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ENVESTRA LIMITED

REVIEW OF GAS ACCESS ARRANGEMENT FOR SOUTH AUSTRALIA

Review of Gas Access Arrangement for South Australia

307/09210

28-Sep-05

Infrastructure
145 South Terrace
Adelaide SA 5000 Australia
Telephone: +61 3 8125 4002
Facsimile: +61 3 8221 6299
www.worleyparsons.com
WorleyParsons Services Pty Ltd
ABN 61 001 279 812

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PROJECT 307/09210 - REVIEW OF GAS ACCESS ARRANGEMENT FOR SOUTH AUSTRALIA

REV	DESCRIPTION	ORIG	REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
0	Issued to client for approval	Blain/Marks	Bruce Davis	Bruce Davis	21/9/05		
1	Issued to client for approval	Blain/Marks	Bruce Davis	Bruce Davis	23/9/05		
2	Issued to client for approval	Blain/Marks	Bruce Davis	Bruce Davis	26/9/05		
3	Issued to client for approval	Blain/Marks	Bruce Davis	Bruce Davis	28/9/05		

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1. EXECUTIVE SUMMARY

1.1 Scope

WorleyParsons was engaged by Envestra to provide an independent review of the reasonableness and prudency of Envestra operating and capital cost forecasts for South Australia the forthcoming regulatory period from 2006/07 to 20010/11, including the benchmarking of publicly available parameters and indicators.

In several instances, WorleyParsons concluded that Envestra's proposed forecast of a particular activity was at the upper bounds of what WorleyParsons considered to be reasonable or efficient. In those cases, Envestra reviewed its forecasts downwards to the satisfaction of WorleyParsons, and those amended forecasts were incorporated into Envestra's AA submission.

Unless stated otherwise, all figures quoted in this report are in real December 2004 dollars.

1.2 Asset Description

The network covered by the Access Arrangement includes transmission pipelines, pressure regulating stations, mains and services, meters and ancillaries.

The Adelaide Metropolitan Region is supplied from four city gate stations. The network is characterised by a series of branches emanating from a limited number of critical supply mains fed from these four city gates. This compares with, for example, Melbourne, which is supplied from two transmission pressure ring mains through approximately 60 city gates/field regulators. In comparison with Melbourne, WorleyParsons considers the Adelaide distribution network to be relatively vulnerable in relation to supply security.

WorleyParsons notes that with the recent construction of the SEAGas pipeline, the supply security into SA has effectively doubled. There has however not been any corresponding improvement of significance to the supply security within the Adelaide networks.

The networks are composed of a mixture of cast iron, plastic inserted in cast iron, unprotected steel, plastic and CP protected coated steel. This is typical of systems that date back to the 1860s. 26% of the Envestra assets are cast iron or unprotected steel and, as is typical of these materials, these systems are in a constant state of deterioration. Envestra has an active program in place to progressively replace these mains with inserted PE in accordance with internal rate of return criteria. Compared with other Australian networks, 23% cast iron is on the high side.

In relation to the asset condition related KPI's reviewed, WorleyParsons notes the following trends:

- There has been a steady increase in UAFG;
- There has been a steady increase in the number of reported gas leaks; and
- There has been a steady increase in third party damage incidents.

The high percentage of cast iron and associated deterioration accounts for the increasing UAFG and leak reports, while a general increase in development activities most likely explains the damage statistics.

WorleyParsons considers the assets are being prudently maintained in accordance with sound industry practice and expects all asset classes will reach their respective economic lives.

1.3 Envestra/OEAM Relationship

Envestra has an Operating and Management Agreement with OEAM to operate and manage the Envestra owned gas transmission and distribution assets. The relationship of OEAM to Envestra is that of an independent contractor and under the terms of the contract, Envestra pays OEAM the following:

- All costs and disbursements reasonably incurred by OEAM in the performance of its obligations under the Agreement;
- A management fee equal to 3% of the network revenue; and
- Incentive bonuses.

The Envestra/OEAM contractual arrangement, where the asset owner engages a contractor to operate and maintain assets, is common practice for gas distribution networks across most Australian states.

OEAM uses a mix of employees and contractors to undertake the operations and management of the gas assets. In relation to total OEAM costs approximately 40% relates to payments made to suppliers of goods and services, which are continually market tested through competitive tendering, while 10% are ad-hoc purchases and uncontrollable costs. Furthermore, wages costs, which represent about 30%, have an element of market testing through industry wage mechanisms and market forces.

WorleyParsons reviewed the forecast management fees as a percentage of works under management (Opex plus Capex) and considers the management fee to be not inconsistent with fees typically paid in contracting for similar risk profile sharing arrangements.

The appropriateness of the management fee, being 3% of revenue, is reinforced in the recently issued Initial Public Offering by Alinta for Alinta Infrastructure Holdings which details a very similar relationship between asset owner and asset manager to that between Envestra and OEAM. WorleyParsons considers the Envestra/OEAM Agreement to compare favourably with the Alinta Agreement, particularly in respect of the incentive fee where in the Envestra/OEAM case, the fee is based on real efficiency gains, which in the long term benefit both the service provider and consumer.

1.4 Asset Management Plan

An Asset Management Plan (AMP) has been recently developed for the Envestra assets. The plan is signed off by senior management from both Envestra and OEAM and provides a sound foundation for the management of the assets.

The AMP has the following features:

- A full life cycle description for each asset class;
- Strategies for each asset class; and
- Monitoring, reviewing and auditing functions.

The AMP serves to tie together the many systems and procedures which Envestra/OEAM use to manage the assets. Although the AMP is in its early stages of evolution, WorleyParsons considers the plan to have the essential foundations to deliver an optimal balance between service quality, risk and expenditure.

1.5 Capital Planning & Approval Processes

Capital budgeting for network expansion and system augmentation is based on network planning processes that use suburb-by-suburb consumer growth forecasts reported by Planning SA and the Housing Industry Association.

OEAM utilises modelling that identifies which system elements require augmentation to meet the increased loads with acceptable levels of supply security. The model is then used to test various augmentation scenarios until the most cost effective augmentation option is identified. WorleyParsons considers the modelling process to be consistent with the process applied by other gas distribution companies and regards this to be a sound foundation for project planning.

WorleyParsons considers that:

- the network planning methodology;
- the budgeting and reporting protocols between Envestra and OEAM;
- the rigour imposed by the contractual relationship between OEAM and Envestra;
- the disciplines imposed on publicly listed companies, (Envestra and Origin Energy); and
- the project management tools applied by OEAM

drives a process which delivers prudent capital project outcomes. WorleyParsons concludes that the process is consistent with section 8.16 of the National Third Party Access Code for Natural Gas Pipeline Systems (the Code).

1.6 Review of Capital Projects

WorleyParsons undertook an audit of a wide range of capital projects for the purpose of determining if the expenditure in the current period meets the prudency test as required by the Code i.e. whether Envestra has been acting efficiently in accordance with good industry practice, and to achieve the lowest sustainable cost of delivering service. WorleyParsons concludes that Envestra's capital expenditure meets Code requirements, and the audit provides a degree of confidence that capital expenditure in the forthcoming period will likewise meet the requirements of the Code.

1.7 Cost Drivers

The major cost drivers for Envestra's Capex and Opex are:

- The need to expand and augment the network to meet increased demand (population growth and changing consumption patterns) - WorleyParsons considers the Envestra approach to forecasting to be sound and an appropriate basis for identifying capital works projects;
- The need to improve supply security - WorleyParsons considers Adelaide's gas distribution network to have relatively low levels of supply security, so concurs with Envestra that a major strategy over the next few years should be to invest in projects that will improve Adelaide's supply security;
- The need to replace aging and expensive to maintain infrastructure - WorleyParsons concurs with Envestra's approach to mains replacement which is based on sound economic and service delivery criteria; and
- Meeting statutory metering obligations - WorleyParsons considers the metering strategies adopted by Envestra/OEAM to be consistent with those adopted by distribution companies elsewhere.

1.8 Benchmarking

The following KPIs are considered by WorleyParsons as those most appropriate for useful comparisons of distributor performance, together with the range over the forthcoming regulatory period that WorleyParsons would expect from an efficient gas distributor operating under the South Australian conditions:

Table 1-1: Appropriate KPIs

KPI	EXPECTED RANGE	ENVESTRA 04/05
Opex/km	4,100 – 4,500 $/km	4,426
Opex/Customer	80 – 90 $/Customer	87
Opex as % of RAB	3.5 – 4.0 %	3.9 %
Capex/km	4,000 – 5,000 $/km	2,727
Capex as % of RAB	2.7 – 4.5 %	2.4 %
Capex/Customer	75 – 95 $/Customer	54
Opex as % of Revenue	25 – 30 %	27
(Capex + Opex)/km	7,500 – 8,500 $/km	7,153

Envestra's Opex KPIs are indicative of efficient performance relative to industry peers. The Capex KPIs are at the lower (and better) end of expectations and are similarly indicative of efficient performance. Further, the Capex KPIs suggest that additional levels of investment are likely to be required in coming years as there are indications Envestra may be lagging other distributors in the cycle of asset replacement, given the high cast iron percentage.

Based on the benchmarking data, WorleyParsons has concluded that Envestra's costs are reasonable and that Envestra is an efficient distributor.

Where there is sufficient comparative data, WorleyParsons has estimated ranges for efficient unit costs in the South Australian environment and these are as follows:

Table 1-2: Unit Costs Expected Ranges

ACTIVITY	EXPECTED RANGE	ENVESTRA 04/05
Domestic Meter Change	100 – 130 $/Unit	97
Mains Renewal	75 – 100 $/m	84
Connect New Domestic Customer $/New Customer	1,280 – 1,500	1,459

From the available information, WorleyParsons considers that Envestra's unit costs to be efficient in both the areas of stay in business and growth.

1.9 Capital Cost Forecast

The Capex forecast has been split into Stay in Business, Growth and Material Changes. WorleyParsons reviewed the capital cost forecasts for Stay in Business and Growth from both a bottom up process and a top down process.

The historical and forecast capital expenditure is shown in the following table:

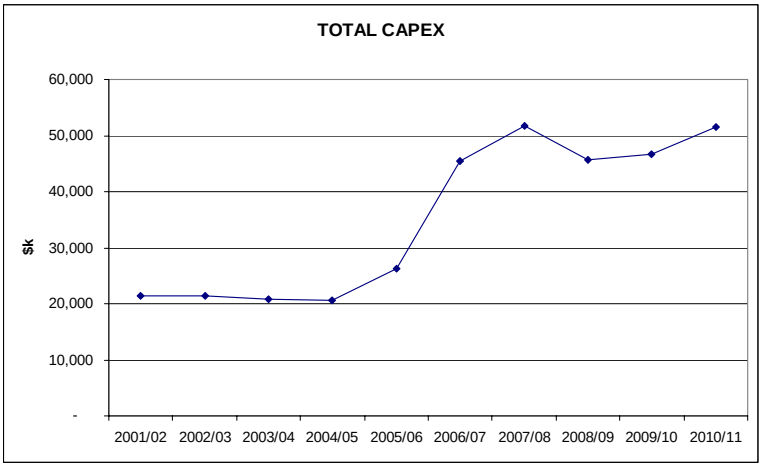
Table 1-3: Capital Cost Forecast $k

	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	TOTAL 6/07-10/11
Stay in Business	6,608	6,488	6,028	7,159	11,730	16,781	17,103	19,154	15,417	18,424	86,879
Growth	14,755	14,990	14,763	13,426	14,750	18,876	18,601	16,889	17,821	19,678	91,866
Material Changes						9,735	16,043	9,679	13,527	13,357	62,341
Total	**21,363**	**21,478**	**20,791**	**20,585**	**26,480**	**45,392**	**51,747**	**45,722**	**46,765**	**51460**	**241,086**

The Capex material changes include IT (which is outside the scope of this review), supply to new townships and security of supply projects in excess of $500k. The security of supply projects have been reviewed by WorleyParsons from a bottom up approach and the proposed expenditure is supported by WorleyParsons.

