some firms are able to achieve higher levels of service at the same or even lower costs. As can be seen, the other companies perform the same sub-function at various levels of cost and service. To provide a framework for evaluating performance, it is helpful to divide the graph into 4 quarters, as shown in Figure 3.

Figure 2: Service Level/Cost Trade-Off

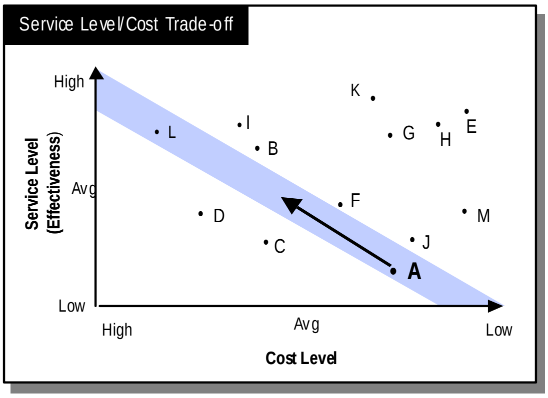
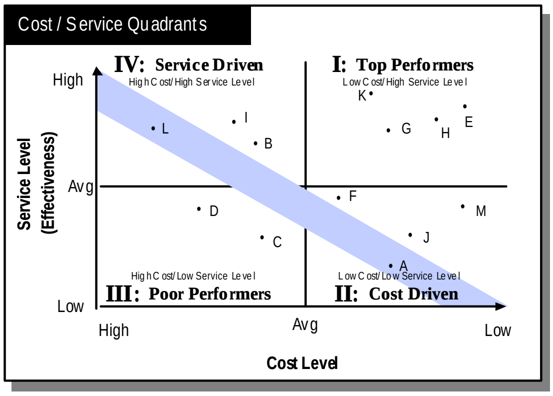


Figure 3: Quadrant Analysis



With regard to performance, Quadrant I represents the companies with high levels of service at low cost (top performers). Quadrant II represents companies who have very low costs but also provide low levels of service (cost driven companies). Quadrant III represents companies who are providing a low level of service at a high cost (poor performers). Quadrant IV represents companies that are providing high levels of service but at a high cost (service driven companies). The knowledge regarding a company's position relative to its peers is critical to management in order to focus performance improvement efforts and to motivate the organisation to accept ambitious targets.

In competitive industries in which companies operate under on-going pressure to produce improvements in cost and service level, remaining a top performer requires continuous innovation. However, for other companies, improving business performance is possible by learning and replicating the practices of the top performers. Companies in Quadrant II will look for ways to improve their service levels without excessive cost increases. Companies in Quadrant III will look for ways to improve service level and reduce cost. Companies in Quadrant IV will look for ways to improve their cost without sacrificing the quality of their service.

The results of benchmarking studies are not widely available. Benchmarking, by its nature, generates a great deal of information that is highly sensitive. Companies would not participate in these comparative studies if specific information about their companies were to be revealed and made public. A great deal of the information generated is considered to be proprietary and confidential.

It is only on the basis that confidentiality will be maintained that companies are willing to be "benchmarked." It must be recognised that the key value of benchmarking is the insight management receives in its quest to improve its products, service level, and financial performance. The identity of the participant companies is usually not essential information.

The purpose of benchmarking is to learn the processes, techniques and technologies being deployed by superior performers to get results. What is critical, however, is learning how large a performance gap exists and how other companies close the gap to achieve superior performance at lower costs. Invariably, companies may disclose some best practices but they receive over three times as many best practices from other companies. Participant companies typically enter into confidentiality agreements whether participating in a one-on-one project with another firm to benchmark a particular area, or in a broader multi-company peer benchmarking study. It is a requirement of such agreements that all data that could be used to identify an individual participant's performance and sometimes their identity not be disclosed. The "benchmarking code of conduct" contains the generally accepted standard for benchmarking surveys. (Table 1)

Table 1 – Benchmarking Code of Conduct

Principle Of Confidentiality
Treat benchmarking interchange as confidential to the individuals and companies involved. Information must not be communicated outside the partnering organisations without the prior consent of the benchmarking partner who shared the information.
A company's participation in a study is confidential and should not be communicated externally without its prior permission.

1.3.3. Uses of Benchmarking

Benchmarking is a tool for management to get a report card on itself, to discover how it compares among a peer group, to learn how others conduct similar work, and to develop insight on how to achieve higher levels of performance at lower cost. In essence, benchmarking is a "diagnostic" tool for management. It allows management to determine a course for the future and assists in the determination of the levels and sources of performance improvement that the company should strive to deliver by capturing the identified opportunities.

In a regulatory environment, a fundamental issue is the reasonableness of costs. Benchmarking is a technique that lends itself to demonstrating how a company's total costs, as well as broad functional costs, compare with its peer group. The use of benchmarking results, as evidence of reasonableness of costs at the total cost or functional cost level, is generally appropriate. However, a temptation exists to look beyond the functional area and to delve into benchmarking results at the sub-functional level. A business consists of many activities that are linked together in a series of processes to deliver products and services to customers. A set of activities which deliver a specific or several similar products and services to customers are usually grouped together in an organisation and are known as functions. Typical broad functions in a utility include extraction, transmission, distribution, customer service, etc. Sub-functions are activities within a function, which are grouped together because of the specialised nature of the work or because of similar skills required to execute the work. For example, within the distribution function, construction, maintenance, and operations can each be considered as sub-functions.

Due to the interdependencies within functions and sub-functions, caution should be used when relying solely on benchmarking results to determine reasonableness of cost at the sub-functional level. Management needs to have the discretion to manage its business as a whole. They should be accountable for business performance but must be allowed to make the necessary trade-offs at the sub-function level in order to achieve optimal overall business results. Regulatory pressure to minimise costs across every sub-function in isolation could lead to sub-optimisation and higher overall costs than would otherwise have been necessary.

Benchmarking is not necessarily conclusive evidence of reasonableness. In our view, results that show costs are better than average can be presumed reasonable in the absence of any evidence to the contrary. By the same token, if costs are above average, this fact alone is not sufficient for determining reasonableness of cost. It is necessary to examine other facts and circumstances prior to making a final determination on whether costs are reasonable.

First, as noted above, if a sub-function's costs are above average, other facts and circumstances must be considered in order to assess the reasonableness of that sub-function's cost. For instance, if sub-function costs are high, but total functional costs are lower than a group of peers, the costs incurred at the sub-function level can be presumed reasonable in the absence of any evidence to the contrary. Indeed, there are often situations in which management decides to spend more in one area in order to realise even greater benefits or savings in other areas.

> *For example, in an effort to reduce telephone call centre costs, employees may be encouraged to improve productivity by reducing the time spent per call. There is a risk that some customer inquiries and service requests may not be dealt with properly. Alternatively, customer problems that might have been resolved over the phone are instead handed over to the field services group to resolve in person by visiting the customer.*
>
> *In companies where this has happened, unhappy customers have driven call volumes higher and field personnel have been dispatched unnecessarily at significant cost. For these companies, call centre costs did not always decline, but customer satisfaction almost always went down and the cost of the field service organisation increased dramatically. Total customer service costs also increased. Since the typical costs associated with customer calls are significantly lower than the cost of a field visit, it is evident that even a small increase in field service workload will dwarf any savings achieved by the call centre. In this case, it would be prudent to allow phone centre employees to spend more time with customers to adequately handle their inquiry or service request on the phone and avoid unnecessary field trips by personnel.*

In this and other areas, it is important to recognise that interdependencies exist between sub-functions, and that management flexibility is important to be able to optimise efficiencies.

Second, when the cost of a sub-function, as well as the total cost of the function in which the sub-function resides are higher than a company's peer group, the existence of mitigating circumstances should factor into a decision on whether or not certain costs are reasonable. There may be legitimate mitigating circumstances for certain costs to be high, such as safety considerations, environmental factors, technology issues, structural constraints, recent investments and pro-active action to lower risk. Governance issues and levels of business risk may also contribute to variations of performance.

Management is faced with continually making trade-offs and judgments, in setting priorities and optimising business results. In assessing the reasonableness of cost, it is important that a regulator take a comprehensive view.

1.3.4. Company Performance

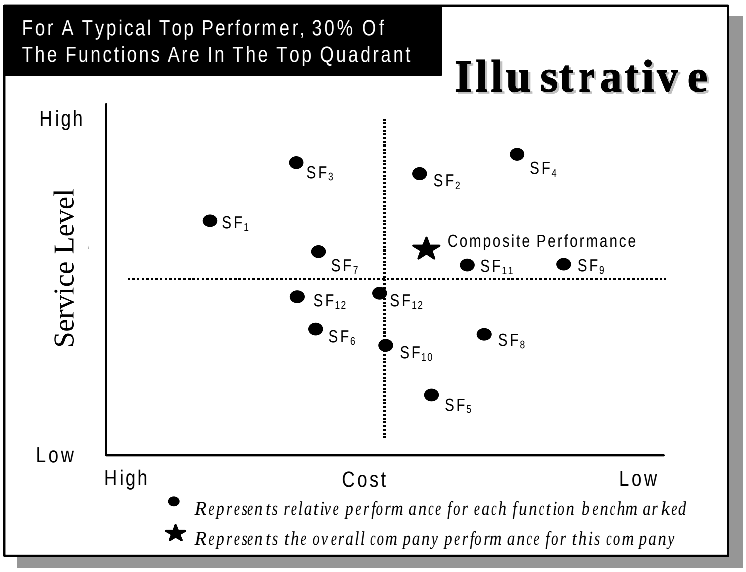
It is UMS Group's view that regulators should review these sub-functions, but the mere existence of a "gap" between a company's performance and a peer group average is not conclusive evidence that the sub-function cost is unreasonable for regulators any more than it is for management. As has been mentioned, there may well be a good explanation for the particular cost levels. There often is. This is an assessment that must be made in the context of the total function cost, performance, the size of the gap and other appropriate factors.

It takes time and often-significant investment to implement most major changes. It is impractical to expect a company with below average performance to become a top performer overnight. All companies face a variety of difficulties that impede their ability to implement major change. Some of these difficulties relate to structural constraints such as existing technology applications or contracts (leases, power contracts, long term fuel contracts, etc). These structural constraints can limit the discretion available to management to act quickly to make wholesale changes. In this instance, management has to focus on incremental changes in the short term and work on eliminating the structural constraints over time.

Another factor in assessing future improvement potential is the consideration of the company's prior performance. A company that has consistently and aggressively implemented programs to improve performance and has been successful in capturing significant efficiencies and reducing costs, will be able to achieve only modest improvements in subsequent years (absent a major technological or process innovation or a change in response to major environmental factors). Programs that focus on improving performance typically begin by targeting the high value projects that are likely to achieve the largest improvements quickly and with minimal investment. As these initiatives are completed, initiatives that are harder to implement, and take longer and require more resources, are tackled. Consequently, the magnitude of the improvements made, as well as the rate of improvement, declines over time. This is often termed a case of 'diminishing returns'.

We have recognised that even the best companies, those that are considered leaders in their industry, do not excel at each and every sub-function. It is broadly recognised that companies have certain core competencies at which they must excel to succeed. Given that most of their competitors are striving to improve and "catch up" with the leaders, these leading companies must continually build new sources of advantage by strengthening those areas in which they are under-performing today, if they are to maintain their lead.

Figure 4: The Portfolio Effect



In our experience, companies that are top performers often have significant opportunity to improve in half or more of their sub-functions. Figure 4 illustrates the performance of various sub-functions of a company considered to be a top performer. The performance is depicted on two dimensions, service level and cost.

For a typical top performer, approximately 30% of its sub-functions are in that top quadrant. Therefore, even for the best overall performing companies, the majority of the sub-functions are not in the top quadrant and significant improvement opportunities can be identified through benchmarking. UMS Group has termed this the "performance portfolio effect."

This observation is based on more than ten years of extensive benchmarking experience with over almost two hundred utility companies. This portfolio effect is extremely strong and has been evident in virtually every one of these performance comparisons analysed. If it is accepted that a company cannot be expected to be a top performer in all activities, then, if that same company sets targets to achieve at least "average or better" performance in all sub-functions in which it is not currently a top quadrant performer, its overall performance will improve. Based on empirical observation, the company will move into the "top quadrant" of performers in due course.

To the extent that management is focused on improving overall performance through actively pursuing performance improvement, the interests of the shareholder and the customer are aligned.

Given this alignment, regulators should not inadvertently discourage management's efforts to improve performance. The risk of establishing disincentives is high if the regulator focuses exclusively on performance at the sub-functional level. Disincentives such as "cherry picking" certain sub-functions for disallowance or rejecting investments intended for performance improvement can handicap management's efforts to improve service and capture efficiencies and can discourage management from taking necessary cost saving measures in the future.

The 'performance portfolio effect' and how pursuing average or better performance at the sub-functional level can lead to superior overall results has already been discussed. Examination of apparent "performance deficiencies" can generate extensive discussion in a regulatory proceeding, and the temptation to isolate specific areas and mandate specific performance improvements can be enticing. However, it is extremely important to view these functions and sub-functions as a part of a process in which management's mission and the customer's interest lie in optimising the overall business performance and not the individual pieces. In protecting the customer's interests, regulators should therefore focus on the broader level of performance rather than on individual components of the process.

