2013-2017 Gas Access Arrangement Review –

Access Arrangement Information

Appendix 3A:

AECOM –

Review of SP AusNet Gas Distribution Capex

Submitted 30 March 2012

SP AusNet
A member of Singapore Power Group

SP AusNet Gas Capex Review
SP AusNet
13 March 2012

Review of SP AusNet Gas Distribution Capex

Review of SP AusNet Gas Distribution Capex

Prepared for

SP AusNet

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Quality Information

Document Review of SP AusNet Gas Distribution Capex

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Reviewed by Craig Bergin

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
1	3-Feb-2012	Final draft	Craig Bergin / Project Manager	
2	7-Feb-2012	Revised final draft	Craig Bergin / Project Manager	
3	13-Mar-2012	Final	Craig Bergin / Project Manager	

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Terms of Reference

At the end of the current period the Australian Energy Regulator (AER) will update SP AusNet's Regulatory Asset Base (RAB). This will include adding conforming capital expenditure, which is capital expenditure that passes the test for new capital expenditure (as stated in Rule 79). Non-conforming capital expenditure will not be added.

SP AusNet requested AECOM to:

- Review their programme of capital expenditure over the current period and consider whether it is generally consistent with that of a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services. This will include a review of procurement and other relevant business process;

- Identify any potentially non-conforming capital expenditure and review it with respect to the justifications for new capital expenditure laid out in Rule 79 (2).

Executive Summary

In preparation for their upcoming Gas Access Arrangement Review (GAAR) SP AusNet has asked AECOM to review their capital expenditure over the period from 2008 to 2010 and to determine if it conforms with Rule 79 of the National Gas Rules. Rule 79, described in the box below, ensures that new investments are either necessary or provide value for money. Capital expenditure that does not conform cannot be added to SP AusNet's Regulatory Asset Base.

Rule 79 has two criteria:

- "Capital expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services"; and
- Must be justified on the basis of an economic, revenue, safety, integrity of services, regulatory obligation or demand justification.

We found that both SP AusNet's capital expenditure and the processes determining their capital expenditure are consistent with Rule 79. This is unsurprising since overall capital expenditure is 10.5 percent lower than that which is allowed under the last GAAR, as shown in the table below.

Capital Expenditure ($ million in July 2006 dollars)							
	2008	2009	2010	2011	2012	Total to 2010	Total
Planned Capex	66.0	73.3	62.7	59.9	58.4	202.0	320.3
Actual Capex	59.5	60.3	61.0			180.8	
Variation	(6.5)	(13.1)	(1.7)			(21.2)	
%	(9.8%)	(17.8%)	(2.7%)			(10.5%)	

Connections expenditure was the only significant overspend

The previous GAAR set allowed capital expenditure limits across a range of expenditure categories. Overspending in any one of these categories may be an indication of non-conforming capital expenditure. To date, the only significant overspend is a $13.7 million overspend for new connections. However, this can be explained by higher than expected demand for connections. Also, since SP AusNet must legally connect new customers, under the Gas Distribution System Code, this expenditure is a legal requirement and consistent with Rule 79(2).

Capital overhead was the only other item to be overspent. This is explained by a higher than anticipated number of connections, since connections were responsible for more than half of all capital overhead expenditure.

Internal processes support prudent and efficient capital expenditure

We reviewed all major internal processes relevant to capital expenditure decision making. Top level processes, which are publically documented, all demonstrate prudent and efficient decision making, consistent with accepted good practice. We also found that processes more specific to particular types of capital expenditure were consistent with Rule 79 and tended to align with the specific justifications listed in Rule 79(2). Finally, our review of businesses cases demonstrated that SP AusNet's stated processes are indeed put into practice.

Spending is driven by performance and safety standards

Overall, SP AusNet has spent about 10.5 percent less than allowed for under the previous GAAR. This largely results from a failure to achieve the targeted level of low pressure mains replacement, in a difficult capital market environment.

1.0 Introduction

In 2012, the Australian Energy Regulator (AER) will review the Gas Access Arrangement for SP AusNet's gas distribution network. This will include a review of capital expenditure over the previous period. In preparation, SP AusNet has asked AECOM to review their capital expenditure and to determine whether, and to what extent, any expenditure did not conform with Rule 79 of the National Gas Rules.

We did not discover any evidence of non-conforming capital expenditure. This is not surprising, since the conditions of the previous Gas Access Arrangement Review (GAAR) generally discourage unnecessary investment during the regulatory period. In fact, spending in several capital expenditure categories was lower than expected as a result of efficiency savings and the lower than targeted level of low pressure mains replacements. Key issues and our conclusions are identified in Table 1.

Table 1 Key issues identified during the review

Issue	Explanation	Conclusions and comment
Connections overspend	- Higher than forecast connection rates in every year of the current Access Arrangement period (for example, in 2010 actual connections were approximately 20,000 compared to a forecast of 14,000); and - Unit rates have also been consistently higher than the GAAR benchmark.	SP AusNet must connect new customers, so the number of new connections is beyond their control. Although the unit rates are higher than the benchmark, we are satisfied, following a review of procurement processes, that these rates are competitive.
Overhead overspend	- Higher than forecast connections also lead to higher overhead costs	
LP pipe replacement underspend	- It is expected that the replacement rate will average approximately 75 km per annum against a benchmark estimate of 90 km per annum; and - The unit rate is lower than forecast due to cost efficiencies and the selection of lower cost zones, to minimise the replacement backlog.	A lower than expected level of expenditure does not suggest non-conforming expenditure. Additionally deferring LP pipe replacement, where safe, is a prudent response to higher capital costs. We note that this deferral is likely to compound the quantity of mains that need to be replaced during the next regulatory period.

Our review of SP AusNet's capital expenditure analyses capital expenditure at multiple levels. This analysis is set out in the following sections:

- **Section 1.0 Introduction:** The remainder of this section highlights relevant capital market conditions, explains the requirements of Rule 79 and our approach to this review
- **Section 2.0 Business Overview:** This section introduces SP AusNet's network, its ownership and the incentives for prudent and efficient operation provided by the regulatory environment.
- **Section 3.0 Business Processes, Policies and Decision Making:** This section reviews SP AusNet's internal policies and processes, and considers whether these are consistent with a prudent service provider acting efficiently and whether they provide a justification for works consistent with Rule 79(2).
- **Section 4.0 Review of Actual Capex**: This final section reviews actual expenditure, compares it to what has been allowed under the last Gas Access Arrangement Review (GAAR) and generally considers whether it is consistent with Rule 79.

1.1 Capital Market Conditions

Shortly after the GAAR was finalised, in late 2007, the Global Financial Crisis (GFC) began. As a direct result of this, debt became less available and substantially more costly. Consequently, many businesses cut or deferred their planned capital expenditure. This is a prudent and often efficient response to a sudden increase in the cost of capital.