The total forecast Capex is shown in the following chart:

Figure 1-1: Total Capex



As the chart shows, Capex was typically less than $25m per year for the current AA period and increases to over $45m per year for the next AA period. The major reasons for this increase are as follows:

- A higher rate of mains replacement;
- An increase in meter unit rates from artificially low levels;
- An accelerated district regulator vault upgrade program;
- SCADA enhancements;
- A commitment to security of supply expenditure; and
- IT expenditure.

WorleyParsons considers the expenditure in part to be a reflection of catch-up for being at the lower end of the capital related benchmark comparisons.

With the exception of IT (which was outside the scope of this review), WorleyParsons considers the forecast Capex to be reasonable for the following reasons:

- The Capex program addresses a number of identified concerns:
    - The revised mains replacement program is required to reverse deteriorating system leakage, as manifested by increasing UAFG figures as well as the increasing frequency of reported leaks.
    - The accelerated district regulator vault upgrade program is required for safety and operational reasons.

- SCADA enhancements are required to allow remote control and enhance operability of the network, which by industry standards is currently well below what is standard practice for prudent gas distributors.
- The security of supply projects redress a past practice of focussing on load increases with lower priority to security of supply which has created a backlog of necessary projects which perhaps should have already been undertaken. One effect of this past practice has been to absorb the available spare capacity and leave very little in reserve. We note, however, that while Envestra has been on the low side of capex benchmarks, it has overspent compared with the regulatory Capex allowance.

- The processes used to identify the projects used iterative modelling over-laid with detailed risk assessments were sound and adhered to good industry practice. WorleyParsons further notes that OTR undertook an audit of the process and outcomes for the load growth and security of supply augmentation projects and understands the auditors were generally impressed.
- The costings for the forecasts have been based on historic costs for similar works, which in any event are constantly market tested as the majority of works is undertaken by contractors.

For the above-mentioned reasons, WorleyParsons considers the proposed Capex meets the requirements of Clause 8:16 of the Code.

1.10 Non-Capital Cost Forecast

The Opex forecasts have been split into Operating & Maintenance, Administration & General, Network Development, FRC and Material Changes.

The non-capital cost forecasts are shown in the flowing table:

Table 1-4: Non-Capital Cost Forecast $k

	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	TOTAL 06/07-10/11
Operating & Maintenance	25,143	24,437	23,948	24,940	24,954	24,767	25,079	25,169	124,910
Administration & General	5,572	6,225	6,837	7,160	6,971	7,527	7,417	7,510	36,585
Network Development	6,771	6,524	6,266	6,275	6,328	6,372	6,436	6,492	31,903
FRC	229	6,191	6,269	6,133	6,425	6,372	6,633	6,598	32,160
Material Changes				4,608	9,404	4,335	3,707	3,490	25,544
Total	**37,716**	**43,377**	**43,320**	**49,116**	**54,082**	**49,373**	**49,272**	**49,260**	**251,102**

Envestra has applied an approach in determining an estimate of efficient non-capital costs for the second Access Arrangement Period that infers that the current level of expenditure is efficient. It has then applied an adjustment for material changes between the first and second Access Arrangement Periods. The non-capital costs are essentially fixed costs; they do not vary materially with variation in the volume throughput of gas.

Envestra has identified six material changes, totalling $26M (nominal dollars) over the forecast period:

- The impact of the ageing workforce;
- New regulatory, governance and service requirements;
- Increased focus on risk management activities, including operation of the extended SCADA system;
- General cost pressures;
- Environmental management; and
- Office and equipment costs.

These are summarised in the following table (values in nominal $k):

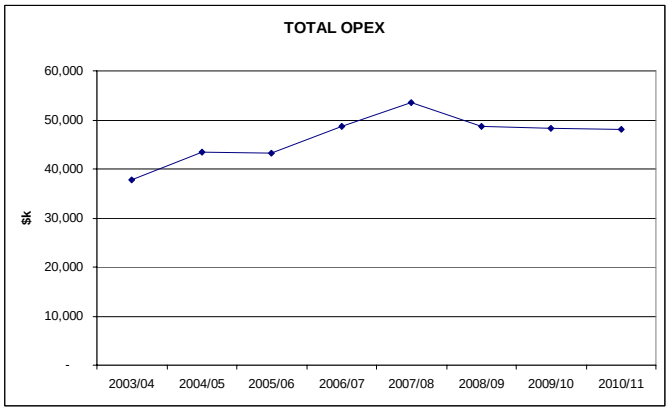
Table 1-5: Summary of Material Changes (from 2004/05 Expenditure)"

MATERIAL CHANGE	2006/07	2007/08	2008/09	2009/10	2010/11	TOTAL
Ageing Workforce	956	1,061	1,110	1,001	973	5,100
Regulatory, Governance & Service	988	1,025	1,345	1,501	1,707	6,564
Risk Management	958	944	1,042	654	729	4,326
General Cost Pressures	658	503	444	590	618	1,812
Environmental Management	349	5,688	-196	-201	-206	5,433
Office & Equipment Costs	414	250	313	358	412	1,747
TOTAL	**4,320**	**9,471**	**4,057**	**3,902**	**4,231**	**25,981**

WorleyParsons has reviewed Envestra's proposed material changes in detail, including the underlying assumptions, the supporting spreadsheets and other documentation (where relevant) and has concluded that the forecast expenditure is reasonable. WorleyParsons is also satisfied that the material changes represent activities that would be undertaken by a prudent distributor acting efficiently.

The total non-capital costs are shown in the following chart:

Figure 1-2: Total Opex



The increase from 2005/06 to 2006/07 is due mainly to the following:

- Increases in leak repairs cost resulting from a change in capitalisation policy, whereby piecemeal (short length) mains replacements will be expensed ($1.2M); and
- A range of material changes ($4.2M).

With the exception of IT (which was outside the scope of this review), WorleyParsons considers the forecast Opex to be reasonable and representative of a prudent distributor acting efficiently.

2. INTRODUCTION

Envestra's current Access Arrangement for the natural gas distribution system in South Australia was approved by the then South Australian Independent Pricing and Access Regulator and applies for the period 2001/02 to 2005/06. Envestra is preparing its Access Arrangement Information (AAI) documentation to submit to the Essential Services Commission of South Australia (ESCOSA) for the forthcoming regulatory period from 2006/07 to 20010/11.

WorleyParsons was engaged by Envestra to provide an independent review of the reasonableness and prudency of Envestra's operating and capital cost forecasts for the forthcoming regulatory period. The review includes the benchmarking of publicly available parameters and indicators. This report presents the findings of the review.

In several instances, WorleyParsons concluded that Envestra's proposed forecast of a particular activity was at the upper bounds of what WorleyParsons considered to be reasonable or efficient. In those cases, Envestra reviewed its forecasts to the satisfaction of WorleyParsons, and those amended forecasts were incorporated into Envestra's AA submission.

3. APPROACH AND METHODOLOGY

3.1 Methodology

The review was conducted in five stages:

Stage one - Data Collection;

Stage two - "Desk Study" Review;

Stage three - Further Gathering of Information;

Stage four - Review of Significant Issues; and

Stage five - Preparation of the Final Report.

3.1.1 Data Collection

This stage involved gaining a detailed understanding of the operation of the Envestra regulated gas distribution business and its key processes. A wide range of information was collected, collated and reviewed as the foundation for detailed analysis. A number of site visits were made and interviews and workshops held with key personnel within Envestra and its contractor (Origin Energy Asset Management). Data was also collected regarding gas distributors operating in other Australian jurisdictions. A list of key documents accessed (during this and later stages) is contained in Section 12.1

3.1.2 "Desk Study" Review

This stage involved the detailed review of the information gained in Stage one. Factors considered included the following:

- Operating, maintenance, augmentation and replacement strategies;
- Asset details - numbers, types, ages, condition;
- Planning processes;
- Network capacity and utilisation;
- Regulatory, safety and environmental compliance issues (including the requirements of the Gas Access Code);
- Performance standards;
- Comparisons with other gas utilities; and
- Assumptions underpinning Envestra's forecasts of Capex and Opex.

Outcomes from this stage were the identification of key issues, identification of areas requiring further information and identification of valid causes for significant differences between Envestra and other utilities. In making comparisons with other utilities, WorleyParsons has utilised only information that is available in the public domain, particularly on the Websites of jurisdictional Regulators and utilities. WorleyParsons recognises that some of the information available may not be directly comparable; however WorleyParsons is of the opinion that the comparisons still provide some useful background information.

3.1.3 Further Gathering of Information

This stage involved discussions with staff to assess processes and design, planning, operating and maintenance standards. It also involved audits of specific assets and systems to verify their condition and operational risks. A detailed review of a range of capital projects was also undertaken to assess the prudency and efficiency of associated capital expenditure.

3.1.4 Review of Significant Issues

Significant issues identified in the earlier stages of the review were discussed with relevant managers within Envestra and its contractor to ensure that WorleyParsons correctly understood the issues and to gain further insights into the business.

3.1.5 Preparation of Final Report

Throughout the review, WorleyParsons has applied its extensive experience in the gas industry and utility regulation. The findings, analysis and conclusions arising from the four preceding stages were collated and integrated into the report.

3.1.6 Reference Year & Inflation Factors

Unless stated otherwise, all costs quoted in this report have been converted to real 31 December 2004 dollars as this will be the reference year used for Envestra's Access Arrangement submission. Historical inflation factors, used to convert nominal dollars and real dollars based on other dates, are the All Groups CPI published by the Reserve Bank of Australia[1]. An inflation rate of 2.5% has been assumed for future years.

[1] RBA Quarterly Statistical Release, Measures of Consumer Price Inflation, RBA Website

4. ASSET DESCRIPTION

The network covered by the Access Arrangement includes transmission pipelines, pressure regulating stations, mains and services, meters and ancillaries.

Envestra commenced operations in 1997 and is the owner of the South Australian gas distribution infrastructure. SAGASCO, a predecessor organisation, commenced operations in 1861 and during the intervening period, built up the South Australian gas distribution networks using the materials and technologies available at the time.

4.1 System Description

The network consists a number of individual networks that supply gas to the Adelaide Metropolitan Region, Barossa Valley, Whyalla, Port Pirie, Mount Gambier, Peterborough, Riverland and Murray Bridge.

City gate stations feed each of the networks as tabulated below:

Table 4-1: Networks & Gate Stations

Network	Custody Gate Station Location
Adelaide Metropolitan Region	Elizabeth Gate Station Taperoo Gate Station Dry Creek Gate Station SEAGas Dry Creek Gate Station
Barossa Valley Area Nuriootpa Freeling Angaston	 Nuriootpa Gate Station (Tanunda Road) Stockwell Road Gawler Road
Whyalla	Lincoln Highway Gate Station
Port Pirie	Warnertown Road - Solomontown
Mount Gambier	Nick Lyons Road
Peterborough	Cotton Road
Riverland Area (Berri)	Jury (Monash) Road J.C. Smith Rd
Murray Bridge	Eleanor Terrace
Waterloo	Tozer Road
Virginia	Park Road

As the table indicates, the Adelaide Metropolitan Region is supplied from four city gate stations. The network is characterised by a series of branches emanating from a limited number of critical supply mains fed from these four city gates. This compares with, for example, Melbourne, which is supplied from two ring mains through approximately 60 city gates/field regulators. In comparison with Melbourne, WorleyParsons considers the Adelaide distribution network to be vulnerable in relation to supply security.

The networks supplying the remaining areas are of designs consistent with typical industry practice.

The table below provides a summary of the assets covered by the Access Arrangement.

Table 4-2: Asset Summary

Asset Description	Unit	South Australia
Transmission Pressure Pipelines	Kms.	187
Mainline Valves	No.	1,348
Secondary Isolation Valves	No.	5,106
City Isolation Valves	No.	26
Inlet to Regulator' Valves	No.	185
Regulator Stations	No.	350
Distribution Mains	Kms.	7,023
Meter Installations	No.	357,502

WorleyParsons notes that unlike other utilities, pressure regulator installations have not generally been designed with standby redundant legs to supply gas in the event of regulator component failure. This represents a lower level of supply security for these elements of the distribution systems.