2. DATA ACQUISITION

As mentioned in Section 1.1, data acquisition was very difficult within the Australian gas industry, with many companies unwilling or unable to participate in the benchmarking study within the timeframe of the project. Analysis has therefore been conducted using only a limited sample of industry performance. It was expected that the final report would reflect greater participation from Australian gas distribution businesses, however these businesses cited a number of reasons to abstain from participation.

Key issues encountered when attempting to solicit and secure company participation have been:

- Timing conflicts with internal six-monthly budgetary reporting
- Key personnel on leave – internal resourcing issues
- Reluctance by some companies to participate in a performance assessment by a Regulatory body
- Did not see benchmarking as being a valuable exercise for their business

The Australian Gas industry has only a relatively small number of Network Operators. UMS Group approached each of these operators in order to collect comparative data from which to draw benchmark results for this study. The Australian business approached are listed below, as well as a brief description of their response:

1. Envestra (QLD) – Participating: mandated participation by the QCA
2. Allgas (QLD) – Participating: mandated participation by the QCA
3. Envestra (SA) – Not participating: no time or resources available to facilitate data collection
4. Envestra (VIC) – Not participating: as above
5. Multinet (VIC) – Not participating: made a commitment to participate and submitted data, however requested to withdraw from the study after the preparation of UMS Group's preliminary report
6. TXU (VIC) – Not participating: agreed to participate but were unable to collect data within the stipulated timeframe
7. Great Southern Energy (NSW) – Participating
8. AGL / Agility (NSW, ACT) – Not participating: did not see value in the benchmarking exercise
9. Alinta Gas (WA) – Not participating: no time or resources available to facilitate data collection

In addition to the Australian companies listed above, and due to a low participation rate, UMS Group approached a small number of international gas network operators in order to achieve a significant benchmarking database. Companies approached are listed below:

1. Powerco (New Zealand) – Participating

2. NGC (New Zealand) – Participating

3. TXU (USA) – Participating: contributed data for Asset Management and Network Services activities, but were unable to provide Corporate Overhead data within the data collection timeframe.

4. Equitable Gas (USA) – Not participating: could not see value in the benchmarking exercise at this time

5. PG&E (USA) – Not participating: could not see value in the benchmarking exercise at this time

There have also been a number of difficulties encountered during the data collection phase for participating companies. Cost-based accounting practices appear to have only been implemented in recent years in many gas businesses and in some cases are only accurate for the last financial year (from July 1, 2000). This has resulted in a very limited ability for participating companies to separate costs into their labour and non-labour components and to allocate those costs into activity groups. The net result of these limitations in accounting records is that the performance analysis has been conducted at a higher level than originally anticipated.

Allgas and Envestra, along with other benchmarking participant companies, were asked to segment their operational expenditure into three high level categories; Network Services, Asset Management and Corporate Overheads. Definitions of these functional cost areas can be found in the Appendices to this report. Within each of these high-level business functions, companies were asked to segment costs further into activity related sub-functions.

Specific data collection limitations and issues for the Queensland distribution networks under review in this report are detailed below.

2.1. Allgas

2.1.1. Financial Data

UMS Group's original assessment framework required that costs for Network Service activities be segmented into medium level activity bundles such as Corrosion Protection, Leakage Mitigation, Syphoning Activities, Above Ground Assets and Procurement and Materials Management activities. These activity groupings are not directly compatible to the Financial reporting framework with which Allgas manages its network. Allgas uses condition monitoring data to manage overall maintenance workload, and the cost segmentation required by UMS Group could not be matched to the maintenance cost tracking deemed meaningful for Allgas to manage its assets. Allgas therefore reported Network Service costs at the level of Above Ground Assets and Below Ground Assets only.

2.1.2. Asset Data

As requested, Allgas provided solid information on installed assets, although not in the table format issued. UMS Group was able to classify to benchmark maintenance workloads and asset types satisfactorily.

2.1.3. Service Level Data

Allgas, along with a number of other participant companies, was not able to provide some system reliability data requested by UMS Group due to the unavailability of that data. Allgas suggests that several data-points requested by UMS Group were not measured or recorded as they had not been deemed relevant to business operations, and definitions were deemed unclear in some instances. Outages and leaks are important to Allgas but are treated in accordance with relevant safety management procedures as required under the Gas Act. Allgas was able to supply further data according to its internal definitions, including Number of Outages on Network Per Annum, Number of High Level Emergencies and Average Time of Lost Supply until Restoration.

2.2. Envestra

2.2.1. Finance Data

Envestra was able to breakdown Network Services costs into the activity areas requested (Leakage Mitigation, Corrosion Protection, etc), but was unable to isolate these costs into their constituent labour and non-labour components because these activities are performed largely by contract.

In the Asset Management and Corporate Services areas, Envestra's finance data was complete. A large portion of reported Asset Management costs were not suitable for benchmarking and were excluded from our analysis. The included network licence fees, etc. Further details of these costs are presented in Section 4.1.3.2.

2.2.2. Asset Data

Envestra's asset data was solid, and provided in the table format issued.

2.2.3. Service Level Data

Some of Envestra's data for reliability and service level indicators was of low accuracy, with target data provided for some indicators in place of actual tracked or recorded data. Number of Customer Complaints information and Planned Outage information was not available. Overall, Envestra's service level information was of an equal or higher standard than other benchmarked companies in this study.

3. FUNCTIONAL ANALYSIS

3.1. Study Variables

Performance benchmarking data falls into three main categories; controllable-variables, measurable-uncontrollable-variables and unmeasurable-uncontrollable-variables.

- Controllable variables are cost-drivers reflective of a company's efficiency and effectiveness and are therefore the quantifiable outputs of a benchmarking analysis.
- Measurable-uncontrollable-variables are typically those cost-driver variables that should be adjusted for in a benchmarking exercise in order to enable a "like for like" comparison of the participating companies.
- Unmeasurable-uncontrollable-variables are cost-drivers that cannot be adjusted for in a benchmarking exercise but that must be qualitatively assessed in conjunction with benchmarking results in order to accurately interpret the data (See Section 1.2.3: Model Limitations).

UMS Group has used statistical methods to analyse the measurable-uncontrollable-variables that may be adjusted for in this benchmarking study. Industry consultation and direct discussion with representatives from Allgas and Envestra highlighted a number of cost driver variables perceived to significantly impact the operation and maintenance expenditure of a gas distribution business. These include:

- Exchange rates and labour costs
- Payroll loading legislation
- Types of assets installed (PVC, nylon, unprotected steel, coated steel, cathode protected steel, etc)
- Pipe pressure (High. Medium, Low)
- Age of the network
- Customer density & network location (CBD, urban, rural)
- Economies of scale (relative network size).

Of these seven adjusters, the first and second apply across all activities, the next four relate to our Network Services analysis and the last relates only to the Asset Management analysis. With regards to payroll loading costs (including superannuation, work-care, benefits, etc), these cost have been excluded from the analysis for all participants as they are typically outside the control of the business. Where contractor costs have been reported, UMS Group has removed a payroll loading factor (provided by participant companies) from the labour component of those contractor costs.

Using available data, UMS Group has reviewed each of the other cost drivers listed above in order to determine appropriate workload adjusters for the gas benchmarking model. With the exception of network age, reasonable and quantifiable relationships were established between cost and many of the above mentioned variables. The details of these relationships are explained in the following sections. Network age proved very difficult to assess because time-series data was not available for enough gas businesses in order for us to establish a significant database with which to assess the impact of system age time on operating costs.

However, other variables examined provide some proxies for age because certain network traits are directly related to their installation age. For example, cast iron pipe is no longer an installation standard for Australian companies and the percentage cast iron pipe in an Australian network is typically directly proportional to the age of the network.

3.2. Workload Units

In cost performance benchmarking analysis there are two variables required in order to make cross-company comparisons; cost and workload. Comparing companies on a raw cost basis is flawed because of the differences in scale between companies, so it is more appropriate to benchmark on a cost per unit work basis. Whilst cost is relatively easy to capture and analysis, more consideration is required in choosing an appropriate workload proxy. UMS Group has chosen workload proxies for Network Services, Asset Management and Corporate activities within the limitations of data availability and in line with our experience in benchmarking utility businesses, as outlined below:

3.2.1. Network Services Workload

There are three main workload units commonly used with regards to a distribution business' Network Services activities; number of customers serviced, total energy delivered and number of kilometres of distribution network operated.

Number of customers has not proven to be a reliable workload unit for Network Services because the work associated with each customer is highly dependent on the customer's geographic location relative to the load centre, relative to other customers and relative to the energy source (transmission pipes). It is also related to the customer's energy consumption (whether the customer is a residential, commercial or industrial customer). Likewise, energy delivered is not considered an appropriate workload unit because it is significantly less costly to deliver 100 units of energy to 1 customer in 1 location than to 100 customers spread over a large area.

It is our experience that the most solid basis for workload comparison between distribution businesses is the number of kilometres in their distribution network. Workload for Network Services revolves around operating and maintaining the network assets, and kilometres of distribution network is a strong proxy for total assets installed, accepting that environmental and network configuration variances between companies need to be accounted for. In this report, Network Services costs have been analysed on a cost per kilometre basis, and the major measurable-uncontrollable cost drivers, as discussed in Section 3.1 have been adjusted for (see Section 3.3 for full description).

3.2.2. Asset Management Workload

UMS Group believes that Asset Management activities are focused on delivering as high a quantity of energy to as many customers as demand dictates, using the least assets possible whilst maintaining safety and reliability standards. Therefore, although Asset Management revolves around managing an asset the workload driver also includes the energy delivered and the customers delivered-to through that asset. Asset Management includes such activities as system planning, risk management and asset strategy for which assets must be matched to customer and energy demand profiles. UMS Group has used cost per kilometre, cost per unit of energy delivered and cost per customer measures to comparatively benchmark Asset Management performance in this study, adjusting for economies of scale relationships as discussed further in Section 3.4.

3.2.3. Corporate Overhead Workload

Workload for Corporate Overhead activities can be driven by a number of variables, depending on the corporate support sub-function in question. Workload proxies typically cited for Corporate Overhead activities include; number of customers, number of employees, total operating costs and total revenue. Note that factors such as assets installed and energy delivered are not generally considered as workload drivers for corporate activities.

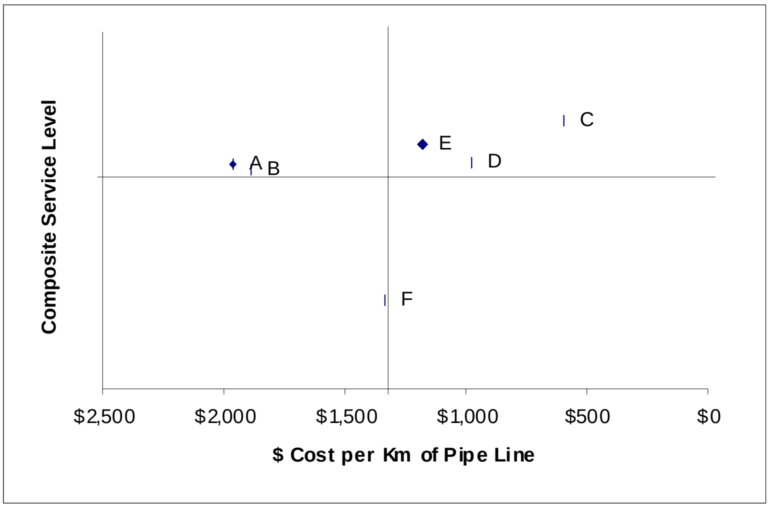
UMS Group considers revenue to be closely linked to energy delivered and therefore inappropriate for comparative benchmarking of Corporate Overhead costs. We also have avoided using employee numbers as a workload proxy due to the high degree of outsourcing (use of contractors) in the Australian gas industry whereby employee numbers vary greatly between companies. In the present analysis, UMS Group have therefore benchmarked corporate cost as a percentage of total operating cost and corporate cost per customer for the participating distribution businesses.

3.3. Network Services Comparative Adjuster Analysis

Prior to data adjustment, the Network Services analysis looked very different to its final outcomes. Raw data comparisons, such as that used in many econometric analyses showed the participating companies to vary widely in terms of operating performance and cost as per Figure 5. On a raw Network Services operations cost per kilometre of pipe installed basis, there was almost a $1500 per kilometre variance in cost performance across the benchmark sample.

Note that Figure 5 has not been adjusted for any environmental or workload factors. Results of the analyses UMS Group has performed in order to create comparative adjustment factors for benchmarking are presented in the following sections. With additional adjustment factors, the relative positioning of benchmarked companies in Figure 5 changes. These changes are displayed in the following sections so that the effects of ‘equalisation’ for uncontrollable environmental and workload factors can be understood.

Figure 5: Raw Network Service O&M cost per Kilometre



UMS Group assessed the relationships between measurable-uncontrollable variables and operational costs in order to determine the appropriate adjustment factors to conduct comparative benchmarking. This analysis requires the availability of sufficient data to run statistical analysis. Due to the small sample size provided in the present study, UMS Group also examined SNL Energy Information System data from the USA in conjunction with historical data from Australian gas businesses in order to establish whether a relationship exists between asset type installed and operating costs. All of the following analyses use these sources.