The same strong incentives to defer capital expenditure have also applied to SP AusNet's gas network over the regulatory period. We also note that the higher cost of debt was unlikely to be fully included in the WACC estimate because the GFC began after the GAAR was finalised. This has provided an additional incentive to prudently reduce or delay particular works.

1.2 Our Approach

For capital expenditure to be added to the Regulatory Asset Base the National Gas Rules state that the expenditure must be consistent with Rule 79 'New capital expenditure criteria'. Under Rule 79, new capital expenditure must meet two criteria:

- The first criterion, under Rule 79 (1), is that "the capital expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services"
- The second criterion is that the expenditure must be justified on one of the grounds laid out in Rule 79 (2). These are listed in Table 2 below.

Table 2 Summary of valid justifications for work under Rule 79 (2)

Justification	Relevant text from Rule 79 (2)
Economic	The overall economic value of the expenditure is positive
Revenue	The present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capital expenditure
Safety	The capital expenditure is necessary to maintain and improve the safety of services
Integrity of services	The capital expenditure is necessary to maintain the integrity of services
Regulatory obligations	The capital expenditure is necessary to comply with a regulatory obligation or requirement
Demand	The capital expenditure is necessary to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity)

Because it was not possible to review all capital projects in depth, we instead reviewed the regulatory incentives SP AusNet faces and their overarching approach to capital expenditure and asset management. We then considered specific internal processes, relevant to capital expenditure decision making. Then finally, we reviewed the capital expenditure accounts and evidence from business cases and budget approvals. Table 3 below provides a summary of this our approach.

Table 3 Analysis framework

Location in report	Items reviewed	Review questions
Section 2	Regulatory Incentives	Under Rule 71 the AER may infer compliance from the operation of an incentive mechanism. - Do regulatory incentives encourage prudent and efficient operation?
Section 3	General business processes	- Are general processes that of a prudent service provider, acting efficiently? - Are processes consistent with accepted good practice?
Section 3	Specific capital expenditure prioritisation processes	- Are specific processes that of a prudent service provider acting efficiently? - Are specific processes accepted good practice? - Are processes aligned with the valid justifications for new capital works shown in Table 2?
Section 4	Actual capital expenditure	- Is expenditure higher or lower than what was allowed for in the previous GAAR? - If expenditure was higher, is it higher for a reason which is consistent with Rule 79?
Section 4	Business cases	- Are general processes that of a prudent service provider acting efficiently? - Are they generally accepted good practice? - Are processes aligned with the valid justifications for new capital works shown in Table 2? - Do business cases provide evidence that stated processes are actually followed?

2.0 Business Overview

2.1 Regulatory Environment

SP AusNet's gas networks are regulated by two state agencies and one federal agency. The two state agencies, the Essential Services Commission (ESC) and Energy Safe Victoria (ESV), impose safety, performance and commercial standards and obligations. In several areas of capital expenditure, this makes a level of investment obligatory. The federal agency, the Australian Energy Regulator (AER), imposes economic regulation, which both sets prices and provides incentives for SP AusNet to reduce costs, delay capital works and reach benchmark levels of performance.

2.1.1 The Gas Distribution System Code

The Gas System Distribution Code administered by the ESC lists minimum network performance standards that SP AusNet must meet. Key standards include minimum gas pressures and benchmark levels of unaccounted for gas. Meeting these obligations often drives investment. For instance, augmentation works is almost solely focused on maintaining minimum gas pressures. A further key obligation of the Code is to connect any customer who requests connection and falls within a particular area. Again this obliges a level of investment. Although the Code focuses on the service consumers receive, there is often a safety element to this. For example, unaccounted for gas is often a symptom of gas leaks which pose an increased risk to the general public. SP AusNet addresses this risk and aims to meet the unaccounted for gas benchmark by replacing the most problematic pipes— old cast iron mains (up to 80 years) with new high pressure polyethylene mains.

2.1.2 The Gas Safety Act and Regulations

The Gas Safety Act imposes a very broad obligation on Victorian gas network operators to manage risks to safety arising on their networks. In particular, S32 states:

> *"A gas company must manage and operate each of its facilities to minimise as far as practicable—*
>
> *(a) the hazards and risks to the safety of the public and customers arising from gas; and*
>
> *(b) the hazards and risks of damage to property of the public and customers arising from gas; and*
>
> *(c) the hazards and risks to the safety of the public and customers arising from—*
>
> *(i) interruptions to the conveyance or supply of gas; and*
>
> *(ii) the reinstatement of an interrupted gas supply."*

The Gas Safety (Safety Case) Regulations 2008 go on to further define risk management on gas networks. Under the regulations, SP AusNet must submit a Gas Safety Case to ESV every five years. The Safety Case must name people responsible for the operation of the gas network and must describe how the network will maintain the safety of employees, contractors, consumers and the general public. The regulations also require SP AusNet to monitor, audit and review the safety management system and to record and report on safety incidents.

Although the Gas Safety Case tends not to impose minimum performance standards, it does commit SP AusNet to internal risk management processes and allocates responsibility for adhering to those processes. In turn, these processes can drive the need for capital works.

2.1.3 The Gas Access Arrangement 2008 - 2012

The Gas Access Arrangement determines the prices SP AusNet is allowed to charge over a five year period, based on past and future capital expenditure, benchmark operating costs and network performance. Historically, this was administered by the ESC. However, on 1 July 2008 the Australian Energy Regulator (AER) was given this responsibility under the National Gas Law and the National Gas Rules. Under the transitional arrangements of the Law, SP AusNet is still bound by some of the licences, codes and guidelines—such as the Gas Safety Distribution Code—issued by the ESC.

Under the Access Arrangement SP AusNet's allowable revenue is determined in part by its capital expenditure over the five year regulatory period. So long as the capital works are completed SP AusNet will keep this revenue. However, the capital cost of capital works can be reduced by delaying them within the period, thereby encouraging SP AusNet to delay capital works. It should be noted that, so long as standards are maintained and other project costs do not increase, this delay is efficient.

The Access Arrangement aims to encourage efficient operation and it provides incentives to achieve this. The efficiency carryover mechanism provides for a sharing, between customers and network service providers, of any savings achieved in operating and capital expenditure. In regard to operating expenditure any permanent saving is retained by the business for five years, after which customers benefit from that cost saving. Similarly in regard to capital expenditure, network service providers retain the return of capital unspent for five years, after which prices are adjusted to reflect the capital saving. In this way customer prices reflect a lower return on and of capital pursuant to the capital efficiency achieved.

The Efficiency Carryover Mechanism (ECM) rewards SP AusNet for delivering particular capital works at a lower unit cost. The mechanism sets benchmark unit costs for delivering particular works, namely Low Pressure (LP) pipe replacement, meter replacement and customer connections. If SP AusNet can complete the work at a lower unit cost, forecast prices reflect the original benchmark cost for five years and as a result SP AusNet keeps a portion of the savings. Conversely, if unit costs are higher than the benchmark, prices continue to reflect the lower benchmark unit cost, which imposes a penalty.