4.2 System Performance & Asset Condition

Envestra is required to submit a Distribution Licence Annual Return to ESCOSA. The document details leakage, third party damage statistics, and other data, which provides an indication on how well the assets are performing.

WorleyParsons reviewed the returns for 2002/3 and 2003/4 and tabulated below are some of the relevant key performance indicators:

Table 4-3: Key Performance Indicators

Key Performance Indicators	03/04	02/03	01/02
Number of over-pressurisations	0	0	0
Number of instances of 3rd party damage (mains and inlets)	545	351	302
Number of locations provided to third parties	15739	15020	12064
Number of leaks entering a building from mains and inlets	0	1	1
Number of fires sourced by a gas leak from the network[2]	0	0	5
Number of public reported leaks (mains and inlets)	2359	2200	1688
Number of unplanned outages (of greater than 20 consumers)	7	2	5
Number of leaks detected by Leakage Surveys per km of surveyed mains per year[3]	0.93	0.53	0.24
Number of regulator failures (including active) per year	0	0	1
Number of incidents involving attendance of the Fire Brigade related to a gas leak	44	72	44

WorleyParsons notes the following trends:

- There has been a steady increase in UAFG;
- There has been a steady increase in the number of reported gas leaks; and
- There has been a steady increase in third party damage incidents.

WorleyParsons considers the high percentage of cast iron mains to be the major contributor to the UAFG and publicly reported leaks. Cast iron mains are very susceptible to leakages with ground movements associated with changes in soil moisture levels.

WorleyParsons also notes the increase in third party damage incidents and although some increases may be accounted for by more diligent reporting, the major reason appears to be associated with recent higher levels of development activity in the Adelaide metropolitan area. This is supported by the steady increase in the number of asset location services provided to third parties. One major concern WorleyParsons has with this poor trend is that there are many critical mains, which if taken out of service by third party damage, could cause outages to large numbers of consumers. Unlike the Melbourne network, there is only limited ring main structure in the network to back feed under such circumstances. Although not necessarily conclusive, there has been a corresponding increase in the number of unplanned outages greater than 20 customers.

[2] The figure for 2003/2004 is for fires sourced directly from the network and does not include fires caused by third parties (i.e. brush fence fires or arson)

[3] Movements from year to year depend on the area surveyed. The entire distribution system is surveyed over a five-year period.

4.3 Asset Condition

Pipe coatings provide the primary method of protecting steel pipes from corrosion. Steel pipes represent 27% of Envestra's mains. Cathodic protection is the usual back-up measure to protect the steel pipes in areas where the coating has become damaged. Approximately 90% of Envestra's steel mains have cathodic protection.

OEAM conducts coating surveys to monitor the soundness of the coatings. These surveys are conducted typically every five years and provide information for subsequent dig-up programs to investigate and repair the more serious defects.

It is understood that OTR recently audited the CP and coating surveillance systems and concluded: *"OEAM CP staff were well knowledgeable of standards and procedures and were able to comprehensively answer OTR questions. As evidence, sufficient documentation of relevant procedures were provided and sufficiently detailed".*

WorleyParsons sighted the Coating Survey Reports for the period May 04 to August 04, the OEAM Cathodic Protection Management Plan and reviewed a graph of measured pipe potentials. WorleyParsons considers the results to be typical of what would normally be expected for distribution networks and further considers the resources applied to obtain the optimal asset lives for the coated steel mains are prudent and consistent with what other network owners would apply.

Approximately 48% of the distribution network is plastic (PE or PVC) and not susceptible to corrosion, while 23% is cast iron and susceptible to leakage with ground movements and in need of ultimate replacement.

WorleyParsons notes however that approximately 26% of the system is either cast iron or unprotected steel which is constantly deteriorating and is undergoing renewal with PE in accordance with internal rate of return (IRR) criteria.

5. OPERATING ARRANGEMENTS

5.1 Envestra/OEAM Relationship

Envestra has an Operating and Management Agreement with OEAM to operate and manage the Envestra owned gas transmission and distribution assets. The key OEAM obligations under this agreement include:

- Managing the haulage of gas through each network;
- Operating and maintaining each network;
- Planning, designing and constructing network extensions;
- Assisting Envestra with submissions to regulators;
- Promoting gas as a fuel;
- Preparing and settling with Envestra the budget for each financial year;
- Providing Envestra with regular information on financial and other management issues; and
- Reading meters and billing retailers.

The relationship of OEAM to Envestra is that of an independent contractor and under the terms of the contract, Envestra pays to OEAM the following:

- All costs and disbursements reasonably incurred by OEAM in the performance of its obligations under the Agreement;
- A management fee equal to 3% of the network revenue; and
- One-off incentive bonuses[4] equal to one third of the following real reductions for each financial year:
    - The average capital cost of connecting new customer sites to the networks; and
    - Controllable costs per giga joule of gas.

The Envestra/OEAM contractual arrangement where the asset owner engages a contractor to operate and maintain assets is common practice for gas distribution networks across most Australian states. In particular, AGL Networks engages Agility, Multinet engages Alinta Network Services (ANS) and SP AusNet engages T Squared (T^2).

Tabulated below are the management fees payable to OEAM associated with the South Australian component of works undertaken by OEAM for the next Access Arrangement period:

[4] While savings may be recurring, the bonus to OEAM relates to one year only.

Table 5-1: Management Fees

Year	Revenue	Operations and Maintenance (O&M)	New facilities investment (NFI)	O&M plus NFI	Management Fee	
					$m	%(1)
2006/7	129.7	24.91	46.12	71.03	3.9	5.49%
2007/8	144.8	24.93	52.49	77.42	4.3	5.55%
2008/9	149.5	24.74	46.50	71.24	4.5	6.32%
2009/10	163.7	25.05	47.56	72.61	4.9	6.75%
2010/11	173.4	25.15	52.26	77.41	5.2	6.72%

(1) Percentage of OPEX plus CAPEX

As the table shows, the OEAM management fees in the next access period range between 5.5% and 6.8% of combined Capex plus Opex. From WorleyParsons experience, profit margins for projects typically range from 7% to 15% depending on the level of risk the contractor takes on. In the case of OEAM, WorleyParsons understands that OEAM does not take on any significant risk and accordingly, profit margin or management fee of this level is consistent with the benchmark.

WorleyParsons notes that the recently issued Initial Public Offering by Alinta for Alinta Infrastructure Holdings details a very similar relationship between asset owner and asset manager to that between Envestra and OEAM. Further it is noted that the management fee detailed in this IPO is the same as that existing between Envestra and OEAM, i.e. 3% of revenue. Similar to the Envestra/OEAM Agreement, there is also an Asset Incentive Fee, which is based on a percentage of the market capitalisation. WorleyParsons considers the Envestra/OEAM Agreement to compare favourably with the Alinta Agreement, particularly in respect of the incentive fee where in the Envestra/OEAM case, the fee is based on real efficiency gains, which in the long term benefit both the service provider and consumer.

WorleyParsons considers the principle of one third sharing of cost reductions to be an appropriate incentive for OEAM to drive efficiency gains. These incentive bonuses are based on nominated key performance indicators and are a tangible demonstration of real cost reductions.

OEAM uses a mix of employees and contractors to undertake the operations and management of the gas assets. In relation to total OEAM costs, approximately 40% relates to payments made to suppliers of goods and services, which are continually market tested through competitive tendering. In addition to this, labour costs are regularly benchmarked with external companies.

WorleyParsons understands that the Essential Services Commission in Victoria concluded that the costs incurred in Victoria under the Envestra contractual arrangements, compared favourably with the benchmarks used to establish the reference tariffs. WorleyParsons expects these benchmarks would have been derived from costs reviewed from the three Victorian distributors, being Multinet/ANS, SP AusNet /T[2] and Envestra/OEAM. WorleyParsons considers that a similar conclusion would apply to SA, since under the National Code, Envestra is required to prepare ring fenced accounts showing

how costs have been allocated across its various networks. These allocations have been endorsed by external auditors as reasonable.

WorleyParsons notes that with the management fee being based on a fixed percentage of the network revenue, there is alignment of interests between Envestra and OEAM to increase network size and utilisation. While linking the fee to the value of works under management is another option for contracts of this nature, this would provide incentive for OEAM to spend as much as possible which would not be in all stakeholders' interests.

Being an independent ASX listed company adds a significant level of financial scrutiny for all expenditure, which in turns provides for elevated levels of prudency. The incentive mechanism aligns efficiency drivers with the interests and expectations of each party and the management fee quantum is consistent with what is paid in the contracting environment. Further to this, Envestra gains further advantage by levering off the strength of Origin Energy by accessing its financial systems, procurement systems, HR etc.

5.2 Asset Management Plan

5.2.1 Key Elements

An Asset Management Plan (AMP) has been recently developed for the Envestra assets. The plan is signed off by senior management from both Envestra and OEAM and provides a sound foundation for the management of the assets.

The AMP has the following features:

- A full life cycle description for each asset class which covers the following:
    - Asset description
    - Asset planning
    - Asset creation
    - Asset useful life
    - Asset replacement
- Strategies for each asset class, detailing:
    - Past strategies
    - Future strategies
- The monitoring, reviewing and auditing functions for the following:
    - KPIs
    - Asset performance
    - Asset condition.

5.2.2 WorleyParsons Review of Asset Management Plan

The AMP serves to tie together the many systems and procedures which Envestra/OEAM use to manage the assets. These systems and procedures span across regulatory jurisdictions, various industry codes and standards, internal risk management and health, safety & environment requirements.

The AMP describes how performance and condition KPIs link into feedback mechanisms, which provide for a culture of continuous improvement. The AMP also details the various means used to keep up with technological developments so that Envestra is able to adopt new materials and technologies as soon as they are proven.

Although the AMP is in its early stages of evolution, WorleyParsons considers the plan to have the essential foundations to deliver an optimal balance between service quality, risk and expenditure.

5.3 Technical Regulation

Envestra operates the assets in accordance with a Safety Management Plan. This is both a regulatory requirement and a Code requirement for those assets that are covered by AS 2885-3. The Safety Management Plan identifies the hazards associated with the existence and operation of the distribution network assets and the measures and management systems in place to manage the hazards. This plan is audited by OTR annually.

Recent audits have covered the following areas:

- Cathodic Protection;
- Asset planning;
- Risk management;
- Change management; and
- Maintenance records.

WorleyParsons sighted some of the OTR findings from these audits. From these findings, WorleyParsons has formed the opinion that the OTR has not identified any significant concerns about the way the assets are being managed. As advised by Envestra/OEAM personnel present at the most recent audit closeout meeting, the OTR auditors made specific reference to and complimented Envestra/OEAM on the continuous improvement progress.

WorleyParsons has conducted a high level review of this plan and considers it appropriate for the purpose and provides a sound foundation on which to base day to day operational management of the system. There is a close linkage between this plan and the AMP.

5.4 Management Systems & Processes

5.4.1 Capital Planning & Approval Processes

Budgets for the forthcoming year are agreed between Envestra and OEAM annually.

Capital budgeting for network expansion and system augmentation is based on network planning processes that use suburb-by-suburb consumer growth forecasts based on information reported by Planning SA and the Housing Industry Association.

Network planning commences with the process of validating the flow model used to model the network performance. Validation involves comparing the actual performance on a day of peak demand (i.e. flows and fringe pressures) against the predicted performance. After validating the model, the model is then normalised for a one in twenty five year peak winter day.

Against the reference peak day used to validate the model and subsequent to normalisation, the planning function uses the model to predict system performance under the forecast load growth scenarios. Load growth is segmented into domestic, industrial and commercial (I&C) and demand customer sectors. Modelling assumes a 1 in 25 winter with fully diversified domestic and I&C loads and the "winter morning/evening non coincident peak" for demand customers.