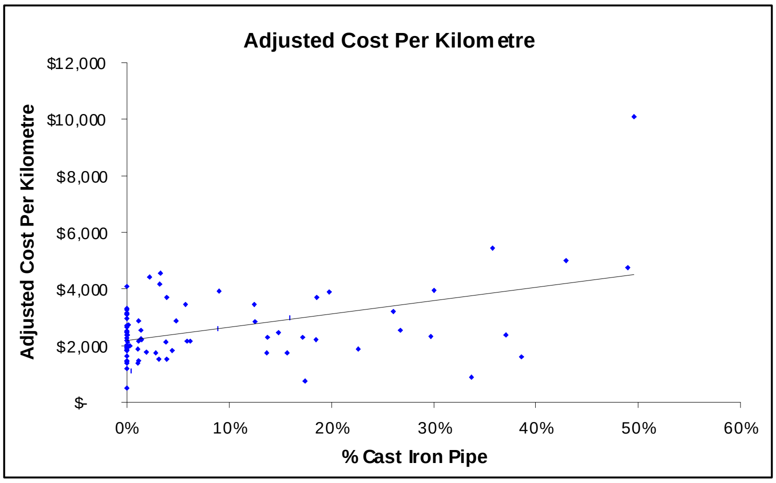
3.3.1. Adjustment for Asset Type

Data availability for asset type was limited to the percentage of unprotected cast-iron main installed on a network. UMS Group examined cost, asset and asset type data from 82 companies from Australia, New Zealand and the USA to determine a relationship between the amount of cast iron (unprotected steel) pipe installed and the raw operational cost per kilometre in a gas distribution network. Regression analysis indicates that a reasonable proportional relationship exists between O&M cost per kilometre and the percentage of cast iron main installed. The relationship indicates;

O&M Cost per Km = 2181 + 4700 X Percentage of Cast Iron Main

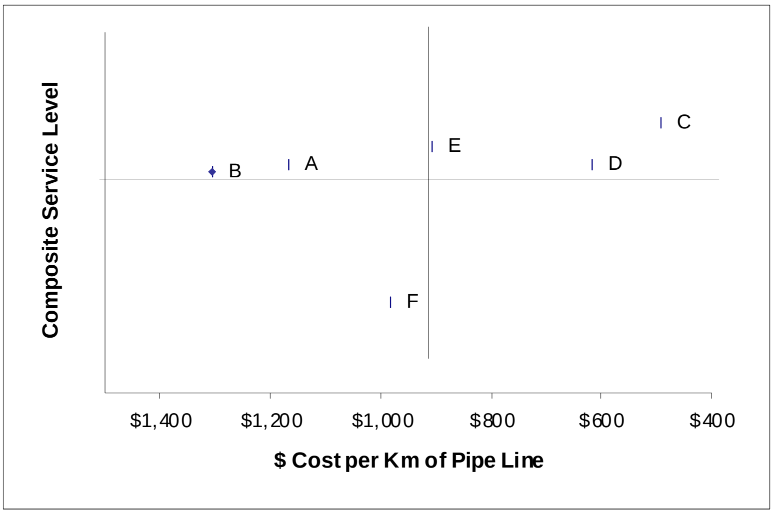
The slope is the equation was statistically significant. 12.4% of the variation in cast iron main can explain the variation in O&M per kilometre. Results from this analysis are charted in Figure 6.

Figure 6: Relationship between O&M cost per kilometre versus % of cast iron mains installed on network for Australian and New Zealand gas distribution businesses



In Figure 7 we see the effects of the % Cast Iron data adjuster on the raw company benchmarks presented in Figure 5. The variance of costs across the six companies is reduced from around $1500 to around $800 as the percentage of unprotected iron pipe is taken into consideration. The performance gap between the best and the worst company is thus significantly smaller than initially observed.

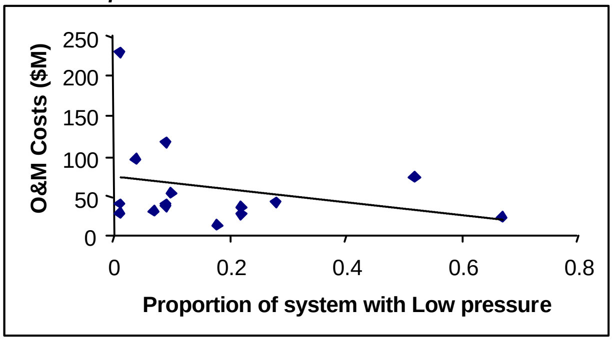
Figure 7: Network Service analysis adjusted for Asset Type



3.3.2. Adjustment for Pipe Pressure

Data from Australian and New Zealand companies collected by UMS Group from 1998 to the present provided the opportunity to analyse the impact of network pressure profiles on operational expenditure. We analysed the percentage of low, medium and high pressure pipe installed on the networks of 15 companies and found that significant correlations exist. These correlations suggest that for a given length and type of pipe, operating and maintenance costs will increase as pipe pressure increases.

Figure 8a: Relationship between % low pressure pipe versus O&M cost per kilometre



Our analysis presented in Figure 8a indicates that there is a negative relationship between O&M cost per kilometre and the proportion of low pressure pipe in the system. That is, for every 1 percentage point increase in the proportion of low-pressure pipe, there is a $77.59 decrease in O&M costs per kilometre. Statistically, the slope of the equation is significant. Therefore, an adjustment factor has been introduced to our Network Services comparative benchmarking analysis to account for this low pressure and cost relationship.

Analysis in Figure 8b indicates that there is a positive relationship between O&M cost and proportion of medium pressure system. The regression results indicates that for a 1 percentage point increase in the proportion of medium pressure pipe there is a $38 corresponding increase in the O&M cost per kilometre.

Figure 8b: Relationship between % medium pressure pipe versus O&M cost per kilometre

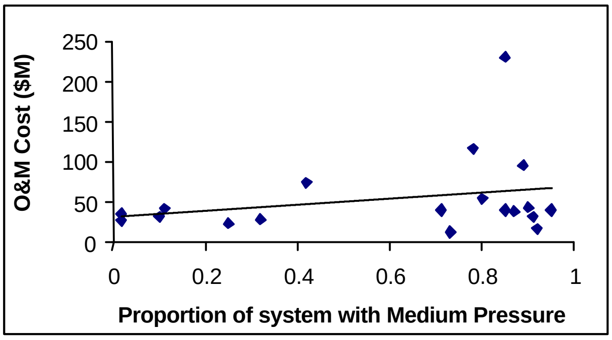


Figure 8c: Relationship between % high pressure pipe versus O&M cost per kilometre

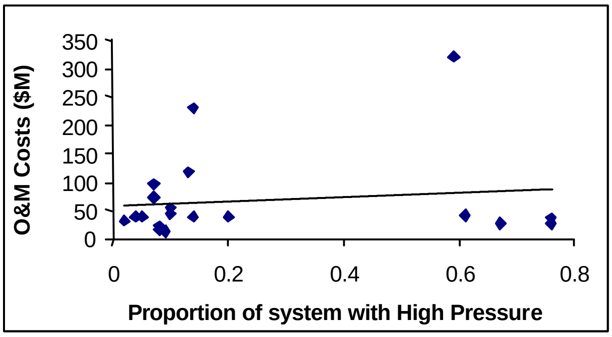
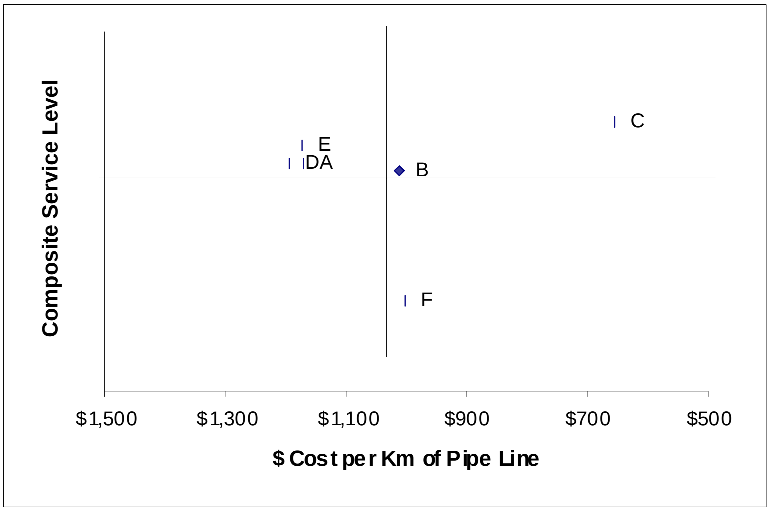


Figure 8c indicates that there is a positive relationship between O&M cost and the proportion of high pressure pipeline installed in a gas network system. The regression results indicate that for a 1 percentage point increase in the proportion of high pressure pipe there is a $36.13 corresponding increase in the O&M cost per kilometre.

The information collected and analysed in Figures 8a, b and c enabled us to calculate an adjustment factor for the low, medium and high pressure components of each benchmarked company's gas network, in addition to the unprotected iron adjustment factor discussed in Section 3.3.1. These adjustment factors are thus used in our comparative benchmarking of Network Services costs to account for the cost-driver relationships discovered.

In Figure 9, the Network Services benchmark results are presented with both the adjustment for percentage unprotected iron pipe in the network as well as the pipe pressure adjustment factors described above. In Figure 9 we therefore see the aggregate effect of pressure data adjustments on the company benchmarks presented in Figure 7. Companies with higher proportions of medium and high pressure pipe installed in their network are most significantly influenced when pipe pressure is taken into consideration, as their 'equivalent' workload is increased and their costs per 'equivalent' kilometre are correspondingly decreased. Again, this adjustment factor further reduced the variance in cost per kilometre for the benchmark sample companies.

Figure 9: Network Service analysis adjusted for Asset Type and Pipe Pressure.

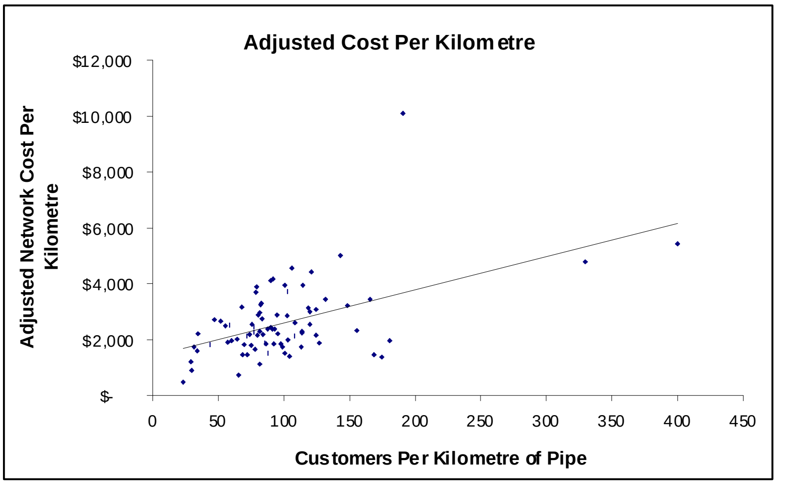


3.3.3. Adjustment for Customer Density & Network Location

Data presented in Figure 10 on the relationship between customer density (defined as number of customers per kilometre of pipeline) and operating cost per kilometre of pipeline produced a significant relationship between these variables. As per the Asset Type analysis, data was drawn from 82 US, Australian and New Zealand gas distribution businesses, and statistical analysis yielded the following relationship between cost per kilometre and customer density:

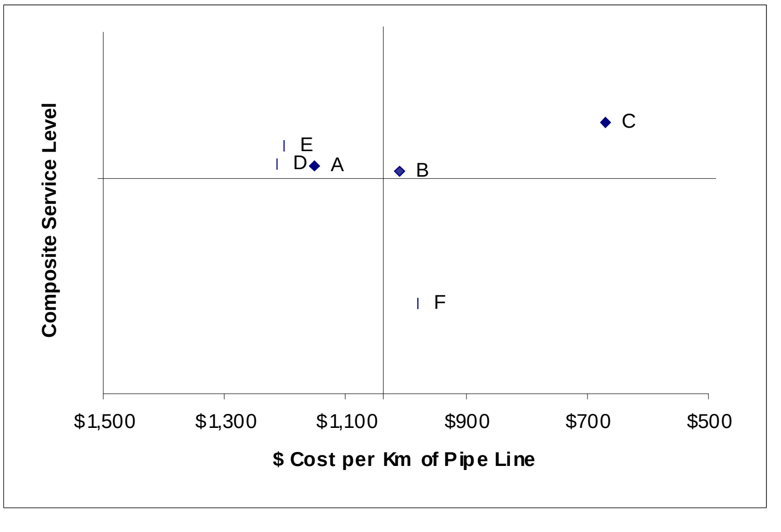
$$O\&M = 1410 + (11.8 \times \text{Customer Density})$$

Figure 10: Relationship between customer density versus O&M cost per kilometre pipe



Industry feedback suggests that network location has an impact on network operations and maintenance costs. The distinction between Central Business District (CBD), Urban, Rural and Remote areas of network coverage has proven difficult to quantify and analyse, however, results from our customer density suggest that on a cost per kilometre basis, a higher customer density (customers per kilometre) results in a higher cost per kilometre to maintain and operate the network.