2.2 Ownership

The gas network is owned by SP AusNet, which is in turn 51 percent owned by Singapore Power Limited and 49 percent owned by public investors. As well as the gas network, SP AusNet owns an electricity transmission and distribution network.

At the time of the previous GAAR, SP AusNet and Tenix jointly owned 'T-squared', a company which provided services to the SP AusNet's gas network. We understand this relationship has now ended.

2.3 Network Overview

SP AusNet owns a large gas transmission and distribution network covering Western Metropolitan Melbourne and South-West and West Regional Victoria. This network supplies gas to 600,000 customers over a geographically diverse region, spanning around 60,000 km^2. The network consists of standard equipment including mains, mainline valves, pressure regulating facilities, service pipes, meters and ancillary equipment.

The network has been progressively built over more than one hundred years. As a result pipes within the network are made of a variety of materials, as shown in Table 4. Before polyvinyl chloride (PVC) was introduced in the late 1970's, cast iron and steel were the most common pipe materials. Then later polyethylene was introduced and is still used today. Older cast iron and steel pipes still exist on the network. However, they tend to corrode and are problematic within the low pressure network. Consequently, low pressure cast iron and steel pipes are gradually being replaced with high pressure polyethylene pipes.

Table 4 **Network composition by pipe pressure and material (December 2010)**
Source: SP AusNet (2011), Asset Management Strategy: Gas Distribution Network

Material	Low Pressure	Medium Pressure	High Pressure	Transmission Pressure	Total
Cast Iron	587km	21km	-	-	608km
Polyethylene	22km	252km	5,393km	-	5,667km
PVC	546km	-	-	-	546km
Unprotected Steel	122km	265km	-	-	387km
Protected Steel	43km	213km	2,237km	183km	2,676km
Other	<1km	-	-	-	<1km

3.0 Business Processes, Policies and Decision Making

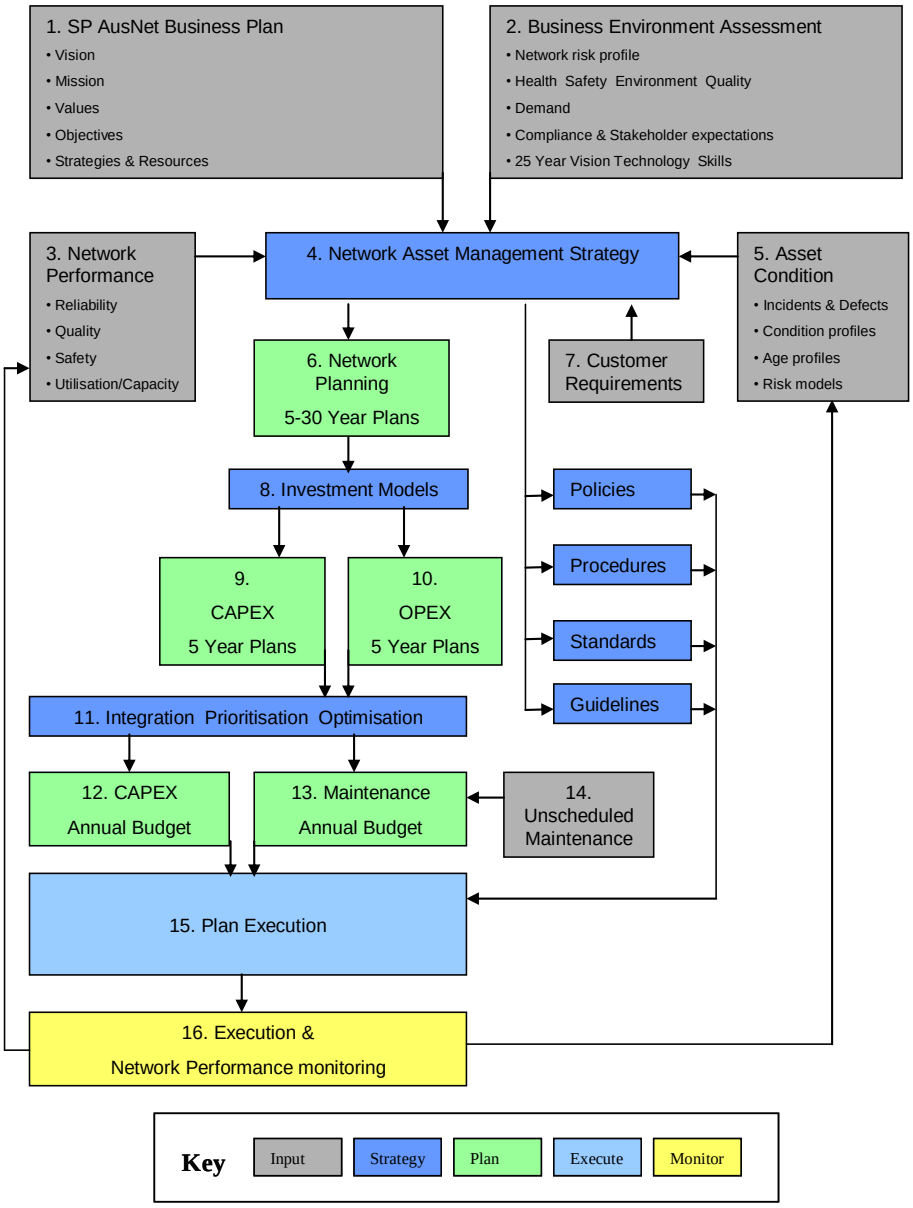
This section examines the internal business processes and policies of SP AusNet which have an impact on capital expenditure decision making. In each case, we consider whether the process or policy is accepted good practice and if it is consistent with a prudent service provider acting efficiently and, where relevant, if it is consistent with the other provisions of Rule 79.

Our analysis in this section is based on the Asset Management Plan (SP AusNet (2009)), Asset Management Strategy (SP AusNet (2011)), interviews and internal documentation.

3.1 Asset Management Approach

SP AusNet's Asset Management approach and process sets the context for capital expenditure decision making. This process is detailed in its Asset Management Strategy and is summarised in Figure 1 below.

Figure 1 Asset Management Process
Source: SP AusNet (2011), Asset Management Strategy: Gas Distribution Network



3.1.1 Asset management drivers

Among other things, the Asset Management Strategy (SP AusNet (2011)) defines Asset Management drivers and describes, at a high level, the capital expenditure decision making process. According to the Asset Management Strategy, capital expenditure can only be approved if it is needed to meet a regulatory requirement or if it is cost benefit justified.

The Asset Management Strategy states:

> *SP AusNet is focused on delivering optimal distribution network performance at efficient costs. Except in the case where outputs are mandated, this requires an explicit cost benefit analysis to be undertaken in order to assess whether the overall economic value of capital expenditure is positive. In doing this, SP AusNet assesses the incremental costs of delivering an incremental change in network performance to customers, relative to the incremental benefits accruing to customers from the delivery of that enhanced network performance.*

The Asset Management Strategy goes on to develop a methodology for considering the economic value of capital expenditure, which is both based on, and consistent with Rule 79. The Asset Management Strategy also highlights five drivers, which are particularly aligned with the requirements of Rule 79 (2). Table 5 below lists these drivers and the Rule 79 (2) justifications that relate.