The modelling identifies where the system needs to expand and which system elements require augmentation to meet the increased loads with acceptable levels of supply security. The model is then used to test various augmentation scenarios until the most cost effective augmentation option is identified.

WorleyParsons considers the modelling process to be consistent with the process applied by other gas distribution companies and regards this as a sound foundation for project planning. WorleyParsons notes that the design criteria of a one in twenty five winter is more conservative than say a one in two winter as applied in Victoria, but considers this to be adequately offset by the less conservative load diversity criteria applied to large industrial customers.

5.4.2 Expenditure Approval Processes

All projects in excess of $500k are forwarded to Envestra for approval before OEAM commence. Projects in excess of $1m require Envestra Board approval. Projects less than $500k can be approved by the OEAM General Manager on behalf of Envestra, provided the projects are in the approved annual budget and satisfy the required rate of return criteria.

OEAM reports to Envestra monthly on progress against capital budget and progress for all capital projects approved. In addition to this, Envestra's internal auditors periodically audit the Capex approval process.

Projects in excess of $100k are managed in accordance with the Project Management Manual (OEAM Document Number 0416). This manual requires the clear allocation of responsibilities, the development of project management plans, appropriate cost controls, and appropriate risk management. At the end of each project, an End Project Report is produced which includes a Lessons Learned Report which aims to express what can be done differently on future projects.

WorleyParsons considers that:

- the network planning methodology;
- the budgeting and reporting protocols between Envestra and OEAM;
- the rigor imposed by the contractual relationship between OEAM and Envestra;
- the disciplines imposed on Envestra as a publicly listed company; and
- the project management tools applied by OEAM

drives a process which delivers prudent capital project outcomes.

5.4.3 Capital Project Audit

In order to assess the efficiency of capital projects, WorleyParsons carried out a detailed review of a range of capital projects from the perspective of whether the expenditure was prudent (did the money need to be spent) and efficient (was there appropriate value for the money spent).

5.4.3.1 Methodology

WorleyParsons nominated a number of projects in each category, ensuring a spread of project values and project types. A total of 21 projects were audited (refer to Section 12.2), with values ranging from $1,400 to $227,000, covering the following project types:

- New Mains – New Estates;
- New Mains – Existing Domestic;
- New Mains – I&C < 10 TJ;
- New Mains – Improving Supply;
- Mains Replacement – Block; and
- Mains Replacement – Piecemeal.

To ensure that a consistent approach was adopted by the review team, a pro-forma was developed and utilised to evaluate each project and record the information. A copy of the pro-forma is contained in Section 12.3.

Given the number of projects, the range of project values and the types of projects audited, WorleyParsons is satisfied that the projects audited form a representative sample from which meaningful conclusions can be drawn.

5.4.3.2 Observations

- There has been a significant tightening up of the process since the implementation of Maximo, but the new arrangements are still being bedded down.

- Some minor issues were identified eg. various examples where unit rates had been amended but no explanation was provided.
- In every case, projects were authorised at the appropriate level in the organisation.
- There is demonstrated evidence of a consistent process for monitoring and updating unit rates.
    - Saw evidence of tracking costs against estimates in aggregated form for the smaller projects and considered approach to be appropriate for the application
    - Saw evidence of cost tracking for larger individual projects.

5.4.3.3 Conclusions

- Although there are some minor gaps in project documentation, particularly during the transition stage, there is evidence that these do not represent a lack of necessary steps or activities being carried out.
- WorleyParsons considers that the current capital project process has a reasonable level of rigour, supporting the conclusion that past capital expenditure has been prudent and efficient.
- Overall, WorleyParsons considers that the audit of capital project provides evidence that the expenditure in the current period meets the prudency test as required by the Code i.e. Envestra has been acting efficiently in accordance with good industry practice, and to achieve the lowest sustainable cost of delivering service. Further, the audit provides a degree of confidence that capital expenditure in the forthcoming period will likewise meet the requirements of the Code.

6. ASSET BASE

WorleyParsons notes that the value of the asset base has already been established and offers no opinion on the appropriateness of this value.

6.1 Economic Lives for Each Asset Class

The following table details the asset lives approved by SAIPAR for the First Access Arrangement Period. WorleyParsons concurs with the asset lives assigned to each asset type, noting that within each type there are sub-categories which have varying lives.

Table 6-1: Asset Lives

Asset type	Life (years)
Mains and Inlets	83
Meters	29
Other distribution equipment	50
IT Systems	5
Other	10
FRC Telemetry	5

6.2 Actual Against Forecast Capex for Current AA

Tabulated below is the actual capital expenditure against the forecast Capex in the current AA. As the table indicates, it is expected that there will be an over-expenditure of approximately 8.7% for the current AA. WorleyParsons considers this to be not inconsistent with the intent of the current AA undertakings.

Table 6-2: Actual Capex in Comparison with AA Capex $k

YEAR	2001/02	2002/03	2003/04	2004/05	2005/06	TOTAL
Actual Capex	21,363	21,478	20,791	20,585	26,480	110,698
AA forecast Capex	29,015	21,337	18,284	16,790	16,420	101,846
Difference	-7,652	141	2,507	3,795	10,061	8,852

7. COST DRIVERS

The major cost drivers for the Envestra Capex and Opex are:

- The need to expand and augment the network to meet increased demand (population growth and changing consumption patterns);
- The need to improve supply security;
- The need to replace aging and expensive to maintain infrastructure; and
- Meeting statutory metering obligations.

7.1 Demand Forecasting

Demand forecasting is a critical input to system modelling for determining where and how networks are expanded and augmented to meet future loads.

At the macro level, Envestra has developed forecasts of demand for each of the regions in SA in which it distributes natural gas. Key inputs into these forecasts, such as dwelling starts, disposable income, industrial production etc., were sourced from independent economic forecaster The National Institute of Economic and Industry Research. Envestra's forecasts are normalised for weather and represent it's best estimates of future natural gas consumption for the regulated network.

For operational and planning purposes the demand forecasts are augmented with location specific information sourced from Planning SA to target potential system constraints and optimise future capital expenditure.

Worley considers the Envestra approach to forecasting to be sound and an appropriate basis for identifying capital works projects.

7.2 Security of Supply Considerations

The Adelaide metropolitan region network is supplied from only four city gate stations and the network is characterised by a series of branches emanating from a limited number of critical supply mains fed from these four city gates. In contrast, the Melbourne metropolitan gas networks are supplied via two ring mains, from approximately 60 off-takes from the transmission system. Gas market similarities make it legitimate to compare Adelaide against Melbourne.

Until 2003, Adelaide was supplied solely from Moomba via the Hastings Fund Management owned Moomba to Adelaide Pipeline. In 2003, the Port Campbell to Adelaide pipeline was constructed and commissioned by SEAGas. This has effectively doubled the security of supply into Adelaide.

WorleyParsons considers Adelaide's gas distribution networks to have relatively low levels of supply security in comparison with Melbourne and the Transmission Pressure pipelines that supply gas into Adelaide. The network is very vulnerable to having significant levels of outage should any one of several critical supply mains be damaged by third party activities causing the main to be temporarily taken out of service. Unlike the ring main configuration in Melbourne, there is very minimal back-feeding capability to mitigate this exposure to outages. Further to this, WorleyParsons notes that the Adelaide networks are supplied with pressure regulating installations (PRIs) that do not have redundancy built-in, as is the case for other systems.

As indicated by the increased infrastructure activity levels in recent years, there is an increasing probability of such events occurring. The increasing number of third party damage incident statistics supports this concern.

In recent years, Envestra's primary focus with network design has been given to meeting the forecast load requirements with lesser regard being given to the impacts of load increases on supply security. The compound effect of this has been to steadily reduce an already comparatively low level of supply security.

Against this background and growing community expectations for more demanding supply guarantees, a major strategy for Envestra over the next few years will be to invest in projects that will improve Adelaide's supply security.

WorleyParsons concurs with Envestra's policy to improve the supply security, particularly after consideration of how Adelaide compares with Melbourne and the recent doubling of supply security into Adelaide. In concurring with this policy, WorleyParsons notes the relative low frequency of supply outages within the gas industry but cautions against falling into a false sense of security, particularly after remembering the economic impact of the 1997 Longford incident and the economic impact the 2003 Moomba incident would have had, had the SEAGas pipeline not been commissioned in time.

7.3 Replacement of Aging Infrastructure

Cast iron mains are susceptible to ground movements and are prone to pipe joint failures. Joint failures allow gas leakage (and associated consequences) and water ingress, which cause supply outages. Unprotected steel mains are susceptible to corrosion-associated leakage.

A major component of Opex involves responding to leaks, particularly publicly reported leaks. The response involves investigating each leak incident, categorising the leaks into severity levels and repairing the leaks in accordance with appropriate priorities. In addition to this, particularly after heavy rainfall, there is a significant amount of resource applied to responding to supply outages caused by water ingress into the mains. This usually involves identifying where the water is, removing the water, restoring gas supply and re-lighting the appliances.

As shown in the benchmarking study discussed in Section 8, Envestra has a high percentage of cast iron mains in the network and similarly ranks high in the Opex per km.

Envestra commenced a mains renewal program in 1976. In the period 1992 to 2003, a total of 1,133 km of mains had been renewed with PE, which is an average rate of 94 km per year. This strategy has been underpinned by detailed economic analyses, which have prioritised renewal projects in order of internal rates of return. Over-riding this have been manpower resource considerations, which have led to reducing renewal rates to suit internal constraints.

As of June 2005, the total length of remaining cast iron mains was approximately 1,790 km and unprotected steel mains was 840 km. At an average rate of 94 km per year, it will take approximately 28 years to complete the mains renewal.

Envestra plans to continue the strategy of continuing to replace cast iron and unprotected mains in accordance with the economic IRR criteria and collecting the necessary data on which to base future replace versus repair decisions.

WorleyParsons concurs with Envestra's approach to mains replacement. It is based on sound economic and service delivery criteria. This opinion is reinforced by the rankings in the benchmarking study. WorleyParsons however considers that Envestra could justify an accelerated replacement program for the next three AA periods.

Renewals are undertaken in either blocks or piecemeal. Block renewals typically represent 95% of renewals. Approximately 5% of renewals are piecemeal where, for localised reasons (e.g. unacceptable water ingress etc.), it is prudent to replace small sections of pipe rather than repair. WorleyParsons concurs with this approach.

7.4 Metering

The drivers for metering include customer growth, customer load change, change out of time expired meters and the adoption of demand management technologies in keeping with the requirements of retail contestability.

WorleyParsons considers the SA metering cost drivers to be common with those in other regulatory jurisdictions and considers the metering strategies adopted by Envestra/OEAM to be consistent with those adopted by distribution companies elsewhere.

8. BENCHMARKING

8.1 Introduction

8.1.1 Purpose of Benchmarking

Benchmarking is carried out to compare the level of costs for the subject business with those of similar businesses elsewhere in order to determine on an informed basis whether the costs are reasonable.

8.1.2 Comparability

Clearly no two distributors are the same – they will have differences in network size, physical operating environment, climate, customer density, geographic considerations etc. Many of these differences will impact on the requirements for expenditure so comparisons need to be approached with a great deal of caution. Two main approaches are generally adopted to address this issue:

- Normalise the data to enable more meaningful comparisons; and
- Identify similar organisations to benchmark against.

Ideally, the use of both approaches should be used in order to provide the most meaningful benchmarks.

Issues associated with the effective application of benchmarking include:

- The suitability of normalisation parameters is largely a matter of judgement (i.e. the choice of normalisation parameters and the extent to which they provide a meaningful comparison);
- The identification of similar organisations is also largely a matter of judgement (differences will still exist, which need to be understood and considered);
- The data available is usually outdated; and
- It is difficult to obtain consistent data (the available data is generally not well defined).

8.2 Approach

8.2.1 Scope

The benchmarking was carried out at two levels:

- high level key performance indicators (KPIs); and
- low level inputs (Capex).