Figure 11: Network Services analysis fully adjusted



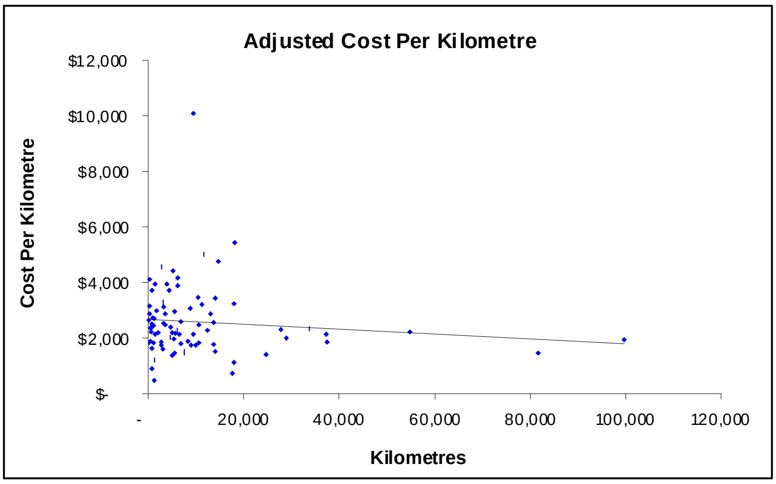
Following the introduction of data adjustment factors for age, customer density, pipe pressure and percentage unprotected iron pipe, the Network Services comparative analysis shows companies with a significantly difference relative performance position than in Figure 5. Figure 11, on the previous page, shows our final analysis. The variance between the highest and lowest cost companies following the data adjustment process is in the order of $600 per kilometre, which is less than half the variance observed in the raw data analysis. Therefore $600-700 per kilometre of difference in costs between the sampled companies appear to be explainable in terms of asset type, network pressure profile and customer density. The significance of this chart with respect to each of the Queensland companies is described in Section 4.

3.4. Asset Management Comparative Adjuster Analysis

3.4.1. Adjustment for Economies of Scale

UMS Group examined current Australian and New Zealand data sources as well as US data in examining the relationships between scale and operating costs for a gas distribution network. Using kilometres of installed asset and customer numbers as proxies for scale, analysis revealed some significant relationships between scale and operating cost per kilometre. These relationships, statistically significant (n=82), have been used to create economies of scale adjustment factors which have been applied to the Asset Management costs analysis for this report. UMS Group also examined cost per unit of energy delivered to determine a relationship for economies of output volume, but no statistically significant relationship could be identified.

Figure 12a: Relationship between O&M cost per km versus number of km



In Figure 12a the results of our regression analysis are displayed, yielding the relationship;

Cost per km = (-0.0087 X # Km) + 2672

This equation indicates that as kilometres of line increase, there is a linear decrease in the O&M Cost.

Figure 12b: Relationship between O&M cost per km versus customers

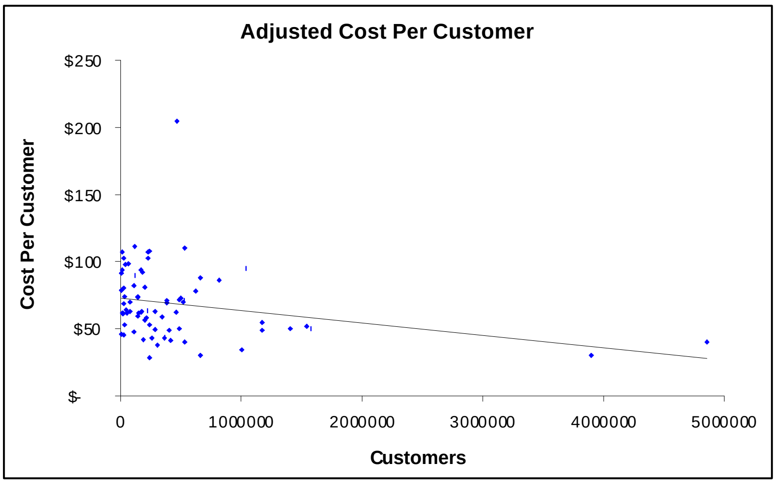


Figure 12b represents the regression analysis performed for cost per customer as a function of total customer numbers. The analysis yields the following relationship:

$$\text{Cost Per Customer} = (-9.3^{-6} \text{ X \# Customers}) + 72.8$$

This equation indicates that as the number of customers increase, there is a decrease in the O&M cost per customer.

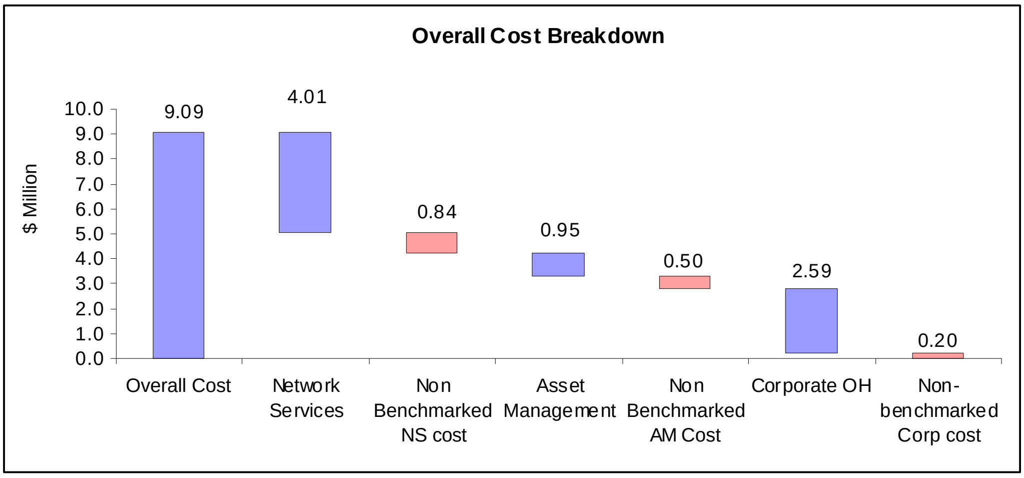
4. PRELIMINARY FINDINGS

4.1. Envestra Ltd

4.1.1. Analysis of Submitted Data

Envestra Ltd has reported a total cost of $9.09 million for its operation and maintenance expenditure in the July 1999 – June 2000 financial year. This has been segmented into three activity areas; Network Services, Asset Management and Corporate Overheads (See Appendices for definitions of activity categories). This segmentation in operational expenditure is presented in Figure 13 below. Note that the striped bars represent non-

Figure 13: Envestra cost submission waterfall chart



benchmarked cost areas that were not assessed in this study. Such costs include costs associated with licences, insurance, unaccounted for gas, miscellaneous costs and payroll loader costs such as superannuation and workcare. In total, $1.54M of Envestra's cost were deemed unsuitable for benchmarking, whilst $7.55M in costs were benchmarked.

Figure 14a: Envestra Ltd Customer Profile

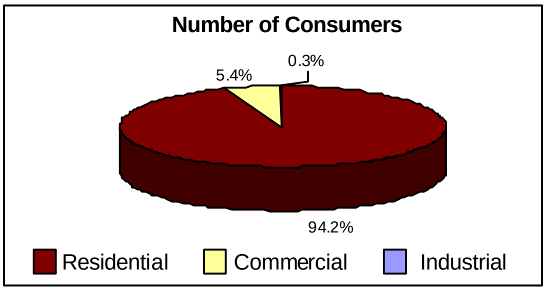


Figure 14b: Envestra Ltd Energy Delivered Profile

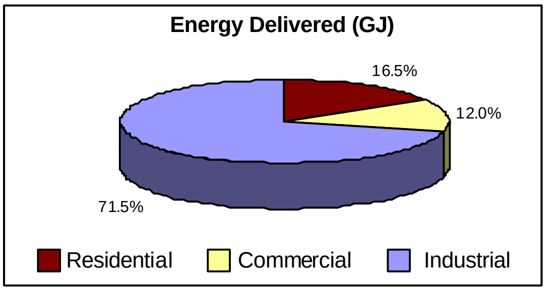


Figure 14c: Sample Average Customer Profile

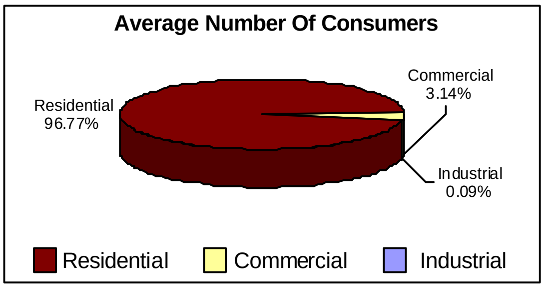
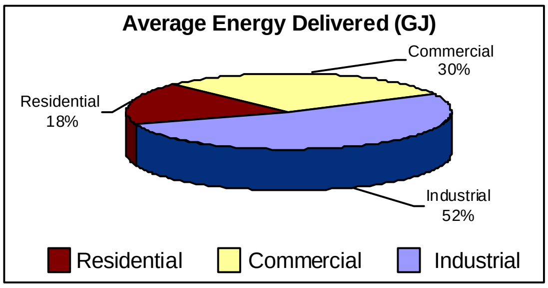


Figure 14d: Sample Average Energy Delivered Profile



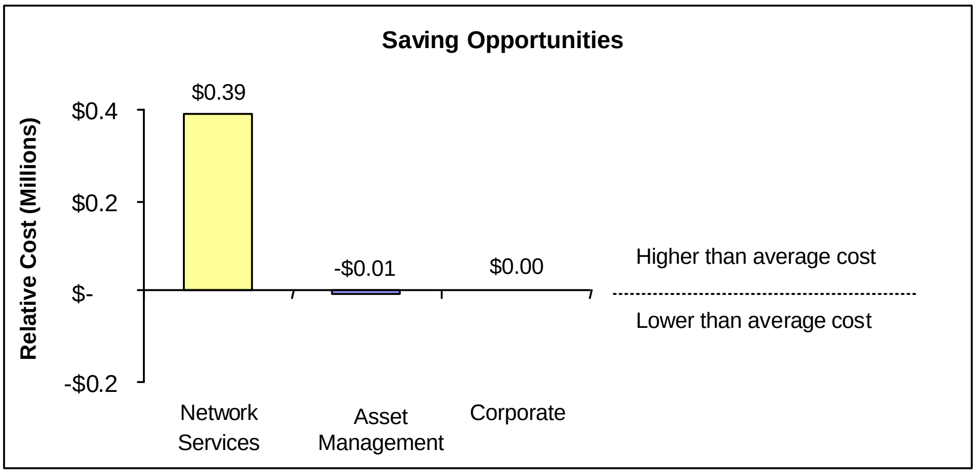
A number of network characteristics specific to Envestra have been highlighted through this data analysis process. Around 71% of the energy supplied by Envestra through its distribution network is delivered to only 0.3% of its customers. There are 56 of these large, industrial customers consuming greater than 10TJ of energy. Figures 14a and 14b display the customer and energy consumption profile for Envestra and highlight the significance of the major industrials to the network. Of the sample group, industrial consumers average 52% of gas delivered, compared with 72% for Envestra. The sample average profiles for customer numbers and energy consumption are presented in Figures 14c and 14d for comparative purposes.

4.1.2. Overall Performance Improvement Opportunity

Analysis indicates that Envestra Ltd's overall O&M costs are approximately $0.38M higher than the sample average, although Envestra's system reliability and performance is above average. These results, quantified as 5.1% of total benchmarked costs and 4.3% of Envestra's overall submitted costs, are presented in Figure 15 as a performance relative to industry average. The chart shows gaps to industry average for each area and highlights Envestra's better than average cost performance in its Asset Management activities and overall strong performance in its support services (corporate).

All of Envestra's savings opportunity was associated with its Network Services activities, where UMS Group identified a 9.8% savings opportunity. This result and results for Envestra's Asset Management and Corporate Services activities are discussed in more detail in the following sections

Figure 15: Savings opportunities for Envestra relative to sample average



4.1.3. Sub-Functional Performance

4.1.3.1. Overall Networks Performance - Envestra

Envestra Ltd reported $4.85 million in operating costs for Network Services activities on its gas distribution network in the 1999-2000 financial year. Note that upon the removal of payroll loading costs which cannot be reasonably benchmarked for efficiency or productivity comparisons, the Network Services operating costs for Envestra are reduced to $4.01M. Figure 16, below, represents the breakdown of the benchmarkable costs captured within these Network Services activities. Unfortunately, other participating companies were unable to breakdown costs into these activity areas as requested, thereby limiting the detail of benchmarking originally intended for Network Services.

Figure 16: Envestra Network Services cost submission waterfall chart

Data supplied but not suitable for public disclosure due to commercial sensitivity

In order to fairly assess Envestra's Network Services operating costs and service levels an understanding of their operating environment and existing assets is required. The age profile of Envestra's installed below-ground assets appears somewhat abnormal in that it is characterised by significant proportions of very new asset and very old asset, with relatively little installed asset in the mid-lifespan range. Figure 17a examines the age profile of Envestra's installed pipeline at ten-year age intervals, and highlights both the relatively recent capital investment in renewing or expanding the network as well as the looming concern associated with 30% of the network that has an average age of over 60 years.