Table 5 Alignment of asset management drivers with Rule 79 justifications

Asset Management Driver	Relevant justifications appearing in Rule 79 (2)
Safety	- Safety of services - Regulatory obligation or requirement
Quality	- Integrity of services - Regulatory obligation or requirement - Capacity needed to meet demand
Economic	- Positive overall economic value - Positive present value of expected revenue minus project costs
Operational	- Integrity of services - Regulatory obligation or requirement
Environmental	- Regulatory obligation or requirement
Network Growth	- Integrity of services - Regulatory obligation or requirement - Capacity needed to meet demand

3.1.2 Publically Available Specification (PAS) 55

PAS 55 is an Asset Management standard developed in the United Kingdom and designed to optimise the management of physical infrastructure. Over recent years, it has gained very wide acceptance as the preeminent standard for the management of utilities and public infrastructure.

SP AusNet was granted PAS 55 accreditation in March 2011. We believe this is a very strong endorsement of SP AusNet's Asset Management practice.

3.2 Capex Prioritisation and Approval Process

SP AusNet has a variety of processes for identifying and prioritising projects, many of which are specific to particular types of capital expenditure, and are explored in more depth below. However, these specific processes are encompassed by an overarching approach which is detailed in the Asset Management Plan (AMP). In summary, the process consists of the following four key steps:

- **Identify the network need:** SP AusNet engages a Network Operations team, who monitor the performance of the network. The team member identifies current and emerging system needs, drawing on information available in the record of assets, asset condition monitoring and system modelling. Where the need is legitimate, an appropriate service standard is identified. This need is likely to be meeting a security, safety, quality, service, operational or environmental standard. Outcomes against the standard are then forecast in the case where nothing is done (the 'do nothing' option)
- **Evaluate options:** The project initiator prepares a business case which considers the costs and benefits of two or more options for addressing the system need and proposes that a particular option be selected. The proposed option either needs to be the least cost option for meeting regulatory obligations or demonstrate a net economic benefit (as defined by Rule 79). The business case is then reviewed and refined by the Network Owner, Management Accountant, Finance and by the Project Management Office
- **Add project to list of selected projects:** Proposed projects are then prioritised and, if approved by the Infrastructure Assets Approval Committee (IAAC), are added to a list of projects due to commence over the following eighteen month period
- **Develop and reconsider projects:** Selected projects are progressively developed and costed. If the forecast cost of the project rises or the benefits decrease outside of agreed tolerances then the project reverts to being a candidate project, rather than a selected project.

This overall approach is very similar to that commonly adopted in many regulated utilities and is consistent with accepted good practice capital expenditure decision making. In particular, the process allows appropriate review, compares options and identifies the optimal option based on minimum standards, cost and economic benefits. The process also makes appropriate use of new information, by reconsidering projects as further information becomes available.

3.2.1 Customer connections

If customers request connection and meet specified criteria, SP AusNet is legally obliged to connect them under the Gas Distribution System Code. However, if the cost of the connection exceeds what SP AusNet is likely to recover through revenue from that connection then they request a customer contribution. We have reviewed the customer contribution model and can confirm that the contribution calculated is the Net Present Value (NPV) of capital and operational costs minus revenue.

There appears to be little scope for non-conforming connections expenditure within this process because the process only meets and does not exceed SP AusNet's legal obligations, and because a regulatory obligation is a justification under Rule 79 (2). Consequently, expenditure will always be conforming, as long as, the connection is requested and the connection is not over specified. Additionally, customer contributions ensure that the expected present value of the project is positive, which is a further justification under Rule 79 (2).

3.2.2 Low pressure pipe replacements

The gas network includes 587km of cast iron, Low Pressure (LP) mains, which have exceeded their design life and are the major source of leaks and system faults on the network. SP AusNet are currently engaged in a programme to replace all their low pressure pipes (including cast iron pipes and pipes made of other materials) with new high pressure polyethylene pipes. The programme has set a target to replace 90km of low pressure pipe annually, which will see all low pressure pipe decommissioned by 2025.

Although high pressure polyethylene pipes are not a 'like for like' replacement for LP cast iron, they can be considered a modern day equivalent. Additionally, high pressure pipes have a higher capacity and so can help meet the need for extra capacity and delay the need for augmentation projects.

Given that only part of the LP network is scheduled for replacement each year SP AusNet have developed a two stage process to optimise replacement:

- **(Stage 1) List prioritisation:** During this stage a priority list of areas for mains replacement is created. Areas are prioritised according to four metrics, in decreasing order of priority, these are: Historical cast iron fractures, leakage rates, remaining technical life, historic operational expenditure.
- **(Stage 2) Spatial optimisation:** Replacing mains in blocks has a far lower cost than *ad hoc* piecewise replacement. During this stage, spatial analysis identifies and prioritises blocks for renewal. This analysis focuses on the mains identified in Stage 1, while also considering the proximity to mains prioritised for replacement, proximity to gas infrastructure that can support high pressure supply and the proximity to regulators, which enable mains removal.

We believe the overall approach is consistent with prudent and efficient capital expenditure. Three observations support this view:

- the systematic transfer of the low pressure network to a high pressure standard with an operating pressure above 140 kPa produces a more reliable, safer network with a lower operating cost
- the prioritisation process targets higher risk areas first
- the block renewal approach reduces the cost of replacement per kilometre.

3.2.3 Meter replacements

The meter replacement process is designed to be compliant with the Gas Distribution System Code (in accordance with AS/NZS 4944:20006). Additionally, we find the replacement process supports prudent and efficient replacement. In particular, the process gains economies of scale through batching replacement and efficiently delays replacement, where testing demonstrates that metering accuracy can still be maintained. This process is summarised in
Table 6 below.

Table 6 Meter replacement process

Extending the field life of meters	**In-service compliance testing** of domestic meter families nearing the end of their compliance periods. The outcome of compliance testing leads to a field life extension (5, 3, or 1 year) or the meter family being removed from the field. In-service testing does not apply to Industrial and commercial meters.
Meter replacement	Meters are selected for replacement for three reasons: - **Domestic meter replacement program** to remove domestic meters (<10m^3/hr) meters at the end of the useful life (in-service compliance period), an outcome of the annual in-service compliance testing program. - **Industrial & Commercial meter replacement program** to remove I&C meters (>10m^3/hr) at the end of the useful life (in-service compliance period). The industrial and commercial program is not subject to annual in-service compliance testing. - **Non-compliant replacement program** to target meters that have remained in the field beyond their in-service compliance periods. - **Meter Faults:** Reactive replacement of meters that have failed within the field.
Meter refurbishment	Where possible meters are refurbished rather than replaced.