In its approach to benchmarking, WorleyParsons considered a range of indicators that might be applicable and narrowed this down to those indicators most likely to provide a useful comparison for the purposes of the Access Arrangement. Where appropriate, the data has been normalised, for example, Opex as a percentage of RAB (refer Section 8.4.3) and Capex as a percentage of RAB (refer to Section 8.4.7).

8.2.2 Cost Exclusions

In order to allow better comparisons, three components of Opex have been excluded from the benchmarks – Unaccounted For Gas (UAFG), Full Retail Contestability (FRC) and Marketing costs. For example, in Victoria UAFG is not included in the distributor's costs as a different mechanism is in place to account for UAFG. The extent of implementation of retail contestability and the treatment of related costs differs across States. Marketing (or network development) costs have been excluded because:

- Regulators have generally not dealt with marketing in the same way as other costs, making benchmarking of that parameter difficult; and
- Marketing programmes are, by their nature, network or market specific, thereby limiting the usefulness of comparisons of such expenditure.

8.2.3 Data Sources

WorleyParsons sourced the data for this benchmarking study primarily from Access Arrangements Draft and Final Determinations, Access Arrangements Information provided by distributors and consultants' reports, as published on regulators' websites. Some additional information was obtained from distributors' websites.

Much of the data relates to the amounts allowed by regulators in their Determinations, rather than actual spending or forecasts made by distributors. As regulatory determinations often themselves draw upon regulatory decisions in other jurisdictions, there is a tendency for "regulation to feed off regulation". This has inherent risks, as actual expenditures can vary from the allowed expenditures for a range of valid reasons.

Gas distributors included in the benchmarking study are shown in the following table:

Table 8-1: Gas Distributors by Jurisdiction

JURISDICTION	GAS DISTRIBUTOR
Victoria	Envestra
	Multinet
	SP AusNet
Australian Capital Territory	ActewAGL
New South Wales	AGL Gas Networks
Queensland	Envestra
	Allgas
Western Australia	AlintaGas Networks
South Australia	Envestra

The timing of the various Determinations is important, as more recent decisions have greater relevance. The timing and status of Gas Access Arrangements Determinations are shown in the following table:

Table 8-2: Timing & Status of Decisions

JURISDICTION	DATE	STATUS
Queensland	October 2001	Final
South Australia	December 2001	Final
Victoria	October 2002	Final
Australian Capital Territory	October 2004	Final
New South Wales	April 2005	Final
Western Australia	July 2005	Final

8.2.4 Treatment of Data

The available data has been presented in either calendar year or financial year format, depending on the jurisdiction. To convert the calendar year data to financial year one would need to rely on the assumption that half of the expenditure for the calendar year in question would fall in the last half of the preceding financial year and half in the first half of the next financial year – this would reduce the validity of the data. Further, this approach would result in the loss of one year's data (i.e. five years of calendar year data would be converted to four years of financial year data). For these reasons, WorleyParsons has adopted the normal approach of using a mixture of calendar year and financial year data, but noting which is which.

8.3 Network Characteristics

In the following sections, the gas distributors are identified by the following abbreviations:

AC	ActewAGL ACT
AN	AGL Gas Networks NSW
AQ	Allgas Queensland
AW	AlintaGas Networks WA
EQ	Envestra Queensland
ES	Envestra South Australia
EV	Envestra Victoria
MV	Multinet Victoria
TV	SP AusNet Victoria (formerly TXU)

Relative performance between gas distributors needs to be considered in the light of the differences in key network characteristics which impact on each distributor's performance. Three key network characteristics are customer density, percentage of cast iron mains and average consumption. Details of these for 2004 are contained in the following table:

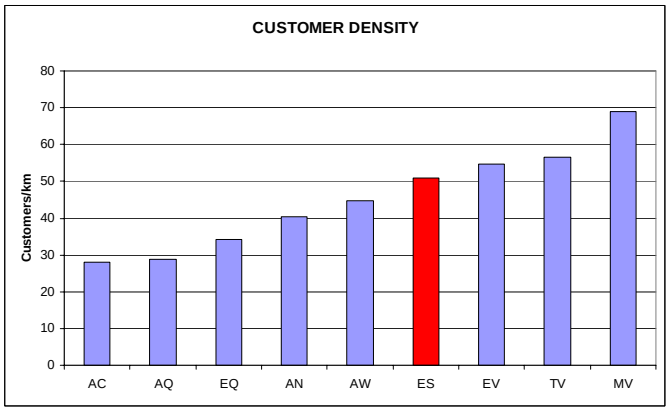
Table 8-3: Key Network Characteristics

NETWORK CHARACTERISTICS	ENVESTRA VIC	MULTINET VIC	TXU VIC	ACTEWAGL	AGLGN NSW	ENVESTRA QLD	ALLGAS QLD	ALINTA WA	ENVESTRA SA	MIN	MAX	AVE
Customer/km	55	69	57	28	40	34	29	45	51	28	69	45
Cast iron mains as % of total mains	11	20	12.2	0.0	5	21	13	0.5	23.0	0	23	12
GJ/customer (< 10TJ customers)	67.8	71.2	61.2	62.1	34.9	27.6	40.0	27.9	31.3	27.6	71.2	47.1
Data Year	Calendar	Calendar	Calendar	Financial	Financial	Financial	Financial	Calendar	Financial			
Data Source	Mainly Determination Forecast	Mainly Determination Forecast	Mainly Determination Forecast	Mainly Determination Forecast	Actuals & Determination Forecasts	Mainly Determination Forecast	Mainly Determination Forecast	Mainly Determination Forecast	Mainly Actuals			

8.3.1 Customer Density

Customer density (measured by customers per km of mains) has an impact on both Capex and Opex – higher customer density should result in more efficient Opex (with lower unit costs) and reduced Capex (through lower unit costs). Envestra SA's relative position is shown in the following chart:

Figure 8-1: Customer Density

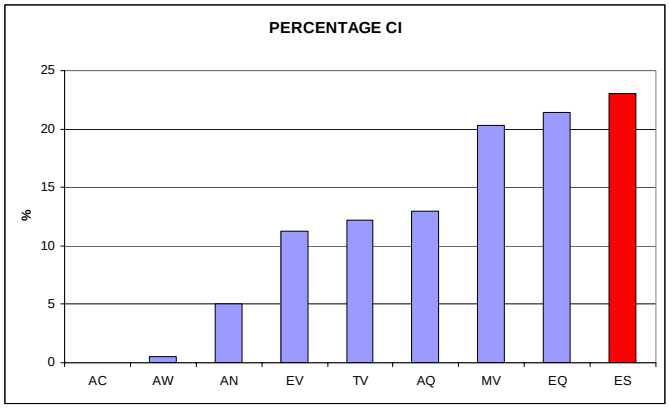


It can be seen that Envestra SA is at the top end of the mid range for this characteristic. The implications of this are considered in Section 8.3.4.

8.3.2 Percentage of Cast Iron

The percentage length of cast iron (CI) mains to total length of mains is significant in that a high value will result in higher levels of Capex (to replace CI mains) and/or higher levels of Opex (to respond to public reported leaks and repair leaks). Envestra SA's relative position is shown in the following chart:

Figure 8-2: Percentage of Cast Iron Mains



It can be seen that Envestra SA has the highest percentage of cast iron mains of all the distributors.

8.3.3 Average Consumption

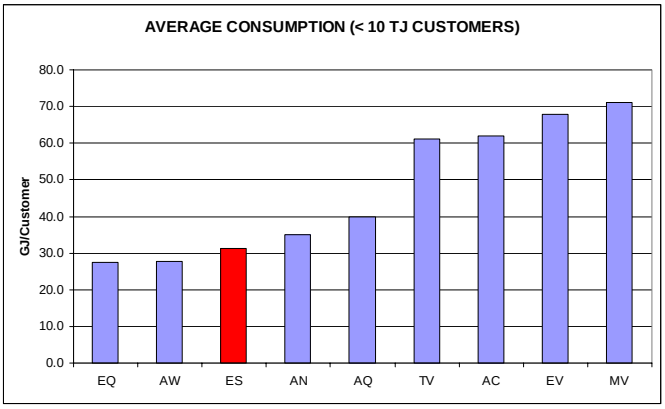
Average consumption (measured by average GJ/customer) is very network-specific, depending on factors such as the mix of industrial/residential customers and the climate (which affects heating loads).

One way to assist in normalising this network characteristic is to exclude the large (contract demand, > 10TJ per annum) customers. This provides a far better basis for benchmarked comparisons, as a key driver of Opex is the number of customers and most of the Capex for large customer works is funded by the large customers concerned.

For this report, consumption excludes the large customers, but due to inconsistencies in the detailed data, it has not been possible to exclude the large customers from the customer numbers in every case. This will, however, make very little difference to the result, as the number of large customers is very small in comparison with the total number of customers.

Envestra SA's relative position is shown in the following chart:

Figure 8-3: Average Consumption (< 10 TJ Customers)



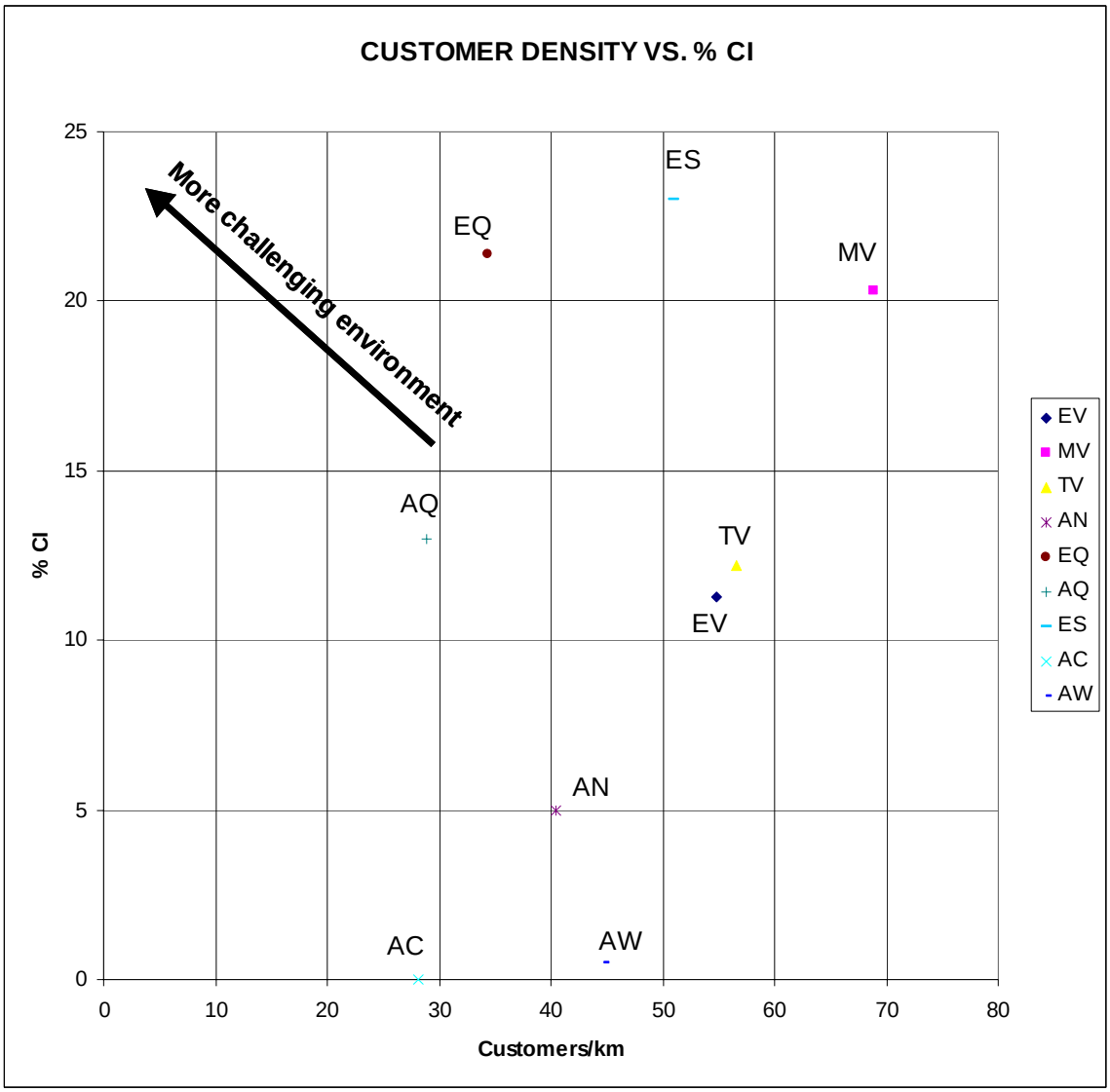
It can be seen that Envestra SA's consumption per customer is at the lower end of the range, and about half that for Victoria and the ACT.