We have carried out analysis to quantify the relationship between average pipe age and cost per kilometre to maintain. The results of this analysis were inconclusive due to limited data

Figure 17a: Envestra Ltd Network Age Profile

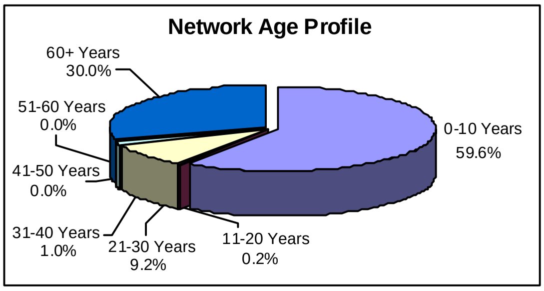
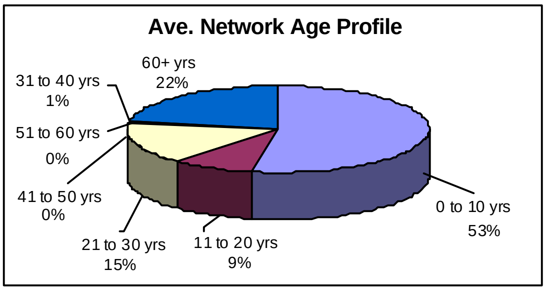


Figure 17b: Sample Average Network Age Profile



availability and a wide data variance. A lack of time-series data prevents us from analysing age profiles such as Envestra's, where over half the installed asset are relatively young but a significant portion of the asset is very old. It is therefore not possible to quantify the impact of this age profile on operating costs. Figure 17 therefore highlights that whilst the average system age for Envestra is around 26 years, which is comparable with the benchmark group average, there may be a considerable maintenance, response and replacement workload associated with the aging areas of the network, which cannot be accounted for in this quantitative performance analysis. Note however, that other non-controllable variables that are accounted for in our analysis, such as the percentage of cast iron pipe installed, are closely correlated with asset age and may provide a proxy adjustment for asset age.

Envestra's installed assets closely relate to average in terms of pipe materials, as might be expected. There is a significant proportion of installed cast iron / uncoated steel pipe (39%), much of which is the older (60+ years) pipe defined in the age profile of Figure 18a. As was defined in Section 3.3.1, cast iron pipe carries a significantly higher maintenance workload than other pipe types, which has been accounted for in the performance analysis. More recently installed pipelines have tended to be polyethylene or nylon. 53%, or 1100km of Envestra's pipelines are polyethylene or nylon, which are typically newer assets and are therefore contributing to the 59% of assets with an average age of less than ten years.

Figure 18a: Envestra Ltd Network Pipe Classification

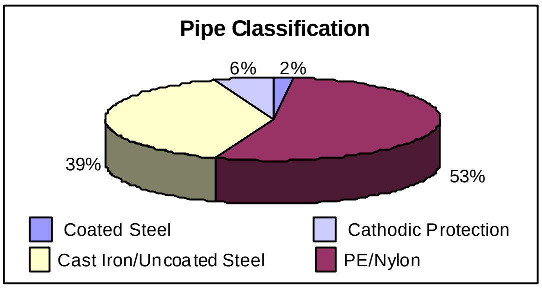
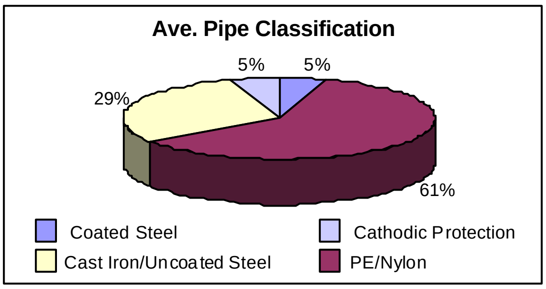


Figure 18b: Sample Avg Network Pipe Classification



Envestra were also asked to profile their network gas pressures according to numbers of kilometres of low, medium and high pressure pipe. 60% of Envestra's network is rated at medium pressure and 8% at high pressure. This leaves a relatively small 32% of pipeline at low pressure. As the ratio of medium or high pressure pipe installed rises, costs are expected to also rise. Network services benchmarks have therefore been adjusted accordingly. Results are illustrated in Figures 19a and 19b.

Figure 19a: Envestra Ltd Network Pressure Profile

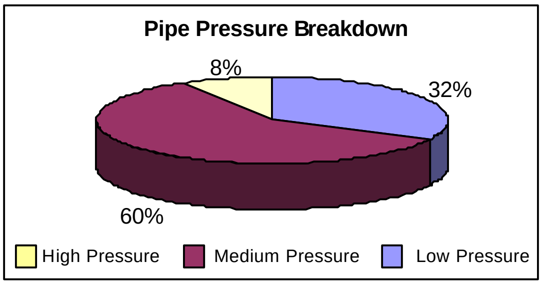
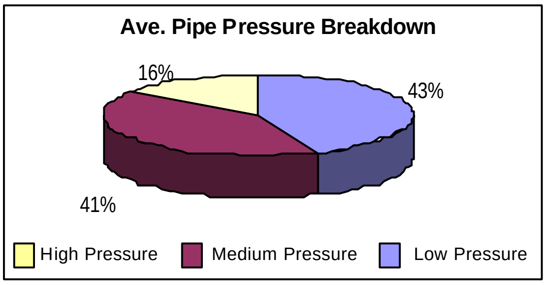


Figure 19b: Sample Average Network Pressure Profile

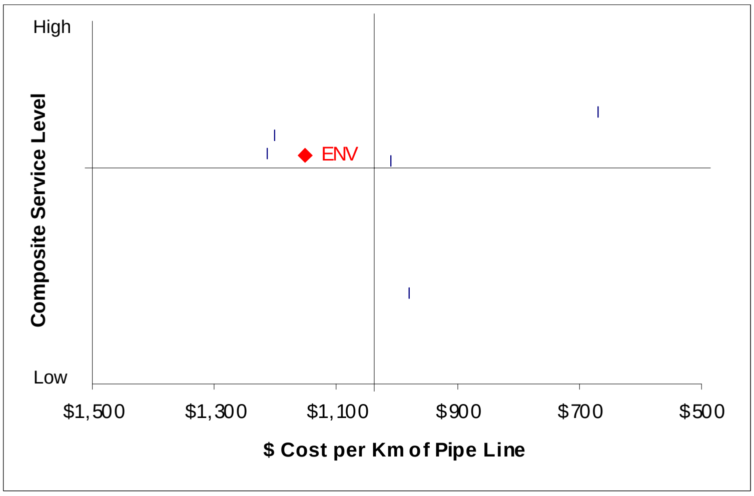


Envestra's performance in Network Services reflects its recent history in operations and maintenance as it works to maintain an aging asset. Network reliability is being well maintained and overall network related operational costs are slightly below the sample average. Figure 20 represents Envestra's overall benchmarked performance for its Network Service Operations indicating high service levels but slightly above average costs to maintain the network relative to the peer group. This chart presents overall costs for Network services expressed as cost per equivalent kilometre of pipe installed on the network for Envestra, and suggests that a 9.8% improvement in cost efficiency is achievable for Envestra's Network Services.

The term 'equivalent' is used to define the cost metric because data for each company has undergone comparative adjustment in order to realise a 'like for like' benchmarking comparison. In Figure 20, the workload data (where the proxy for workload is kilometres of pipe) has been adjusted to account for differences between participating companies

Figure 20: Overall Network Service Performance Scatter Plot

In a UMS scatter plot, the y-axis represents composite service level, whilst the x-axis represents cost per equivalent unit. Note that an equivalent unit is one that has been adjusted for comparative analysis purposes as discussed in the text. The cross hairs represent world average cost and service performance and best performing companies are located in the upper-right quadrant.



associated with; exchange rates, labour costs, percentage of unprotected iron pipe installed on network, and low, medium and high pipe pressures for installed pipeline, average asset age and customer density.

The very old asset component of Envestra's network may therefore be influencing O&M expenditure, but is possibly having a more significant impact on capital expenditure as those aging assets are replaced.

Network Services costs can be further broken down to represent costs associated with operating expenditure for above ground and below ground assets (See Figure 21), however, even at this level of data capture, data integrity begins to deteriorate (see Section 2; Data Acquisition). Unfortunately, as previously discussed, most companies were unable to provide costs at the activity level, thereby preventing any activity related analysis. In Envestra's case, costs could be apportioned into above and below ground asset maintenance for labour and contractor costs, but not for vehicle and equipment costs, which were therefore pro-rated across the above and below ground categories in order to produce the results displayed in Figure 21. Envestra appear to have a higher proportion of above ground asset operational costs than average, which might suggest a higher than average workload, or higher than average costs, in meter maintenance or gate station maintenance.

The Service Level analysis for Network Services represented in Figure 22 indicates that Envestra performed strongly in two of system reliability measures captured and but above average in terms of response times. The chart also highlights the limited data availability for reliability indicators from the participating companies, with only three service measure questions answered consistently and only two answered by all participants. It is worth noting that during this study, the Queensland gas distribution businesses advised that service level indicators presented herein are relevant but are insignificant in terms of their impact on operating and maintenance cost due to the very small number of incidents and outages experienced by consumers.

Figure 21: Above and Below Ground Asset Cost Proportions

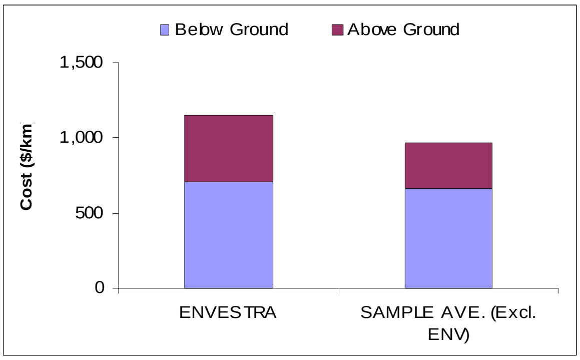
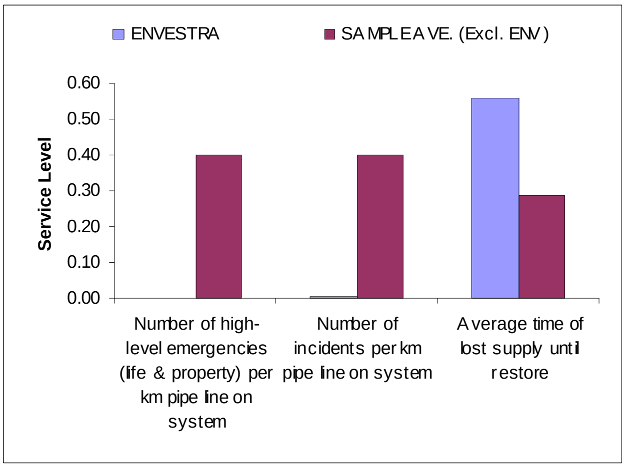


Figure 22: Network Services Service Level Indicator Breakdown



4.1.3.2. Overall Asset Management Performance - Envestra

Envestra Ltd was able to provide a higher level of detail for its Asset Management cost breakdown than most participating companies. Figure 23, below, displays the key cost components of Asset Management activities assessed for Envestra.

Figure 23: Asset Management Costs Breakdown

Data supplied but not suitable for public disclosure due to commercial sensitivity

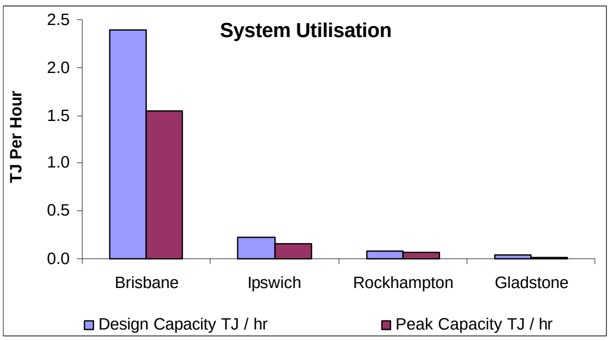
A large component of "other" costs has been removed from the analysis as these costs are not appropriate for benchmarking efficiency comparisons. Envestra reported $0.65M in 'other' costs, but a proportion of these costs relate to gas control monitoring and pressure survey analysis of the distribution system, which UMS Group considers to be operational asset management costs. Figure 24 quantifies the allowable 'other' costs.

Figure 24: Envestra's "other" Asset Management Costs

Data supplied but not suitable for public disclosure due to commercial sensitivity

Due to the geographic location of Envestra's gas distribution network, it must overcome a disparate geographical demand profile between its CBD areas and its more rural areas. The peak demand and capacity information presented in Figure 25 clearly illustrates the variance in demand and utilisation between the Brisbane area of Envestra's network, and the more regional areas. Unfortunately, this data is unavailable for other participating companies and therefore a direct comparison cannot be made.

Figure 25: Geographical Demand Profile



Envestra's Asset Management performance is better than the industry average on a cost per equivalent consumer basis, although the effectiveness in this activity group needs to be assessed in conjunction with capital expenditure and high level business indicators such as return on assets or return on revenue. Figure 26a charts the benchmarking results for Asset

Management costs per equivalent consumer, indicating a lower than average cost performance for Envestra. Figure 26b represents Envestra's Asset Management costs as a function of energy delivered, and indicates that a significant cost performance opportunity may be achievable. Finally, Figure 26c represents Asset Management costs per kilometre of pipe in the network, and shows Envestra to be below average costs.

Our analysis is limited in that sub-functional or activity based costing was not available to us for this benchmarking exercise, however the average performance opportunity for Envestra across these three measures indicates an overall cost that is approximately $5500 (0.6%) less than the industry average, given the scale of Envestra's operations. This figure has been used in determining the overall savings opportunity calculation for Envestra.