3.2.4 Augmentation

SP AusNet has a legal obligation, under the Gas Distribution System Code, to maintain prescribed gas pressures. As demand increases network pressure decreases. If pressure is going to drop below the prescribed pressure then mains reinforcement will be needed, or alternatively pressure reducing facilities will need to be upgraded and/or Greenfield installations required.

SP AusNet maintains a system model which estimates the impact of ongoing residential, commercial and industrial demand growth and the impact of other changes to the system. The model forecasts pipe pressures at locations throughout the network during a 1-in-2 peak winter day. This standard was previously established by VENCorp and is the equivalent of forecasting pipe pressure with a 50% probability that the pipe pressure is lower in that winter. SP AusNet also undertakes a programme of winter testing on parts of the network which modelling indicates may need augmentation. This is used to confirm the need for augmentation and update the model.

Following modelling and winter testing, SP AusNet schedule network reinforcement during the year before pressure would drop below standard pressures on a 1-in-2 winters day.

Having reviewed SP AusNet's process for identifying network augmentation projects, we find that it employs accepted good practice and is unlikely to result in unnecessary augmentation.

3.2.5 SCADA

Supervisory Control and Data Acquisition (SCADA) is used to maintain service quality (remotely or automatically), ensure system safety and gather system data. There is no particular process for prioritising SCADA work. However, expenditure normally occurs in tandem with other capital works, as an asset replacement or as part of an upgrade of network SCADA systems.

The direct value of SCADA is improved service and reduced operating costs. These benefits drive SCADA investments and are, in fact, essential for ensuring efficient operating costs. However, the information generated by SCADA also has significant indirect value since it helps forecast demand growth and identify network problems, which then enables more efficient capital expenditure. Without this information much greater investment would be required to maintain the same level of service. Given the impact SCADA has over the efficiency of the rest of the, much larger, capital expenditure programme, it is prudent to take a precautionary approach and not risk underspending in this area.

3.3 Procurement and Project Management

Good procurement and project management processes are essential components of an efficient and prudent approach to capital works. In order to verify the nature of SP AusNet procurement and project management, we interviewed one of SP AusNet's project managers and reviewed the procurement and project management process.

3.3.1 Procurement

All capital works at SP AusNet are procured through competitive tender. Each tender proceeds through the following steps:

- receive gas design (a high level description of works) from the Network Planning Group
- a project manager conducts a site visit
- the project manager prepares a high level cost estimate (The business case is also prepared and approved at this point)
- Project Manager prepares a detailed scope of works
- Project Manager issues a Request for Quotation (RFQ) to the panel of contractors. The panel comprises six contractors and is renewed every three years.

Where three or more tenders are received, the successful tender is selected on the basis of price and available capacity. Consequently, the lowest bid may not win the tender if they cannot demonstrate they have the capacity to complete the job. If a tender fails to attract more than three tenders, then the Project Manager needs to seek a Waiver of Competition from the appropriately authorised manager, before the winning bid can be accepted.

The gas network project managers employ a robust strategy to avoid the risk of being overcharged through contract variations. During the bidding stage, bidders are asked to include an allowance in their price for project risks, rather than limit the scope of their bid. If, however, the scope is limited, then the project manager asks for unit rates relating to the qualification. For instance, if a bidder limited their bid to work not involving the excavation of contaminated soil, then the project manager would request the unit rates for excavating contaminated soil and make a contingency allowance.

3.3.2 Monitoring and quality assurance

SP AusNet monitors and incentivises contractor performance through a penalty system which can deduct up to ten percent of the contract value for failure to meet Key Performance Indicator (KPI) targets. KPIs are monitored once or twice each month and include health and safety, timeliness and customer satisfaction. Customer satisfaction is determined through customer surveys of local residents and project manager assessments of impacts on customers.

The quality of work is also assessed before completed projects are signed off. Once work is completed, the project manager selects a ten percent sample of the work and assesses it. If the results are unsatisfactory then the entire job is evaluated and further work or penalties may apply.

3.3.3 Discussion

Accepted good procurement practice includes a wide variety of different approaches ranging from highly competitive to the much less competitive (but cheaper) 'preferred supplier' arrangements. SP AusNet's approach is clearly within this range of accepted good practice, albeit at the competitive end of this range. This approach can risk running up bidding costs for suppliers, which could reduce the pool of suppliers, in the long-term. However, we note that SP AusNet also encourages bids by conducting fairly substantial initial research and including that information in the scope of works. This makes bidding easier, less expensive and less risky for suppliers.

SP AusNet's strategy for avoiding unduly expensive contract variations appears to be fairly sophisticated and robust. This is no doubt in part due to the previous contracting experience of project managers. The approach to quality assurance and contract incentives, are both fairly effective and typical approaches within the gas industry.

Overall, SP AusNet employs an effective procurement and project management approach, which clearly falls within accepted good practice. We are satisfied the approach achieves value for money through a competitive tender process and a quality assurance mechanism encourages quality and timely delivery of capital works through financial penalties.

4.0 Review of Actual Capex

This section compares actual capital expenditure to that allowed under the GAAR, considers the reasons for any variation and seeks to identify any potentially non-conforming capital expenditure. We also review selected business cases and evaluate whether these individual projects are compliant with Rule 79 and are generally consistent with the SP AusNet's stated processes (as described in the previous section).

This review did not identify any non-conforming capital expenditure. However, some items were overspent; this arises from a legal obligation to connect new customers. Other expenditure was lower than allowed for.

Table 7 Comparison of overall capital expenditure to planned capital expenditure by year

Capital Expenditure ($ million in July 2006 dollars)							
	2008	2009	2010	2011	2012	Total to 2010	Total
Planned Capex	66.0	73.3	62.7	59.9	58.4	202.0	320.3
Actual Capex	59.5	60.3	61.0			180.8	
Variation	(6.5)	(13.1)	(1.7)			(21.2)	
%	(9.8%)	(17.8%)	(2.7%)			(10.5%)	

At the time this report is being prepared expenditure data is only available for the period from 2008 to 2010. Consequently, we have adjusted the allowed capital expenditure to only include the years 2008 to 2010 and compared actual capital expenditure to this benchmark. Also, all actual capital expenditure has been adjusted to reflect expenditure in 2006 dollars, consistent with the GAAR.

Overall, capital expenditure to the end of 2010 is 10.5 percent below that approved in the last GAAR, as shown in Table 7. Individual accounts, shown in Table 8, show much higher deviation from that allowed in the last GAAR. In particular, connecting new residential customers—required under the Gas System Distribution Code—cost $18.4 million (29.5 percent) more than the benchmark. Also, LP pipe replacement was significantly under spent, by 10.1 million (28.7 percent).

The remainder of this section examines each category of capital expenditure in more detail, apart from IT spending, which is addressed in a separate consultants report, and the Government Contribution, which was zero as expected.