8.3.4 Customer Density vs. Percentage of CI

Of the three network characteristics discussed in the previous sections, WorleyParsons considers that the two most important variables impacting on the validity of benchmarking comparisons are customer density and the percentage of cast iron mains.

Plotting customer density against percentage of CI provides a high level indication of the environment in which a distributor operates. Envestra SA's relative position is shown in the following chart:

Figure 8-4: Customer Density vs. Percentage of CI



It can be seen that the three Victorian distributors and AGL GasNetworks are operating in the least challenging environment, so operating costs would be expected to be lower for these distributors and they will have less requirement for mains replacement Capex. Envestra SA is operating in the second most challenging environment which would reflect in higher operating costs. Envestra Queensland is operating in the most challenging environment, so, all things being equal, operating costs would be expected to be highest for this distributor.

8.4 High Level Key Performance Indicators

The following table shows the high level Key Performance Indicators for 2004 or 2003/04 as the case may be. Each indicator is then discussed in the following sections.

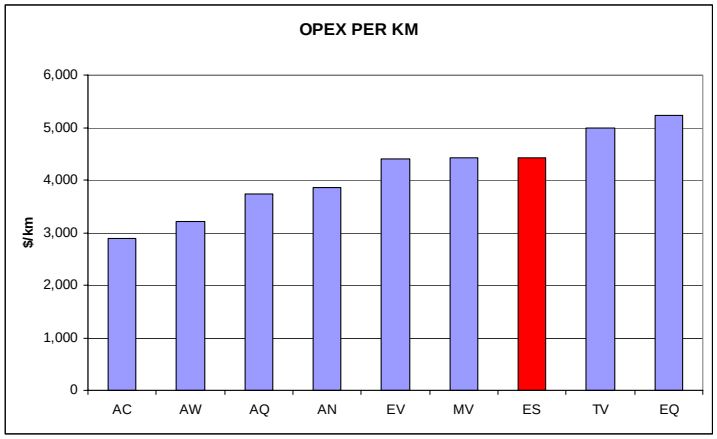
Table 8-4: Key Performance Indicators 2004 Data

SUMMARY 04 DATA 11 DATA FOR ES												
HIGH LEVEL BENCHMARKS	**ENVESTRA VIC**	**MULTINET VIC**	**TXU VIC**	**ACTEWAGL**	**AGLGN NSW**	**ENVESTRA QLD**	**ALLGAS QLD**	**ALINTA WA**	**ENVESTRA SA**	**MIN**	**MAX**	**AVE**
Opex$/km	4,397	4,423	4,998	2,894	3,865	5,232	3,729	3,222	4,426	2,894	5,232	4,132
Opex $/customer	80	64	88	103	96	153	129	72	87	64	153	97
Opex as % of RAB	5.1	4.7	5.1	4.3	4.6	5.0	3.4	5.5	3.9	3.4	5.5	4.6
Opex $/GJ (< 10TJ customers)	1.18	0.90	1.44	1.66	2.74	5.53	3.23	2.59	2.78	0.90	5.53	2.45
Capex $/km	3,586	4,895	5,030	2,139	3,134	5,140	4,914	2,815	2,727	2,139	5,140	3,820
Capex as % of RAB	4.18	5.22	5.13	3.20	3.72	4.88	4.44	4.84	2.41	2.41	5.22	4.22
Capex $/customer	65	71	89	76	78	150	170	63	54	54	170	91
Capex $/GJ (< TJ customers)	0.97	1.00	1.45	1.22	2.22	5.44	4.25	2.26	1.71	0.97	5.44	2.28
Opex as % of revenue	33	28	33	28	30	32	25	34	27	25	34	30
(Capex + Opex) $/km	7,982	9,318	10,028	5,033	6,999	10,372	8,643	6,038	7,153	5,033	10,372	7,952
Data Year	Calendar	Calendar	Calendar	Financial	Financial	Financial	Financial	Calendar	Financial			
Data Source	Mainly Determination Forecast	Mainly Determination Forecast	Mainly Determination Forecast	Mainly Determination Forecast	Actuals & Determination Forecasts	Mainly Determination Forecast	Mainly Determination Forecast	Mainly Determination Forecast	Mainly Actuals			

8.4.1 Opex/km

This is a measure commonly used to gauge the relative efficiency of distributors. Envestra SA's relative position is shown in the following chart:

Figure 8-5: Opex/km

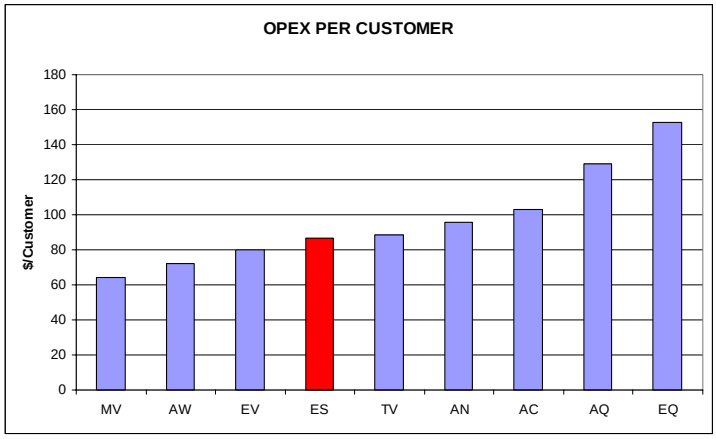


It can be seen that Envestra SA is at the top end of the mid range. This is not unexpected, given Envestra SA's challenging operating environment, as discussed in Section 8.3.4. It is relevant to note that Envestra SA's costs are on a par with two of the Victorian distributors and significantly less than the third Victorian distributor, whereas the three Victorian distributors operate in a far less challenging environment. WorleyParsons considers that Envestra SA's Opex/km is representative of an efficient distributor. Based solely on benchmarking, WorleyParsons considers an efficient distributor operating in the SA conditions should achieve values of Opex/km in the range 4,100 - 4,500 dollars per kilometre over the forthcoming regulatory period.

8.4.2 Opex/Customer

This is another measure commonly applied to assess relative efficiency. Envestra SA's relative position is shown in the following chart:

Figure 8-6: Opex/Customer

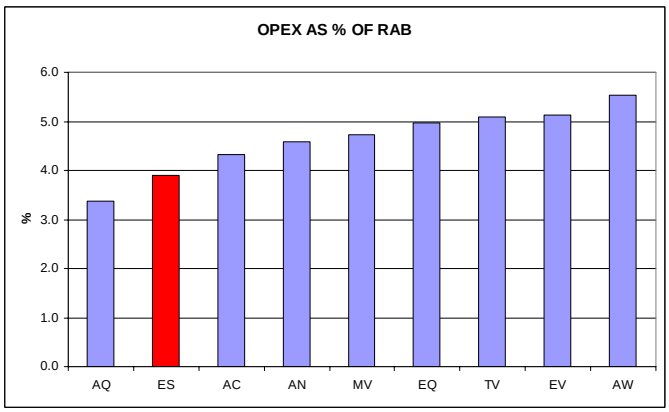


It can be seen that Envestra SA is at the lower end of the mid range. It is relevant to note that Envestra SA compares favourably to AGL GasNetworks and to one of the Victorian distributors. Again, considering the challenging nature of the SA network with its high percentage of CI and low customer density, WorleyParsons considers that Envestra SA's comparative performance to be representative of an efficient distributor. Based solely on benchmarking, WorleyParsons considers an efficient distributor operating in the SA conditions should achieve values of Opex/Customer in the range 80 - 90 dollars per customer over the forthcoming regulatory period.

8.4.3 Opex as Percentage of Regulated Asset Base

Expressing expenditure as a proportion of the Regulated Asset Base (RAB) is a commonly used tool to normalise data between distributors, on the basis that the more assets there are in the network (and hence higher RAB), the greater the need for both Opex and Capex. Envestra SA's relative position is shown in the following chart:

Figure 8-7: Opex/RAB



It can be seen that Envestra SA has the second lowest ratio of Opex to RAB, indicating that Envestra SA's Opex is representative of upper quartile performance. Based solely on benchmarking, WorleyParsons considers an efficient distributor operating in the SA conditions should achieve values of Opex/RAB in the range 3.5 to 4%.

8.4.4 Opex/GJ Delivered

While Opex/GJ delivered is a KPI that has been used in some benchmarking studies, WorleyParsons considers that such a measure does little to assist in assessing relative efficiencies between distributors. This is because a gas distributor has little influence over the volume of gas delivered (which in many cases is weather dependent) and Opex does not vary significantly with changes in consumption. For these reasons, WorleyParsons has not included this measure in this benchmarking study.

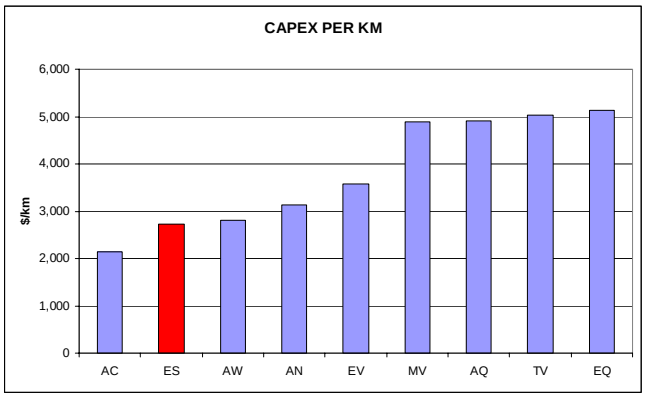
8.4.5 Un-Accounted For Gas

UAFG is measured on a GJ/km basis, but such information was not publicly available, and in any event, UAFG is usually reflective of the amount of cast iron mains in a network. Being a parameter that is therefore network specific, it does not lend itself to benchmarking, but is used to assess an individual network over time, to ensure that appropriate strategies are in place to optimise the repair/replace or Opex/Capex relationship.

8.4.6 Capex/km

This is another commonly used measure and Envestra SA's relative position is shown in the following chart:

Figure 8-8: Capex/km



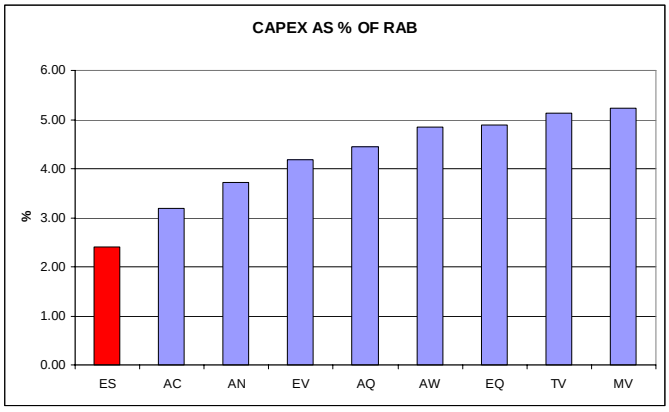
It can be seen that Envestra SA is towards the lower end of the range. This represents the application of tight fiscal policy, and is indicative of the need for increasing levels of expenditure in future years. Given Envestra SA's high percentage of CI mains and its

proposal to increase its mains replacement programme, it is expected that Capex/km would move into the middle of the range over the next regulatory period. Based solely on benchmarking, and ignoring network-dependent factors, WorleyParsons considers an efficient distributor operating in the SA conditions should achieve values of Capex/km in the range 4,000 to 5,000 dollars per km over the next regulatory period.