Figure 26a: Asset Mgt Costs Per Equiv Customer

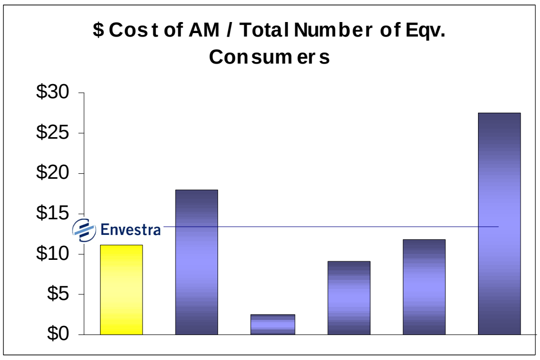


Figure 26b: Asset Mgt Costs Per GJ Energy Delivered

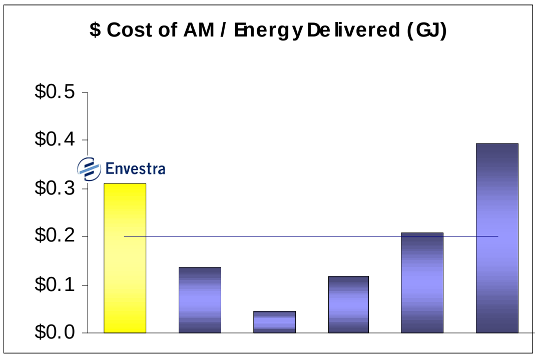
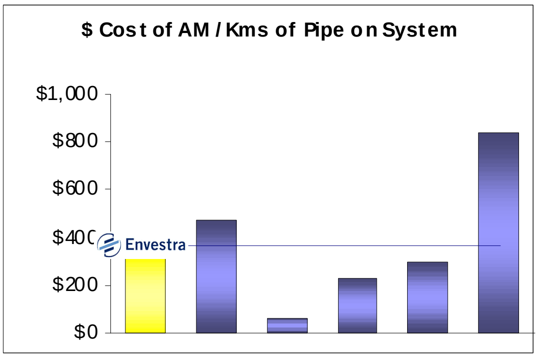


Figure 26c: Asset Mgt Costs Per Km Pipe on System



4.1.3.3. Overall Corporate Performance - Envestra

In the area of Corporate Overheads, including such activities as Human Resources, Finance and Accounting, Property Management, Management Services, Corporate Services, Fleet Management, Information Technology Services and Environmental Management, Envestra's O&M cost performance was better than industry average on a cost per equivalent customer basis. Envestra's submissions for corporate overhead costs by its key activities are presented in Figure 27..

Figure 27: Corporate Overhead Cost Breakdown – Envestra Ltd

Data supplied but not suitable for public disclosure due to commercial sensitivity

Figures 28 and 29 present Corporate Overhead costs for twenty four gas, water and electricity utilities businesses throughout Australia and New Zealand, with Envestra represented as the light-coloured bar on the chart. Figure 28 indicates that as a proportion of total operating cost for the business, Envestra's corporate overheads are above industry average and represent a 7.5% improvement opportunity relative to the sampled peer companies. However, on a cost per equivalent customer basis these Corporate Overhead costs appear well below average (Figure 29). Therefore at the overall corporate overhead level, it is difficult to quantify the performance improvement opportunity for Envestra, and a more detailed sub-functional analysis of corporate and support services is required. Our assessment of Corporate Overhead costs drilled down to assess corporate support services costs at a mid-level activity basis, with results for Envestra presented to the QCA, but not for publication due to commercial confidentiality issues.

Figure 28: Corporate Overhead Costs Per Total Operating Costs

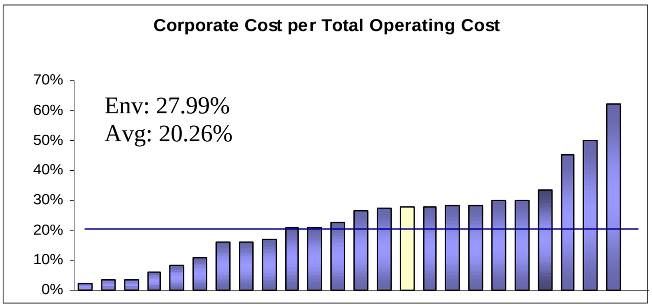
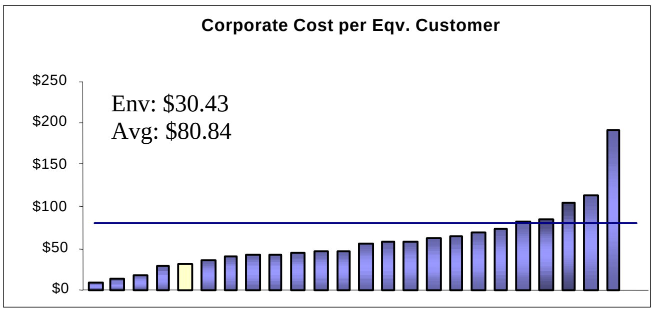


Figure 29: Corporate Overhead Costs Per Equivalent Customers



4.2. Allgas

4.2.1. Analysis of Submitted Data

Allgas submitted operational costs of $7.29 million in the July 2000 - June 2001 financial year for benchmarking across its Network Service, Asset Management and Corporate Overhead Activities. As indicated in Figure 36, $5.74 million of these costs were benchmarked, after removing $1.55M in payroll loading costs and "other" miscellaneous cost items that could not be categorised (See Appendices for definitions of activity categories). For each of these three activity areas, cost performance was assessed and is presented in the following sections.

Figure 36: Allgas cost submission waterfall chart

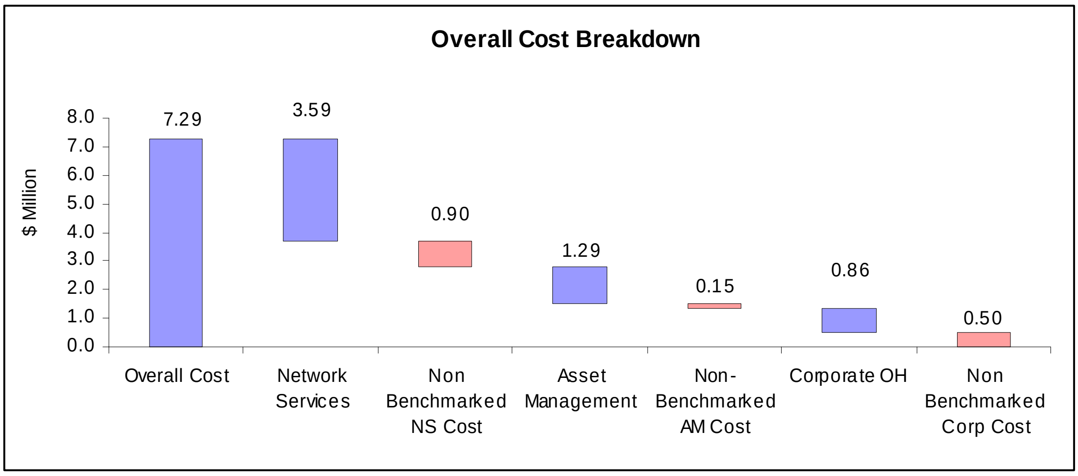


Figure 37a: Allgas Customer Profile

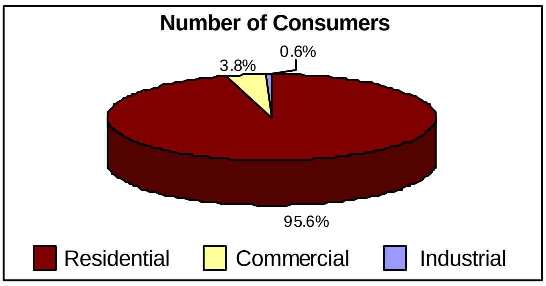


Figure 37b: Allgas Energy Delivered Profile

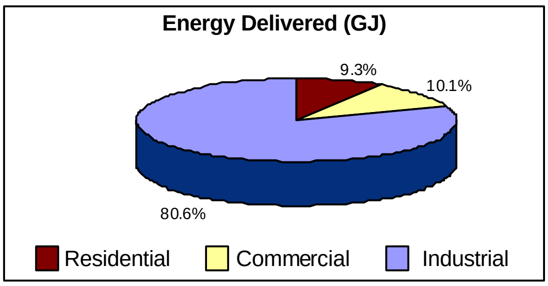


Figure 37c: Sample Average Customer Profile

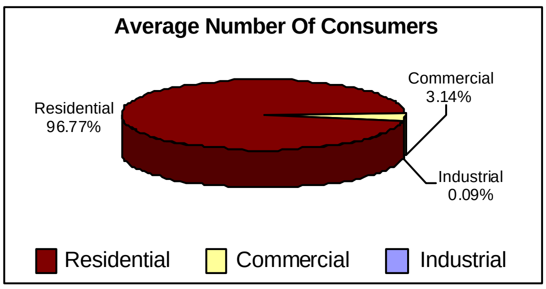
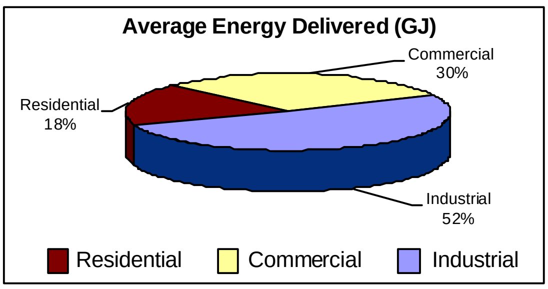


Figure 37d: Sample Average Energy Delivered Profile



As with Envestra, a number of network characteristics specific to Allgas should be reviewed and considered before interpreting performance benchmark results. Energy consumption, for example, is even more extremely weighted towards a few key large industrial consumers than that of Envestra. Around 81% of all energy delivered through Allgas' distribution network is consumed by 0.6% of its customer base. This is graphically displayed in Figures 37a, b, c and d, which represent the consumer base and energy delivery profile for Allgas and for the sample average as a proxy for industry average. Clearly, the proportion of industrial gas consumption in Allgas' network is significantly greater than average. Allgas reported 111 large industrial companies consuming over 10TJ of energy annually. This is slightly different from 109 accounts reported in Access Arrangement. Note also that residential customers represent 96% of Allgas' customer base and yet consume only 9% of the energy delivered through its network. This data suggests that most residential Queensland gas customers are low consumption customers with a low dependence on gas as an energy source. It is also of note that Allgas has a predominantly urban customer base, with no Central Business District (CBD) area.

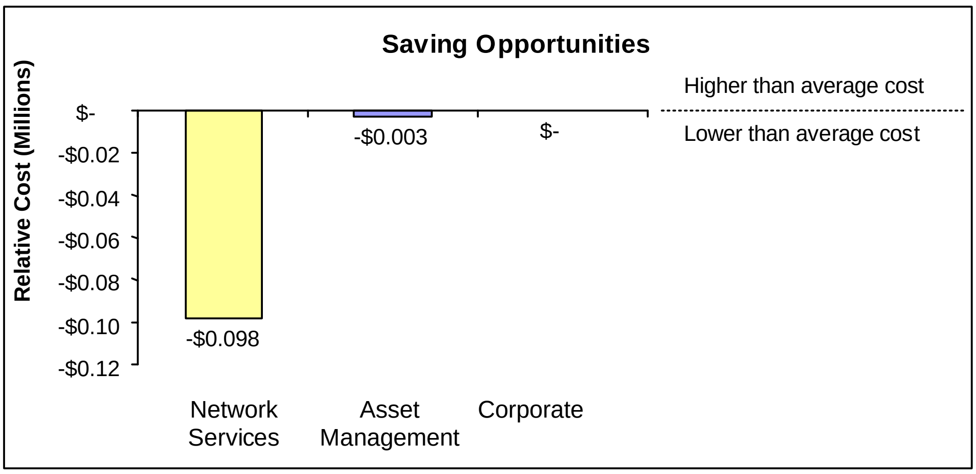
Allgas believe that whilst service levels play a significant part in its network management, gas customers experience few outages and the industry has a strong performance record. Therefore, service and reliability issues are of relatively less significance in the Queensland gas energy market than for other energy sources such as electricity. This is one of the reasons cited for limited availability of reliability and service level data.

Network asset factors are examined in more detail in the Network Services (Section 4.2.3.4) and Asset Management (Section 4.2.3.5) sections of this report.

4.2.2. Overall Performance Improvement Opportunity

Analysis indicates that overall, Allgas is operating at lower than average O&M costs compared to the sample average and therefore from a regulatory perspective Allgas' current performance exceeds reasonable expectations. Figure 38 highlights that Allgas' costs are well below average in Network Services and in Asset Management and Corporate Overheads, resulting in an overall $0.10M below average cost position for its gas distribution operations.

Figure 38: Cost performance for Allgas relative to peer average



4.2.3. *Sub-Functional Performance*

4.2.3.4. Overall Network Services Performance - Allgas

Allgas has reported $3.6 million in operating cost for its Network Service operations, but could not break these costs into their activity groups as requested. The only cost breakdown that could be provided by Allgas for these costs is that of above-ground and below-ground costs, as presented in Figure 43. Unfortunately, other companies did not accurately report data in this manner and therefore separate above-ground cost and below-ground cost benchmarks could not be calculated.

Allgas did not provide an age profile in the requested format, however the asset data they provided enabled an age profile to be estimated. Around 58% of installed pipe in Allgas' Network has an average age of less than ten years, a figure similar to that of Envestra (notably, a $DORC weighted age would possibly provide a different result to this length weighted age analysis). This could indicate either an intensive capital works program in the past ten years or the capitalisation of age-related asset replacement (reactive maintenance) activities, or a combination of both. Notably, Allgas has a relatively larger proportion of middle-aged asset on its network than does Envestra, but is still burdened with 20% of its asset at an average age of over 60 years. This older, mostly cast iron pipe is less reliable than pipe in the Envestra network, as leakage comparisons display, and therefore represents a significant maintenance workload for Allgas.