Table 8 Comparison of overall capital expenditure, quantities and unit rates by category

Capital Expenditure ($ million in July 2006 dollars)					
		Approved	Actual	Difference	(%)
LP pipe replacement		35.3	25.1	(10.1)	(28.7%)
LP pipe – ad hoc replacements		0.0	0.3	0.3	
Residential connections		62.3	80.7	18.4	29.5%
Commercial / industrial connections		12.5	7.8	(4.6)	(37.2%)
Augmentations		4.1	3.6	(0.5)	(11.3%)
IT		28.3	18.5	(9.8)	(34.7%)
Residential meter replacements		12.3	6.4	(5.8)	(47.5%)
Commercial / industrial meter		3.3	0.9	(2.4)	(71.9%)
Other		22.5	10.0	(12.5)	(55.7%)
Gas extensions – NGEP		6.2	8.1	1.9	30.7%
Gas extensions - other		0.0	0.0	0.0	0.0%
Capital overheads		24.9	28.6	3.7	14.7%
Customer contributions		(9.6)	(9.2)	0.4	(3.8%)
Government contributions		0.0	0.0	0.0	0.0%
Total		**202.0**	**180.8**	**(21.2)**	**(10.5%)**
* Although the NGEP project is over-budget at 2010, it is now complete and there is zero variation from the total allowed capital expenditure for the project to 2012					
Quantities					
		Approved	Actual	Difference	(%)
LP pipe replacement	km	270	218	(52)	(19.2%)
Residential connections	Connections	41,682	49,615	7,933	19.0%
Commercial / industrial connections	Connections	1,099	710	(389)	(35.4%)
Residential meter replacements	Meter	117,740	83,140	(34,600)	(29.4%)
Commercial / industrial meter replacements	Meter	2,039	1,550	(489)	(24.0%)
Unit Costs					
		Approved	Actual	Difference	(%)
LP pipe replacement	$/km	130,333	115,215	(15,118)	(11.6%)
Residential connections	$/connection	1,494	1,630	136	9.1%
Commercial / industrial connections	$/connection	11,334	11,426	92	0.8%
Residential meter replacements	$/meter	104	76	(28)	(27.0%)
Commercial / industrial meter replacements	$/meter	1,646	618	(1,028)	(62.5%)

4.1 Low Pressure Pipe Replacements

Low pressure pipe replacement expenditure is $10.1 million (28.7 percent) less than allowed for up to the end of 2010. This results from a 52km (19.2 percent) decrease in the amount of pipe replacement activity completed, compared to what was allowed for.

We observe that the quantity of LP pipe replacement is lower than the targeted level. We also note that unlike other major expenditure items (connections, meter replacement, augmentation), spending in this area is not a legal obligation and so underspend may, as indicated by SP AusNet, have resulted from capital constraints caused by higher than expected customer connections in a context of difficult capital market conditions.

Given that less work was done than the benchmark and unit costs were actually lower than expected, there is no reason to believe this expenditure is non-conforming.

We also reviewed the business case for LP replacement during 2009/2010 and can confirm the justifications for work were in accordance with Rule 79 (2). The business case also demonstrated consistency with SP AusNet's stated LP pipe replacement processes.

Table 9 Review of LP pipe replacement budget approval

2009/2010 Gas Mains Renewal Program	
Type	Pipe replacement
Document date	September 2009
Approved Project Cost	$7,259,361
Construction Period	2009/2010
Description	The replacement of 49.9 km of LP pipe in Loeman St (Essendon North), Carnarvon Rd (Strathmore), Josephine Street (Oak Park), Jeffrey Street (Keilor East), Macey Ave (Avondale Heights), King St (Airport West), Grandview Road (Niddrie), Cameron Road (Essendon). This includes the replacement of 33.5km of cast iron pipe, 8.1 km of PVC pipe and 8.3 km of steel pipe.
Justifications for work	- Highest NPV of three options considered - Maintains safety and performance standards
Observations	- The expenditure is consistent with Rule 79 and justified on economic and legal obligation grounds. - Pipe replacement areas were prioritised consistent with SP AusNet's stated policy

4.1.1 Ad hoc LP pipe replacement

Ad hoc LP pipe replacement occurs in response to a significant LP pipe failure, such as a pipe fracture. Replacing these pipes is considerably more expensive per kilometre than planned pipe replacement, both because a premium is paid for urgent works and because economies of scale cannot be achieved.

The GAAR made no allowance for ad hoc pipe replacement. However, there has been $ 0.3 million of expenditure in this area. Given the extreme safety implications of not responding to significant pipe failures, we are satisfied that this expenditure is prudent and generally unavoidable. In addition, this expenditure is a legal obligation under S32 of the Gas Safety Act.

4.2 Residential, Commercial and Industrial Connections

Connections expenditure, to date, is $4.6 million less than approved for commercial and industrial connections and $18.4 million more than approved for residential connections. Consequently, the overall Connections account is $13.7 million overspent, making it the most overspent capital expenditure item. This overall overspend results from a higher than expected residential connection unit price and greater volumes of residential connections. This is at least partially explained by demand from high growth areas and new residential connections in towns which were recently connected to mains supply by the Natural Gas Extension Programme (NGEP).

Because connections are legally required under the Gas System Distribution Code, there is little scope for non-conforming capital expenditure. The slightly higher than expected residential connection unit cost (9.1 percent) is

a cause for some initial concern. However, SP AusNet has a robust procurement process (see Section 3.3). Consequently, we conclude that the higher unit costs are the result of genuinely higher costs. This is most likely either the result of more expensive connections in new, less compact, residential developments or an insufficient per customer benchmark allowance.

We also note that service providers uniformly requested higher unit rates during the last GAAR. Table 10 compares SP AusNet's proposed cost per residential connection to that ultimately set and the actual cost per connection.

Table 10 Cost per residential connection (in July 2006 dollars)

	2008	2009	2010	Average 2008-2010
Final	$1,464	$ 1,494	$ 1,525	**$1,494**
Proposed	$1,478	$1,513	$1,553	**$1,515**
Actual	$1,681	$1,612	$1,597	**$1,630**

A review of Authority to Proceed documents for two customer connections, is summarised in Table 11 below. One of these jobs illustrates the use of the customer contribution policy.

Table 11 Review of Authority to Proceed documents for connections

	101 & 103 Pascoe Street Creswick	60A Edgewater Boulevard
Type	Residential connection	Commercial connection
Document Date	24 November 2011	16 December 2011
Approved Project Cost	$13, 830	$46,984
Construction Period	Nov 2011 – Jan 2012	2011
Description	Connection of 101 & 103 Pascoe Street Creswick	60A Edgewater Boulevard
Justifications for work	Legal obligation	Legal obligation
Observations	A customer contribution of $2,394 is sought, which is consistent with the stated connections process.	

4.2.1 Customer contributions

Customer contributions, which are paid by customers when connections are otherwise uneconomic (see Section 3.2.1), were higher than expected. This is consistent with higher than expected cost per connection, since higher connection costs will generally increase the likelihood and size of customer contributions.

4.3 Augmentation

Augmentation spending is very slightly below benchmark. $4.1 million was approved (to the end of 2010) and $3.6 million has been spent, making this account 11.3 percent underspent.