8.4.7 Capex as Percentage of Regulated Asset Base

This is another commonly used measure and Envestra SA's relative position is shown in the following chart:

Figure 8-9: Capex/RAB

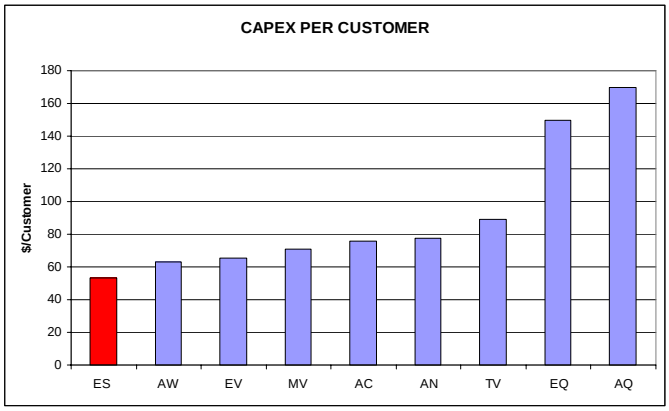


It can be seen that Envestra SA is the lowest of all the distributors, which is supported by Envestra's low relative position in Capex/km and Capex/customer. Again, this represents the application of tight fiscal policy, and is indicative of the need for increasing levels of expenditure in future years. Given Envestra SA's high percentage of CI mains and its proposal to increase its mains replacement programme, it is expected that Capex/RAB would move into the middle of the range over the next regulatory period. Based solely on benchmarking, and ignoring network-dependent factors, WorleyParsons considers an efficient distributor operating in the SA conditions should achieve values of Capex/RAB in the range 2.7 to 4.5% over the next regulatory period.

8.4.8 Capex/Customer

This is another standard measure and Envestra SA's relative position is shown in the following chart:

Figure 8-10: Capex/Customer

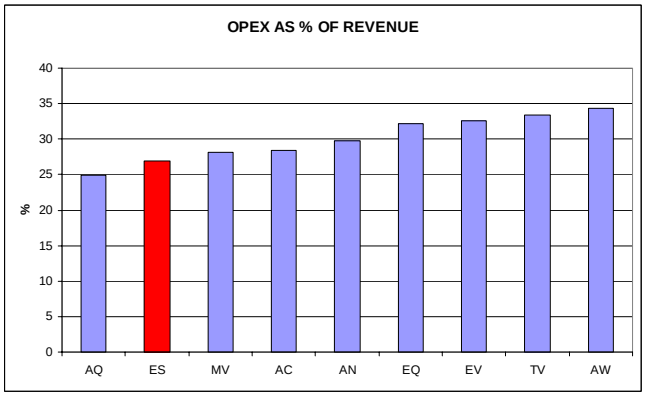


It can be seen that Envestra SA is the lowest of all the distributors, which yet again represents the application of tight fiscal policy, and is indicative of the need for increasing levels of expenditure in future years. Given Envestra SA's high percentage of CI mains and its proposal to increase its mains replacement programme, it is expected that Capex/customer would move into the middle of the range over the next regulatory period. Based solely on benchmarking, and ignoring network-dependent factors, WorleyParsons considers an efficient distributor operating in the SA conditions should achieve values of Capex/Customer in the range 75-95 dollars per customer over the next regulatory period.

8.4.9 Opex as a Percentage of Revenue

Envestra SA's relative position is shown in the following chart:

Figure 8-11: Opex/Revenue



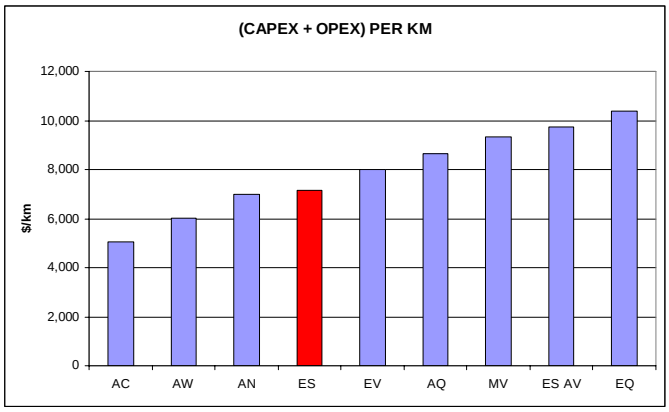
It can be seen that Envestra SA has the second lowest Opex as a percentage of revenue which represents upper quartile performance. Based solely on benchmarking,

WorleyParsons considers an efficient distributor operating in the SA conditions should achieve values of Opex as a percentage of revenue in the range 25-30% over the forthcoming regulatory period.

8.4.10 Total Expenditure/km

As there are often trade-offs between Capex and Opex (eg. a decision not to spend Capex to replace CI mains will result in higher Opex), it is useful to present total expenditure (i.e. Capex plus Opex) per km. Envestra SA's relative position is shown in the following chart:

Figure 8-12: Total $/km

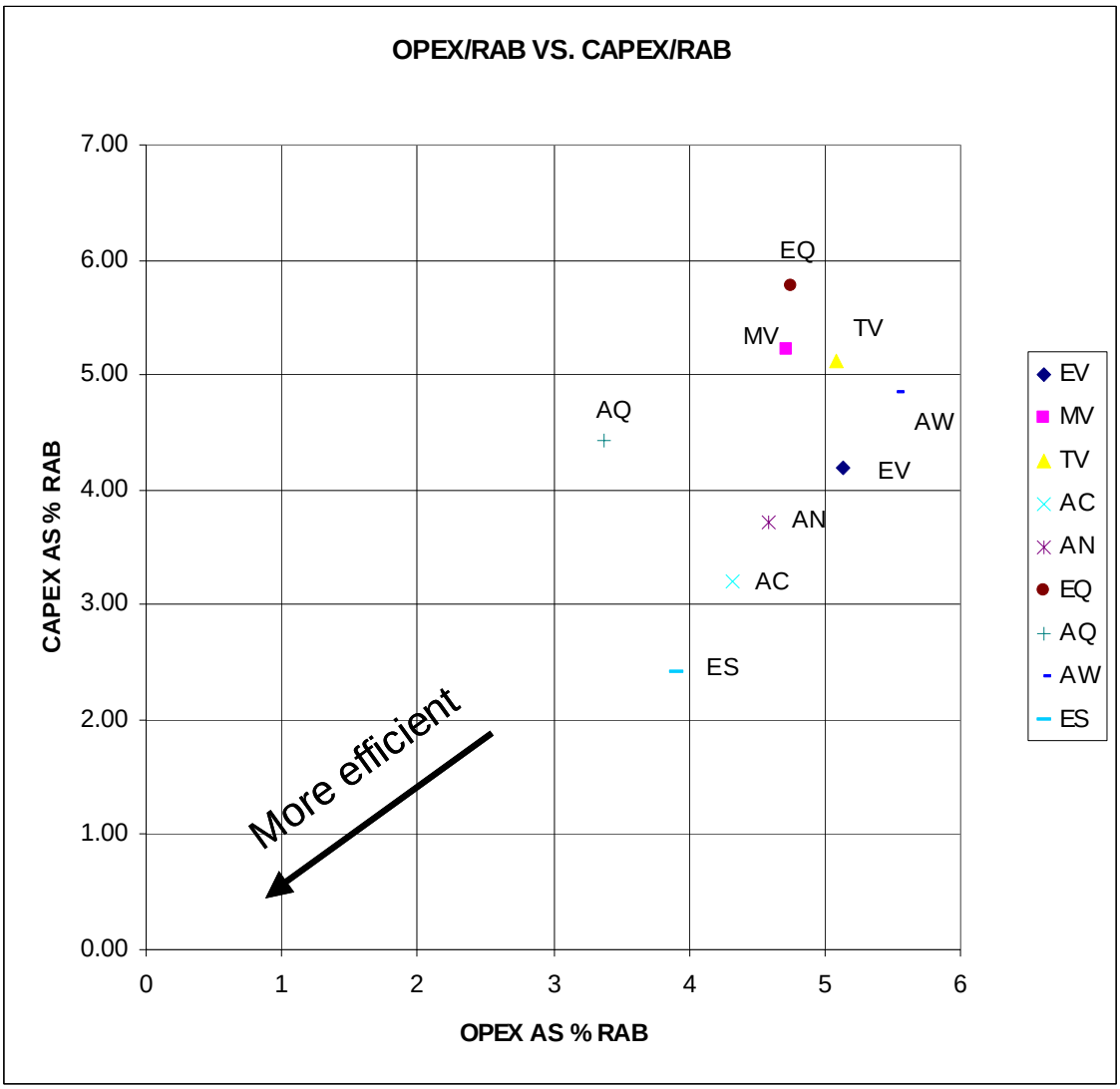


It can be seen that Envestra SA is in the mid range and is lower than the three Victorian distributors. Given Envestra SA's challenging environment as discussed in previous sections, WorleyParsons considers that Envestra SA's comparative performance for this indicator to be representative of an efficient distributor. Given the indications of the need for some increase in Capex, WorleyParsons considers an efficient distributor operating in the SA conditions should achieve values of total expenditure/km in the range 7,500 to 8,500 dollars per km.

8.4.11 Opex/RAB vs. Capex/RAB

Expressing expenditure as a percentage of RAB is a commonly used normalisation technique. Plotting Opex as a percentage of RAB against Capex as a percentage of RAB provides a high-level indication of a utility's relative performance, as there are trade-offs between Capex and Opex and use of the RAB takes into account the relative size of the networks. Envestra SA's relative position is shown in the following chart:

Figure 8-13: Opex/RAB vs. Capex/RAB



It can be seen that Envestra SA is currently an industry leader, which may represent the application of tight fiscal policy, and may also be indicative of the need for increasing levels of expenditure in future years. Given Envestra SA's high percentage of CI mains and its proposal to increase its mains replacement programme, it is expected that Envestra SA would move towards the position currently held by AGL Gas Networks over the forthcoming regulatory period.

8.4.12 Conclusions

The following KPIs are considered by WorleyParsons as those most appropriate for useful comparisons of distributor performance, together with the range over the

forthcoming regulatory period that WorleyParsons would expect from an efficient gas distributor operating under the South Australian conditions (excluding material changes):

Table 8-5: Appropriate KPIs

KPI	EXPECTED RANGE	ENVESTRA 04/05
Opex/km	4,100 – 4,500 $/km	4,426
Opex/Customer	80 – 90 $/Customer	87
Opex as % of RAB	3.5 – 4.0 %	3.9 %
Capex/km	4,000 – 5,000 $/km	2,727
Capex as % of RAB	2.7 – 4.5 %	2.4 %
Capex/Customer	75 – 95 $/Customer	54
Opex as % of Revenue	25 – 30 %	27
(Capex + Opex)/km	7,500 – 8,500 $/km	7,153

WorleyParsons also considers that a plot of Opex/RAB vs. Capex/RAB provides a meaningful basis for comparisons. The relative efficiency of the distributors for this key measure are shown in the following table, with a ranking of 1 equating to highest efficiency

Table 8-6: Opex/RAB vs. Capex/RAB Efficiency

DISTRIBUTOR	RANKING
Envestra SA	1
ActewAGL ACT	2
Allgas Queensland	3
AGL Gas Networks NSW	4
Envestra Victoria	5
Multinet Victoria	6
SP AusNet Victoria	7
AlintaGas Networks WA	8
Envestra Queensland	9

Envestra SA's Opex KPIs are indicative of efficient performance relative to industry peers, taking into consideration the more challenging characteristics of the Envestra SA network. The Capex KPIs are at the lower end of expectations and are similarly indicative of efficient performance. Further, the Capex KPIs suggest that additional levels of investment are likely to be required in coming years as there are indications Envestra SA may be lagging other distributors in the cycle of asset replacement, given the high cast iron percentage.