Figure 39a: Allgas Network Age Profile

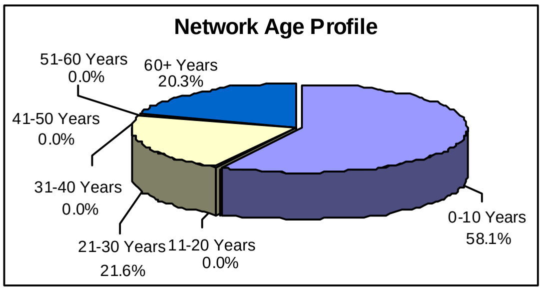


Figure 39b: Sample Average Network Age Profile

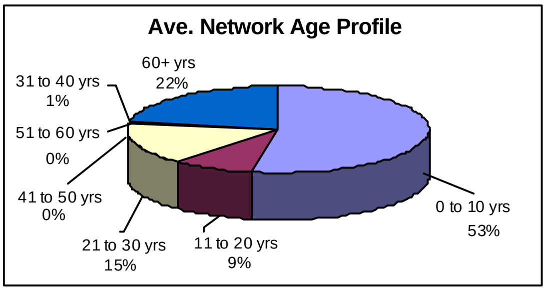


Figure 40a: Allgas Pressure Profile

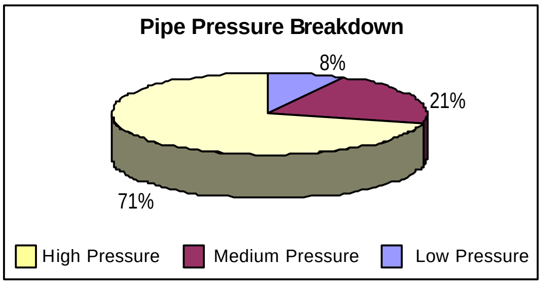
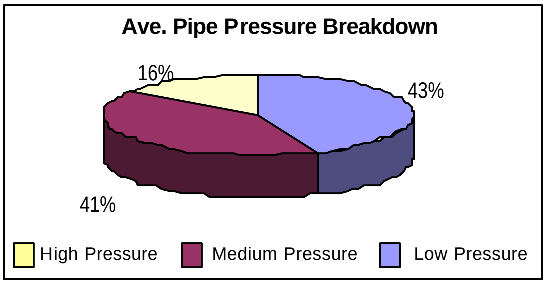


Figure 40b: Sample Average Network Pressure Profile



We have also examined the asset profile of Allgas and results indicate a disproportionately high percentage of high pressure pipe on the Allgas network (see Figures 40a and 40b). Our analysis indicates that high pressure pipe represent higher maintenance cost than low pressure pipe, therefore possibly burdening Allgas with a comparatively higher workload than other gas distributors. Our performance analysis therefore makes an adjustment for pipe pressure in order to overcome this disparity.

The breakdown of installed pipe by material type provides another interesting insight into Allgas' distribution network. Data suggests Allgas has proportionately less cast iron and more coated steel on its system than does Envestra. Allgas also has less cathode protected pipe installed relative to Envestra and industry average. Both cathode protected pipe and cast iron pipe represent increased maintenance workload to a network operator. Whilst data adjusters should adequately compensate for the lower cast iron content of Allgas relative to average in our analysis, no adjustment has been made with respect to cathodic protection, as a significant cost relationship could not be accurately determined.

Figure 41a: Allgas Pipe Classification

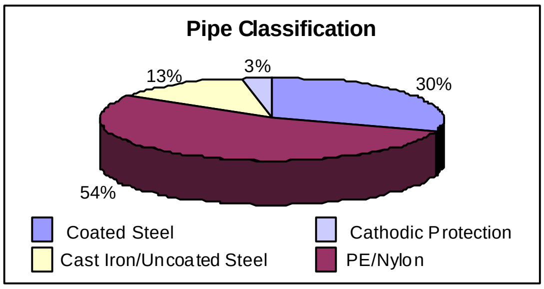
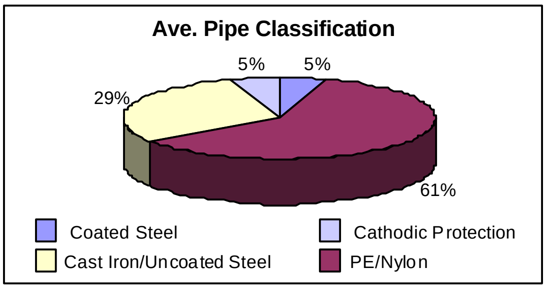


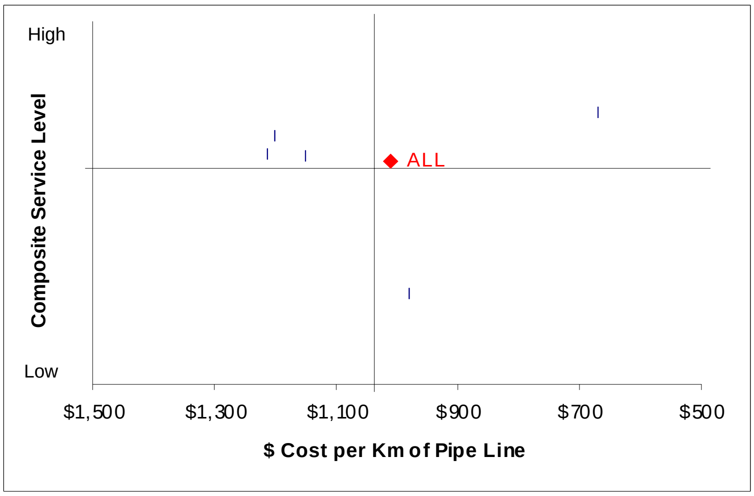
Figure 41b: Sample Average Pipe Classification



Allgas has focused on significantly decreasing operational costs in recent years, which is reflected in its results in the Network Services activities. Figure 42 presents adjusted Network Services operational costs per equivalent kilometre of pipe for the benchmarked sample group. Equivalent kilometres of pipe is the workload proxy for this analysis, and has been adjusted to account for differences between sampled companies with respect to the percentage of unprotected iron pipe in the network, the percentage of low, medium and high pressure pipe on the network, average asset age and customer density. This analysis,

Figure 42: Overall Network Service Performance Scatter Plot

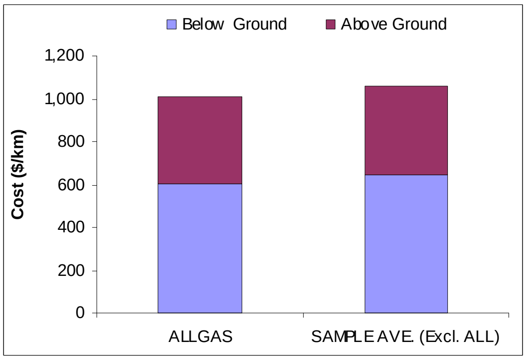
(See figure 22 for explanation of scatter-plot chart)



using the adjusted workload data, indicates that Allgas' cost per equivalent kilometre is around 3% better than the sample average. These benchmarking results also indicate that Allgas has an above average service level for its network relative to industry peers

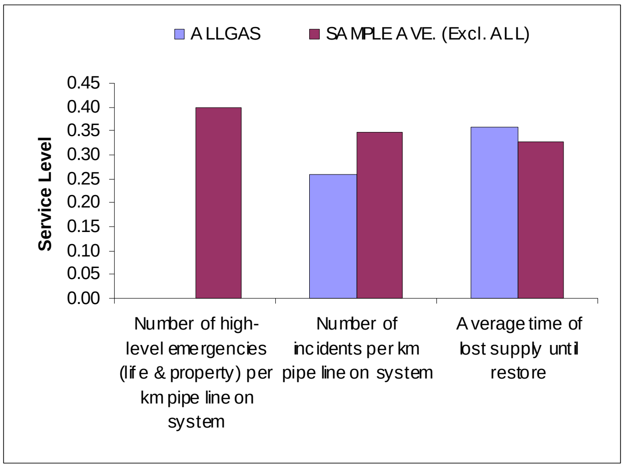
When Network Service costs are further broken down into above ground and below ground asset categories, Allgas can be seen to have recorded a percentage of above ground operational costs that is well aligned with the sample average, as presented in Figure 43.

Figure 43: Above Ground and Below Ground Asset Cost Proportions



A more detailed view of the Service Level analysis reveals that Allgas were lower than average in terms of numbers of incidents per kilometre of pipeline, but had a slightly slower response time to loss of supply incidents than the sample average. Allgas also reported zero high level emergencies for the 12 month assessment period, which was significantly below the sample average. Service Level results can be seen in Figure 44.

Figure 44: Network Services Service Level Indicator Breakdown



4.2.3.5. Overall Asset Management Performance - Allgas

Allgas could not provide a breakdown of Asset Management costs into the activity areas requested by UMS Group, but was able to categorise cost data into internal labour, contractor and vehicle costs as indicated in Figure 45.

Figure 45: Asset Management Cost Breakdown

Data supplied but not suitable for public disclosure due to commercial sensitivity

As with our analysis of Envestra's costs, UMS Group assessed Allgas' Asset Management costs on a cost per customer, cost per unit energy delivered and cost per kilometre of pipe basis. These metrics were adjusted for economies of scale relationships as discussed in Section 3.4. This data analysis indicates the Allgas have an above average Asset Management cost on a cost per equivalent customer basis, a below average cost on a cost per energy delivered basis and an above average cost on a cost per kilometre basis. The overall average performance position for Allgas calculated from these three indicators suggests Allgas' Asset Management activities are approximately $3000 (or 0.24%) lower than average and therefore no efficiency improvement targets are suggested for Allgas. Results are displayed in Figures 46a, 46b and 46c, below.

Figure 46a: Asset Mgt Cost Per Equiv Consumers

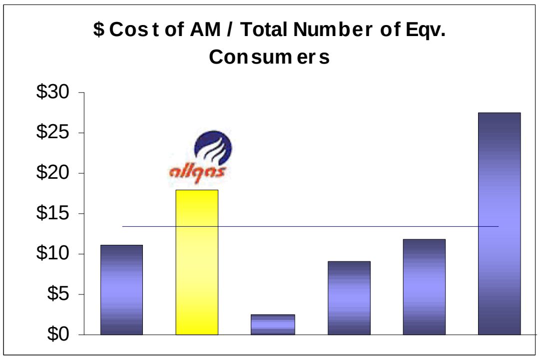


Figure 46b: Asset Mgt Cost Per GJ Energy Delivered

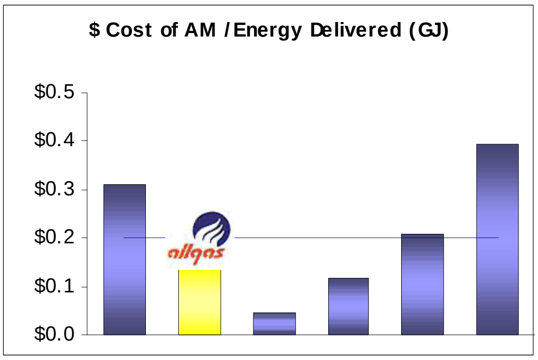
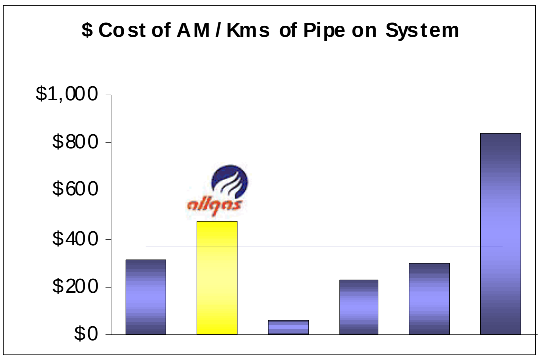


Figure 46c: Asset Mgmt Cost Per System Kms of Pipe



4.2.3.6. Overall Corporate Performance - Allgas

Allgas reported $1.36 million in operational corporate overhead costs in the reporting period, $0.50M of which was 'other' uncategorised costs that could not be benchmarked in this study. The $0.86M in benchmarked costs was broken down into a number of component cost items as displayed in Figure 47.

Figure 47: Corporate Overhead Cost Breakdown – Allgas

Data supplied but not suitable for public disclosure due to commercial sensitivity

Figure 48a: Corporate Overhead Cost per Total Operating Cost

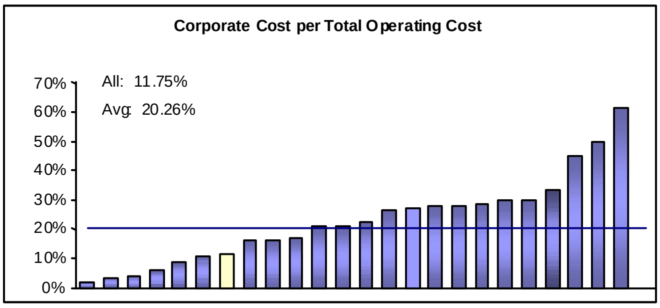
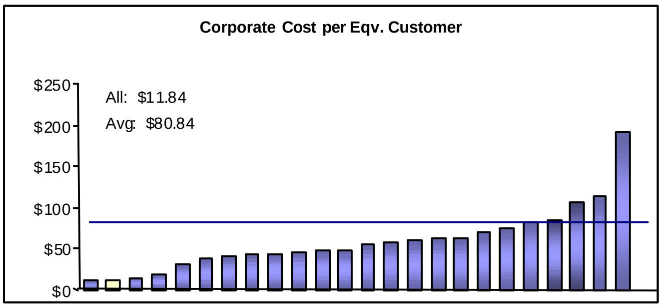


Figure 48b: Corporate Overhead Cost Per Equivalent Customer



Benchmarking analysis revealed that Allgas' Corporate Overheads are significantly lower than industry average. Allgas' overall corporate overhead costs represent 11.75% of its total operating costs for the gas distribution network compared to an industry average of 20.26%. Likewise, on a cost per customer basis, Allgas corporate overhead costs appear very low relative to other benchmarked companies.