Augmentation work is triggered by a forecast showing pressure below pressure standards, which SP AusNet has a legal obligation to address. We also reviewed two recent business cases, shown in Table 11, for work to be conducted competed during 2012 and can confirm the justifications for work were pressure related and in accordance with Rule 79 (2). The business case also demonstrated consistency with SP AusNet's stated process for identifying augmentation projects.

Table 12 Augmentation project business cases

	Geelong Rd Gas Main Extension	Kirkham Dr Gas Main Reinforcement
Type	Augmentation	Augmentation
Document Date	11/11/2011	11/11/2011
Approved Project Cost	$803,000	$685, 000
Construction Period	1 April 2012 – 31 December 2012	1 April 2012 – 30 November 2012
Description	This project will extend a gas main in Geelong Road (Torquay) and is part of a wider programme of work to maintain gas pressure in the area and prepare for a dedicated supply injection, which will be built in 2012/13.	Gas main reinforcement in the Kirkham drive (Greenvale) area to avoid a breach of the minimum pressure requirement in the winter of 2013
Justifications for work	Meeting a regulatory obligation or requirement (Gas Distribution Code)	Meeting a regulatory obligation or requirement (Gas Distribution Code)
Observations	- Consistent with SP AusNet's stated 1 in 2 winter demand forecasting approach - Consistent with Rule79(2)	- Consistent with SP AusNet's stated 1 in 2 winter demand forecasting approach - Consistent with Rule79(2)

4.4 Residential, Commercial and Industrial Meter Replacements

Expenditure in all categories of meter replacement was lower than expected. As shown in Table 8, commercial and industrial meter replacements were 71.9 percent lower and residential 47.5 percent lower. The quantity and the unit cost of replacements were also lower. SP AusNet reports that the lower number of replacements relates to lower failure rates, detected during its in-service testing programme. Consequently, there is little reason to suspect non-conforming expenditure.

A review of the budget approval for meter replacement work in 2009/2010, summarised in the table below, highlighted the mandatory nature of meter replacement. The reviewed budget approval was also consistent with SP AusNet's process for determining meter replacements (as described in Section 3.2.3)

Table 13 Review of Meter replacement budget approval

Annual Meter Replacement Budget	
Type	Meter Replacement
Document date	February 2009
Approved Project Cost	$3,101,000
Construction Period	2009/2010
Description	Activities consist of the following: - Replacement of 16,796 domestic and I/C meters as part of the replacement program - Replacement of 2,318 faulty or damaged meters - Replacement of 585 Field Life Extension meters (FLE)
Justifications for work	Compliance with the Gas Safety Case, Gas Distribution Code and Gas Quality Regulations.
Observations	- The expenditure is consistent with Rule 79 and needed to maintain unaccounted for gas standards contained in the Gas Distribution System Code - Meters to be replaced have been determined in accordance with the in-service testing regime.

4.5 'Other' Capital Expenditure

The 'Other' capital expenditure category is further broken down in the allowable capital expenditure into SCADA (Supervisory Control and Data Acquisition), Other Demand, Other General, and Other Non-Demand categories, as shown below in Table 14. Overall, the benchmark for spending to date was set at $22.5 million. However, spending in this category to date is only $11 million, making this account underspent by at least $11.5 million (51.2 percent). Spending in all areas contributing to Other expenditure are also underspent. SCADA related spending is 43.4 percent underspent compared to the benchmark, Other General 72.4 percent underspent and Other Non-Demand is 37.5 percent underspent.

Due to the fact that all sub-categories are underspent, we are satisfied that this expenditure is conforming. However, it is apparent that some of this expenditure may have been merely deferred and some allowance for increased spending may need to be made during the next regulatory period.

Table 14 'Other' capital expenditure

Capital Expenditure ($ million in July 2006 dollars)				
Expenditure Category	**Approved**	**Actual**	**Difference**	**(%)**
SCADA	3.3	1.9	(1.4)	(43.4%)
Other Demand	6.3	2.2	(4.1)	(65.0%)
Other general	3.3	0.9	(2.4)	(72.4%)
Other non-demand	9.7	6.0	(3.6)	(37.5%)
Total SCADA & Other Expenditure	**22.5**	**11.0**	**(11.5)**	**(51.2%)**
Note: Costs exclude capital overheads				

We also reviewed the business case for the installation of SCADA fringe point control equipment during 2009/2010. The work was justified on overall economic value grounds in accordance with Rule 79(2).

Table 15 Review of business case for SCADA works

SCADA Fringe Point Control	
Type	SCADA
Document date	23/04/2010
Approved Project Cost	$111,228
Construction Period	2010/ 2011
Description	Installation of SCADA fringe point control RTUs at two fringe locations, two Field Regulators and two City Gate sites within the SP AusNet gas distribution network. The projects will ensure operating costs are maintained.
Justifications for work	- The project has a higher NPV than doing nothing - The project will help meet unaccounted for gas standards
Observations	- The expenditure is consistent with Rule 79 and justified on economic and legal obligation grounds. In particular, the programme helps to meet unaccounted for gas standards, contained in the Gas Distribution Code - The project is consistent with stated SP AusNet policy of establishing SCADA fringe point control for their network

4.6 Capital Overheads

Capital overheads are $3.7 million overspent (14.7 percent). This appears initially unusual since overall capital expenditure is lower. However, a likely explanation for this is the changed pattern capital expenditure. In particular, residential connections overheads are responsible for more than half of all capital overhead expenditure, as shown below in Table 16. This is consistent with the fact that more residential connections have been required and may have been exacerbated by higher overhead costs (per dollar spent) on connections work.

In addition the ESC set its overhead benchmarks based on a 'rate in the dollar' approach. This did not take into account the fact that many overheads are fixed; therefore as the Natural Gas extension Programme capital expenditure diminished there was no allowance given for the fact that some overheads would return to the other gas activities.

Table 16 Breakdown of overhead capital expenditure

Actual Overhead Expenditure ($ million in July 2006 dollars)				
	2008	2009	2010	Total to 2010
LP pipe replacement	1.53	1.15	1.76	4.43
LP pipe – ad hoc replacements	0.00	0.05	0.02	0.07
Residential connections	4.76	5.68	5.56	16.00
Commercial / industrial connections	1.19	0.11	0.28	1.59
Augmentations	0.48	0.13	0.10	0.71
IT	0.15	0.36	0.29	0.81
Residential meter replacements	0.48	0.18	0.22	0.87
Commercial / industrial meter replacements	0.06	0.05	0.02	0.13
Other	0.89	0.82	0.58	2.29
Gas extensions – NGEP	0.92	0.74	0.00	1.66
Gas extensions - other	0.00	0.00	0.00	0.00
Capital overheads	0.00	0.00	0.00	0.00
Customer contributions	0.00	0.00	0.00	0.00
Government contributions	0.00	0.00	0.00	0.00
Total	**10.46**	**9.27**	**8.84**	**28.56**

Appendix A

Results

Appendix A Results

Capital Expenditure

GAAR Approved ($ million in July 2006 dollars)							
Expenditure Category	**2008**	**2009**	**2010**	**2011**	**2012**	**Total to 2010**	**Total**
LP pipe replacement	11.4	11.8	12.1	12.4	12.8	35.3	60.5
LP pipe – ad hoc replacements	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residential connections	19.5	21.0	21.8	21.7	20.3	62.3	104.3
Commercial / industrial connections	3.8	4.2	4.5	5.1	5.4	12.5	22.9
Augmentations	2.3	1.5	0.3	1.7	0.5	4.1	6.4
IT	6.5	14.5	7.3	1.2	3.9	28.3	33.3
Residential meter replacements	5.9	3.9	2.5	4.2	2.4	12.3	18.8
Commercial / industrial meter replacements	1.1	1.1	1.2	2.1	1.9	3.3	7.3
Other	8.4	7.4	6.7	5.8	6.1	22.5	34.4
Gas extensions – NGEP	1.9	2.3	1.9	1.4	1.1	6.2	8.7
Gas extensions - other	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital overheads	8.2	8.9	7.9	7.6	7.5	24.9	40.0
Customer contributions	(3.1)	(3.2)	(3.3)	(3.3)	(3.4)	(9.6)	(16.3)
Government contributions	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**66.0**	**73.3**	**62.7**	**59.9**	**58.4**	**202.0**	**320.3**

Actual						
Expenditure Category	**2008**	**2009**	**2010**			**Total to 2010**
LP pipe replacement	8.1	7.3	9.7			25.1
LP pipe – ad hoc replacements	0.0	0.2	0.1			0.3
Residential connections	24.1	26.0	30.5			80.7
Commercial / industrial connections	4.3	2.0	1.5			7.8
Augmentations	2.3	0.8	0.5			3.6
IT	1.6	8.7	8.2			18.5
Residential meter replacements	4.0	1.1	1.4			6.4
Commercial / industrial meter replacements	0.5	0.3	0.2			0.9
Other	2.7	4.1	3.1			10.0
Gas extensions – NGEP	4.8	3.2	0.0			8.1
Gas extensions - other	0.0	0.0	0.0			0.0
Capital overheads	10.5	9.3	8.8			28.6
Customer contributions	(3.4)	(2.8)	(3.0)			(9.2)
Government contributions	0.0	0.0	0.0			0.0
Total net capital expenditure	**59.5**	**60.3**	**61.0**			**180.8**

Variance							
Expenditure Category	**2008**	**2009**	**2010**			**Total to 2010**	**Variation (%)**
LP pipe replacement	(3.3)	(4.4)	(2.4)			(10.1)	(28.7%)
LP pipe – ad hoc replacements	0.0	0.2	0.1			0.3	0.0%
Residential connections	4.7	5.0	8.7			18.4	29.5%
Commercial / industrial connections	0.5	(2.2)	(3.0)			(4.6)	(37.2%)
Augmentations	0.0	(0.7)	0.2			(0.5)	(11.3%)
IT	(5.0)	(5.8)	1.0			(9.8)	(34.7%)
Residential meter replacements	(2.0)	(2.7)	(1.1)			(5.8)	(47.5%)
Commercial / industrial meter replacements	(0.6)	(0.8)	(1.0)			(2.4)	(71.9%)
Other	(5.6)	(3.3)	(3.6)			(12.5)	(55.7%)
Gas extensions – NGEP	2.9	0.9	(1.9)			1.9	30.7%
Gas extensions - other	0.0	0.0	0.0			0.0	0.0%
Capital overheads	2.3	0.4	1.0			3.7	14.7%
Customer contributions	(0.3)	0.4	0.3			0.4	(3.8%)
Government contributions	0.0	0.0	0.0			0.0	0.0%
Total variation	**(6.5)**	**(13.1)**	**(1.7)**			**(21.2)**	**(10.5%)**
Total variation (%)	**(9.8%)**	**(17.8%)**	**(2.7%)**			**(10.5%)**	

* Although the NGEP project is over-budget at 2010, it is now complete and there is zero variation from the total allowed capital expenditure for the project to 2012

Quantities

GAAR Approved						
Expenditure Category		**2008**	**2009**	**2010**	**Total**	
LP pipe replacement	km	90	90	90	270	
Residential connections	connection	13,299	14,082	14,301	41,682	
Commercial / industrial connections	connection	345	367	387	1,099	
Residential meter replacements	meter	55,529	38,727	23,484	117,740	
Commercial / industrial meter replacements	meter	611	708	720	2,039	
Actual						
Expenditure Category		**2008**	**2009**	**2010**	**Total**	
LP pipe replacement	km	77	66	75	218	
Residential connections	connection	14,346	16,154	19,115	49,615	
Commercial / industrial connections	connection	218	231	261	710	
Residential meter replacements	meter	49,408	16,798	16,934	83,140	
Commercial / industrial meter replacements	meter	599	386	565	1,550	
Variance						
Expenditure Category		**2008**	**2009**	**2010**	**Total**	**%**
LP pipe replacement	km	(13)	(24)	(15)	(52)	(19.2%)
Residential connections	connection	1,047	2,072	4,814	7,933	19.0%
Commercial / industrial connections	connection	(127)	(136)	(126)	(389)	(35.4%)
Residential meter replacements	meter	(6,121)	(21,929)	(6,550)	(34,600)	(29.4%)
Commercial / industrial meter replacements	meter	(12)	(322)	(155)	(489)	(24.0%)

Unit Rates

GAAR Approved					
Expenditure Category		2008	2009	2010	Average
LP pipe replacement	$/km	127,000	130,000	134,000	130,333
Residential connections	$/connection	1,464	1,494	1,525	1,494
Commercial / industrial connections	$/connection	11,103	11,333	11,567	11,334
Residential meter replacements	$/meter	107	100	104	104
Commercial / industrial meter replacements	$/meter	1,836	1,488	1,613	1,646
Actual					
Expenditure Category		2008	2009	2010	Average
LP pipe replacement	$/km	105,604	110,559	129,482	115,215
Residential connections	$/connection	1,681	1,612	1,597	1,630
Commercial / industrial connections	$/connection	19,861	8,645	5,772	11,426
Residential meter replacements	$/meter	80	67	80	76
Commercial / industrial meter replacements	$/meter	813	774	267	618

Variance						
Expenditure Category		2008	2009	2010	Average	%
LP pipe replacement	$/km	(21,396)	(19,441)	(4,518)	(15,118)	(11.6%)
Residential connections	$/connection	217	118	72	136	9.1%
Commercial / industrial connections	$/connection	8,758	(2,688)	(5,795)	92	0.8%
Residential meter replacements	$/meter	(27)	(33)	(24)	(28)	(27.0%)
Commercial / industrial meter replacements	$/meter	(1,023)	(714)	(1,346)	(1,028)	(62.5%)

Appendix B

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Appendix B References

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