ENERGEX provides most of the corporate support activities and therefore the associated costs to Allgas, and this analysis suggests that the allocation of its corporate costs to Allgas is small for the cost base of the gas business.

5. RECOMMENDATIONS

5.1. Review of Objectives

This study of the efficiency of the Queensland gas distribution industry has been conducted to address three core components of this assignment:

1. An assessment of current efficiency of the Queensland gas distributors and comparison with suitable peers leading to identification of any efficiency shortfall compared to industry best practice after adjusting for factors such as different operating environments;
2. Where an efficiency shortfall exists, identification of those areas where the shortfall can be reduced and assessment of the rate at which any such gap might reasonably be expected to be closed; and
3. Analysis of the likely impact of external factors on future performance and assessment of the likely scope for improvement in industry best practice performance over the next five years.

Although the study has been challenged by difficulties with data availability, we have created a performance assessment framework that provides for comparisons between the Queensland gas businesses and selection of suitable Australian, New Zealand and US peer organisations. A major tool in developing 'apples-to-apples' comparisons is a set of statistical performance adjusters that take account of measurable-uncontrollable variables which could potentially impact on cost performance. Section 3 of this report outlines these adjustment factors in detail, highlighting the work done to account for such non-controllable variables as scale economies and customer density.

5.2. Assessment of Current Efficiency

Overall, both Envestra and Allgas currently appear to be performing at levels at or close to the performance of its peers in the Australian market. After making adjustments for factors outside the control of Envestra and Allgas, their performance relative to the peer group average is as follows:

- Envestra has an overall performance gap to the peer group average of 4.3% in terms of operation and maintenance expenditure. This represents a savings opportunity of $0.38M for Envestra.
- Allgas' performance is approximately 1.3% better than that of the peer group average in terms of operation and maintenance expenditure. Overall, no savings opportunity was identified for Allgas

5.3. Identification of Where Shortfalls Can Be Reduced and Projected Improvement Rates

This study has shown that Envestra has an opportunity to improve overall efficiency, whilst Allgas is operating within a reasonable range of overall performance. As such, this section deals only with the Envestra summary.

For the purposes of this report, the table below indicates the percentage gap to peer group average at the functional level and hence represents the major improvement areas for Envestra.

	Percentage Improvement Gap to Peer Group Average			
Company	Network Services	Asset Management	Corporate	Aggregate
Envestra	9.8%	None	None	4.3%
Allgas	None	None	None	None

Given that this analysis has adjusted for each of the uncontrollable and quantifiable environmental factors outlined in Section 3 of this report (including average system age, economies of scale, etc), it is the view of UMS Group that closing this performance improvement gap is a reasonable target for the business. Experience shows that performance improvement agendas can take anywhere from one to five years on average to realise. It is usual to conduct a full change assessment to determine impediments to change and an appropriate period of change. Given that this has not been done within the scope of this engagement, we can only indicate that it is reasonable to expect that gap closures could be achieved within a period of five years. This would include keeping pace with industry improvement referred to below.

5.4. The Impact of External Factors on Performance

The Queensland gas industry is expected to be impacted by structural changes and performance improvement initiatives that are currently occurring within the global and national energy industry. Ownership changes, the emergence of multi-utilities, resource and competency sharing, economies of scale and scope, and higher consumer expectations for service and reliability will continue to drive performance improvements.

UMS Group has performed conservative calculations on data from Australia's electricity sector (ESAA) that indicate that performance improvements ranging from 4% to 51% were achieved over a three year period from 1996 to 1998. There is considerable variance in these calculations depending on the comparative metric used in each analysis; cost per customer, cost per kilometre and cost per GWh. The most conservative figures were derived through the cost per customer analysis, but there was still considerable variance between the Australian states in terms of efficiency improvements. Further calculations using UMS Group's extensive international database of electricity utility costs revealed performance improvements of 3.5% on average have been achieved over the past ten years in that industry. These calculations also revealed that in highly competitive regions, improvements have been in the order of 10-15% per year over the last three years. Without detailed research into historic trends in the gas industry both in Australia and internationally, UMS Group cannot produce similar analysis for the gas industry

Given that the Queensland businesses are not under the threat of full national competition, and in consideration of energy industry changes, it is considered that it is reasonable to expect the underlying performance of the gas distribution businesses improve at a rate that is in line with the lower range of performance improvements experienced in the electricity sector. UMS Groups suggests that that the gas distribution industry should therefore achieve cost efficiency improvement at a minimum level of 3.5% per year over the next five years, in line with the baseline trends experienced in electricity utilities highlighted above.

Note that these figures represent calculations from industry average performance. Best performing companies as discovered through a benchmarking exercise are typically those that have already realised productivity and efficiency improvements and therefore their scope to achieve further annual improvement may be reduced. The gap between the average for best performing companies and the industry average may therefore close over time, as the industry as a whole closes-in on the efficiency frontier.

6. APPENDICES

6.1. Definition of Terms

Above Ground Assets – Includes various above ground operational work such as meter maintenance, instrumentation, odorising plant and city gate station maintenance, painting (corrosion protection, etc.), SCADA systems operation, field checks, pressure transmitters and any other operation or maintenance associated with predominantly above-ground assets.

Adjusted – Various numerical analyses are performed on company-provided data to enhance comparability.

Age – Years from the time the equipment, structure, or component was installed, replaced or refurbished.

Asset Management – Key Asset Management sub-functions include Asset Strategy, Investment Planning, Contract Management, Performance Management and Industry Issues.

Benchmarking – Evaluating a company's cost, productivity, and service level performance against a peer group for the purpose of obtaining practice insights from the strongest companies, and hence, improving overall performance.

Capital Expenditure 'Capex' – Generally large system additions or improvements having a multi-year lifetime. These expenditures are charged against a company's earnings over a period of years, based on some predetermined amortisation schedule (straight-line, accelerated, etc.), as opposed to an expensed item, which is taken against earnings entirely in the year obtained. Any expenditure considered capital for the purposes of the Price Review must be in accordance with the rulings of the Australian Tax Office and Australian Taxation legislation for the distinction between maintenance and capital.

Capitalised Materials Costs – See Capital Expenditure 'Capex'

CBD – This network type is defined as a network that is supplying the central business district of a capital city. Customers and assets within this area will be classified as CBD.

Composite (Service Level) – Analytical technique that combines several different equalised and weighted service level scores to arrive at a single overall service level result.

Consumption – The quantity of gas metered at a customer's premises or groups of customer's or the entire network.

Contractor – An individual or firm that performs work (for a fee) on behalf of the utility, instead of or in addition to company personnel. This person would not be on the company / utility payroll.

Corporate Overhead Costs – Operational costs for Corporate Overheads are to be allocated across the nine sub-functional areas listed: Finance, Information Technology, Human Resource, Property Services, Management Services, Fleet Management, Corporate Support, Environmental and other.

Corporate Support – Business activities associated with corporate administration governance, secretarial, corporate communications and legal affairs.

Distribution – Distribution refers to the reticulation of gas in a system / network of gas pipes for supply to consumers. The distribution network starts at the city gate and end of gas transmission pipeline.

Effectiveness – For the purposes of benchmarking, EFFECTIVENESS is synonymous with Service Level.

Efficiency – For the purposes of benchmarking, EFFICIENCY is synonymous with Productivity.

Equipment Costs – Maintenance costs associated with equipment directly used within a given maintenance function.

Equivalent (Kms, Tasks, etc.) – Term used throughout benchmarking to indicate tasks or transactions that have been normalised to reflect inherent differences in workload driver distribution from one company to the next. To calculate EQUIVALENT TASKS/Kms each individual adjustment factor (e.g., pipe pressure, customer type) is assigned a multiplier based on industry standards for a task performed in that environment. A factor that takes the group longer than average will have a multiplier greater than 1, and a task that takes less effort than average for the group will have a multiplier lower than 1.

Function – A benchmarking Function is a major area of analysis such as Customer Service, Distribution, etc. (as opposed to a sub-function, which is an area of analysis within a function, e.g., Corrosion Inspections, Service Installation, Network Planning, etc.).

Human Resources Services – All corporate HR functions: Payroll, Recruitment, Corporate training costs and Corporate workplace health and safety.

High Pressure – High pressure is a nominal term referring to gas reticulated at a pressure above 500-1000 kPaG.

Information Technology / Business Systems – All IT costs and business systems support costs: Planning and administration, Infrastructure management, Desktop client services, Application projects, Infrastructure projects. It also includes rental/leasing charges and depreciation charges.

Inspection – Inspection of facilities includes any routine visual inspection of an asset.

Line length – Line length is a term referring to the length of gas main in the network or district, or a street.

Load Factor – The ratio of the average load over a designated period of time to the peak load occurring in that period.

Low Pressure – Low pressure is a nominal term referring to gas reticulated at a pressure below 15 kPaG.

Maintenance – The combination of all technical crafts, supervision, planning, scheduling and associated administration activities intended to keep equipment and structures in, or restore it to, a state in which it can perform its intended function. Maintenance includes all the necessary resources to deliver reactive fault and defect investigations and repairs. Maintenance of facilities includes any routine replacement, adjustment or treatment of facilities. Any structure modification, equipment modification or parts replacement are part of maintenance. Any in-kind replacement of existing assets due to age or degradation is considered maintenance unless the work is part of a system-wide improvement effort.

Management Services – All activities associated with CEO and Group Managers with direct support staff on business planning and business development.

Medium Pressure – Medium pressure is a nominal term referring to gas reticulated at a pressure greater than 15 kPaG and less than 500 kPaG.

Network Services - Network Services are defined as the operating, maintenance, construction and response activities performed on or for the gas network and its related assets. Network services do not include activities such as system planning, asset life-cycle planning, investment, risk management, corporate services, management services.

Operations & Maintenance Cost (O&M) – Costs which are taken as current year cash expenses associated with supervision and engineering, load dispatching, gas pipeline expenses, customer installations, structures and miscellaneous plant, expenses and rents. The resources necessary to provide inspection, maintenance and repair of pipes and equipment, protection and control equipment and auxiliary support equipment.

Overhead Costs – Costs associated with management, administration, legislative and regulatory requirements and obligations that are not directly associated with the job unit description but are required in order for the business to operate and manage its workforce. May also include marketing and advertising costs, etc.

Planned Outage – Pre-planned system outage not caused by an incident or mechanical failure. Typically used when performing maintenance or construction work which needs to be completed on an isolated area of the network or an isolated section of pipe. A single planned outage may require multiple switching or closure points to be operated to isolate the line or equipment.

Procurement & Materials Management – All activities associated with the purchasing, ordering, delivery, storage and warehousing of material and consumables.

Property Services –All activities associated the management, operation and maintenance of property facilities and land.

Refurbishment – Significant overhead line and substation equipment work intended to restore plant and equipment up to acceptable functional conditions.

Replacement – The one for one exchange of material and equipment.

Residential Customer – Ultimate utility customer typically in a residential house, apartment (flat) or other dwelling.

Rural – An area not having direct association with multiple permanent or seasonal residences and including right-of-way in areas of agricultural and forest land use. Rural areas are not intensively developed and typically include right-of-way occupied by native vegetation cover types, stocked with naturally occurring plant materials. Undeveloped sites within otherwise urbanised areas and undeveloped sites within residential neighbourhoods are considered rural sites.

Service Interruption – Customer complaint reporting a loss or degradation of utility service (electricity, gas or water).

Service Level – The quality of a particular task or transaction performed; generally including measures of speed, accuracy, and resulting customer satisfaction. Service level in benchmarking is usually a composite of several related measures, each properly weighted and normalised.

Sub-Function – Functional area within a benchmarking function. For example, sub-functions with the distribution program include network planning, service installation, and gas quality testing.

System Planning: Distribution design work performed for overall system and asset strategy. Includes system utilisation and planning studies, pipeline analysis, maintenance life-cycle cost studies, O&M standards policies and procedures, construction standards, policies, and procedures, equipment standards and specifications, etc. This also includes any distribution design work associated with Asset Management and Asset Strategy. This means any design work associated with high level budgets and any design work up to the point where you choose to undertake a specific project, including option analysis of system projects.

Total Revenue – Sum of all monies received by the company during the year.

Unplanned Outage – A system event, resulting in leakage, that was not part of planned or scheduled maintenance or construction.

Urban – An area in direct association with and in close proximity to permanent and seasonal residences and dwellings. Urban sites include developed lawn areas and other intensively landscaped areas, such as, business and industrial properties, parks and golf courses. Urban areas include areas where the vegetation is intensively managed and typically involve yard and street trees of high landscape or ornamental value. Urban networks are generally suburban areas surrounding the CBD of capital cities, plus any regional cities, centres, and towns with more than approximately 5000 customers.

Vehicle Costs – Total costs associated with the organisation's vehicles including leasing, purchasing, maintenance and fuel, depreciation and borrowing costs.