Based on the benchmarking data, WorleyParsons has concluded that Envestra SA's costs are reasonable and that Envestra SA is an efficient distributor.

8.5 Low Level Benchmarks

8.5.1 Data Availability

Comparative unit rates are shown in the following table. It can be seen that there is little comparative information available in the public arena at this level. Some information regarding individual distributors is available and discussed later in this section of the report.

Table 8-7: Low Level Benchmarks

LOW LEVEL BENCHMARKS	ENVESTRA VIC	MULTINET VIC	TXU VIC	ACTEWAGL	AGLGN NSW	ALINTA WA	ENVESTRA SA
STAY IN BUSINESS							
Periodical Meter Change Domestic $/unit Total	136	177	133	153			97
Periodical Meter Change I&C $/unit Total	3,387	2,421	841	2,481	,		1,289
Mains Replacements total cost/m	150	150	121		75		84
GROWTH							
Cost per new residential customer	1,609	1,807	1,884	1,472	1,284		1,459
Cost per new I&C customer	9,285	12,860	18,226	5,224			8,347
Growth mains cost / new customer					261	163	675
Total $/ new customer					1,315	1,048	1,897

It can be seen that there is a wide variation in the unit costs for meter changes for industrial/commercial customers and for connecting a new industrial/commercial customer. These costs are very dependant on the mix of types of industrial/commercial customers, so comparisons at the level of total costs for industrial/commercial customers are of little value. Although residential customer costs are also subject to dependence on the mix of customer types (eg. new estates and existing homes), there is less variation and some useful conclusions can be drawn from the comparisons.

The most detailed information relating to unit costs is contained in a report by ECG, prepared for IPART in the lead up to its Draft Determination in December 2004.

8.5.2 Stay in Business

8.5.2.1 Meter Change - Domestic

The available comparative data is shown in the following table:

Table 8-8: Meter Change - Domestic

DISTRIBUTOR	ENVESTRA VIC	MULTINET	SP AUSNET	ACTEWAGL	ENVESTRA SA
Cost $/Unit	136	177	133	153	97

There is a growing number of domestic residences using commercial meters and the average cost of a meter change will depend on the percentage of such residences (a commercial meter is significantly more expensive than a domestic meter). Leaving aside issues of the relative mix of customers between the various distributors, WorleyParsons would expect the efficient cost for a domestic meter change in the South Australian environment to be in the range 100 to 130 dollars per meter. It can be seen that Envestra SA is at the bottom of this range, hence WorleyParsons considers that Envestra SA's cost for a domestic meter change is very efficient.

8.5.2.2 Meter Change – Industrial/Commercial

The available comparative data is shown in the following table:

Table 8-9: Meter Change – Industrial/Commercial

DISTRIBUTOR	ENVESTRA VIC	MULTINET	SP AUSNET	ACTEWAGL	ENVESTRA SA
Cost $/Unit	3,387	2,421	841	2,481	1,289

Due to the wide fluctuations in cost with differing industrial/commercial installations and mix of customers, it is not practicable to offer a range for this activity. However, it can be seen that Envestra SA's cost is at the low end, being second only to SP AusNet with the costs for Envestra VIC, Multinet and ActewAGL all being significantly higher.

8.5.2.3 Mains Renewal

The available comparative data is shown in the following table:

Table 8-10: Mains Renewal

DISTRIBUTOR	ENVESTRA VIC	MULTINET	SP AUSNET	AGLGN	ENVESTRA SA
Cost $/Unit	150	150	121	75	84

The unit cost for AGLGN is significantly less than those for the Victorian distributors. but represents the most detailed and most recent data. It is noted that rates are very dependant on location, with big variations between CBD and residential areas. WorleyParsons would expect efficient mains renewal costs in the South Australian environment to be in the range 75 to 100 dollars per metre. It can be seen that Envestra SA is at the lower end of this range, hence WorleyParsons considers that Envestra SA's cost for mains renewal is efficient.

8.5.3 Growth

8.5.3.1 General Mains

The available comparative data is shown in the following table:

Table 8-11: General Mains

	ACTEWAGL	AGLGN	ALINTA WA	ENVESTRA SA
New Domestic Customer $/m				
New Homes Built Up		96		
New Estate		38		
Medium/High Density		76		
Cost per New Dom Customer	636			466
Industrial/Commercial $/m		102		
Cost per New I/C Customer	1,659			3,746
Ave Cost $ per New Cust.		261	163	675

It can be seen that there is little comparative information at this level of detail and it would appear that there is some inconsistency in the data. It is also relevant that the unit cost of installing mains is very sensitive to ground conditions (eg. sandy soil versus rock) and the extent of development (eg. green fields estates versus urban redevelopment). It is not practicable to offer a range for this activity. It is worth noting that the price of polyethylene, a significant material content of the unit price for mains, is sensitive to oil prices. The unit rate for mains installation needs to be considered in the light of material prices which are currently moving at a far greater rate than CPI.

8.5.3.2 Meters/Regulators

The available comparative data is shown in the following table:

Table 8-12: Meters/Regulators

	ACTEWAGL	AGLGN	ENVESTRA SA
New Domestic Customer $/unit			
New Homes Built Up		180	
New Estate		180	
Medium/High Density		618	
Cost/New Domestic Cust.	178		293
Industrial/Commercial $/unit	2,435	2,829	2,359
Total Cost $ New Customer		399	425

It can be seen that there is little comparative information at this level of detail. It is therefore not possible to offer a range for this activity.

8.5.3.3 Services

The available comparative data is shown in the following table:

Table 8-13: Services

	ACTEWAGL	AGLGN	ENVESTRA SA
$/New Domestic Customer	651		699
$/New I/C Customer	1,130		2,242
Total Cost per New Customer		655	798

Again, it can be seen that there is little comparative information at this level of detail and it is not practicable to offer a range for this activity. Although detailed costs have been tabulated in the ECG Report[5], the figures quoted are clearly in error and cannot be used.

[5] Table 7-13 – the figures in the table are not consistent with the rest of the report.

8.5.3.4 Total Cost per New Customer

The available comparative data for the total of mains, services and meters is shown in the following table:

Table 8-14: Total Cost per New Customer

	ENVEST V	MULTI-NET	SP AUSNET	ACTEW	AGLGN	ALINTA	ENVEST SA
Domestic $/New Cust	1,609	1,807	1,884	1,472	1,284		1,459
I/C $/New Cust	9,285	12,860	18,226	5,224		8,400	8,347

As with meter changes, the total costs for industrial/commercial customers are very network-specific, and no meaningful comparisons can be made for this class of customers. For domestic customers, WorleyParsons would expect efficient costs in the South Australian environment to be within the range 1280 to 1500 dollars per new domestic customer. It can be seen that Envestra SA's cost per new domestic customer falls within this range and is therefore considered to be efficient.

8.5.4 Conclusions

Due to the detailed nature of ECG's report, the recent date of the review and the lack of other detailed information, WorleyParsons considers that the detailed unit costs listed in the ECG report represent the best available indicator of industry unit rates.

Where there is sufficient comparative data, WorleyParson has estimated ranges for efficient costs in the South Australian environment and these are as follows:

Table 8-15: Expected Ranges

ACTIVITY	EXPECTED RANGE	ENVESTRA SA 04/05
Domestic Meter Change	100 – 130 $/Unit	97
Mains Renewal	75 – 100 $/m	84
Connect New Domestic Customer $/New Customer	1,280 – 1,500	1,459

From the available information, WorleyParsons considers that Envestra SA's unit costs to be efficient in the both the areas of stay in business and growth.

9. CAPITAL COST FORECAST

WorleyParsons reviewed the capital cost forecast from both a bottom up process and a top down process.

9.1 Code Requirements

In conducting this part of the review, WorleyParsons was cognisant of the requirements for capital expenditure contained in the National Third Party Access Code for National Gas Pipeline Systems (the Code). Clause 8.16 of the Code states that:

> "The amount by which the Capital Base may be increased is the amount of the actual capital cost incurred (***New Facilities Investment***) provided that:
> (a) that amount does not exceed the amount that would be invested by a prudent Service Provider acting efficiently, in accordance with accepted good industry practice, and to achieve the lowest sustainable cost of delivering Services; and
> (b) one of the following conditions is satisfied:
> (i) the Anticipated Incremental Revenue generated by the New Facility exceeds the New Facilities Investment; or
> (ii) the Service Provider and/or Users satisfy the Relevant Regulator that the New Facility has system-wide benefits that, in the Relevant Regulator's opinion, justify the approval of a higher Reference Tariff for all Users; or
> (iii) the New Facility is necessary to maintain the safety, integrity or Contracted Capacity of Services."

9.2 Bottom up Capex Review

WorleyParsons reviewed many of the projects from a bottom up perspective where WorleyParsons commenced the review with OEAM Network Planning officers and reviewed the general planning approach taken and several specific projects in detail. This was done for the following Capex Categories as detailed in sections 9.2.1 to 9.2.3:

- Growth;
- Security of Supply;
- Strategic Replacement;
- Mains Replacement; and
- Miscellaneous Capex.

9.2.1 Growth, Security of Supply, Strategic Replacement Capex

As detailed in Section 7, the drivers for Capex are growth, security of supply and infrastructure replacement. With most projects there is close interlinking between these drivers, particularly with growth and security of supply. For this reason, projects have been grouped together except for routine mains replacement Capex, which is covered in Section

9.2.2. Strategic replacement provides for the principle supply mains to allow general mains replacement.

To identify the projects for the forecast period, Envestra applied the following process:

- The network computer model was validated against actual field conditions for a recent peak demand day;
- The model was normalised by adding a correction to the validated model to allow for a 1 in 25 year winter peak day;
- The forecast load growth data was then inputted into the normalised model and various elements of the network were identified as being unable to cope with the forecast loads; and
- Various options to remedy the network element shortfalls were identified and tested in an iterative manner to determine the most cost effective long term option.

Superimposed over this process was a security of supply network risk assessment process, which was premised on the considerations detailed in Section 7.2. This process involved the following steps:

- The identification of those network elements vulnerable to single point failure;
- A qualitative risk assessment was undertaken to assess consequences and likelihood of each of the single point failures identified;
- Using a risk-rating matrix, the elements were classified and ranked; and
- In combination with the modelling undertaken to determine supply options to meet load growth, various options were modelled to identify those options which met load growth needs as well as adequately mitigating the security of supply risks.

WorleyParsons is of the opinion that the process was both robust and tightly adhered to. WorleyParsons had several discussions with the system planner on the process and on various options considered and has a high level of confidence in both the personnel involved and the outcomes.

The following tables detail the projects identified under this category of Capex:

Table 9-1: Load Growth Reinforcement Projects

Proj ID	Description
1	Yr 1 Piecemeal Reinforcement to Supply
2	Seaford
3	Port Pirie
4	Kidman Park
7	Burton
28	Prospect
29	Mt Gambier
30	Yr 2 Piecemeal Reinforcement to Supply
37	Outer Harbour
39	Yr 3 Piecemeal Reinforcement to Supply
44	Yr 4 Piecemeal Reinforcement to Supply
47	Eastern Ring Main
48	Yr 5 Piecemeal Reinforcement to Supply
49	Virginia
53	Southern Loop
54	Gawler Augmentation

Table 9-2: Strategic Replacement Projects

Proj ID	Description
35	Brighton
34	Nth Central Suburbs - Grand Junction Rd Stage 1 of 3
42	Nth Central Suburbs - Grand Junction Rd Stage 2 of 3
46	Nth Central Suburbs - Grand Junction Rd Stage 3 of 3

Table 9-3: Security of Supply Projects

Proj ID	Description
55	MAP - SEAGAS Interconnector
8	Bridge Rd, Para Hills
36	Marleston
9	Wright Rd. Salisbury
11	Womma Rd, Davoren Park
14	Jetty Rd, Largs North
18	Jetty Rd, Largs Bay
32	Mawson Lakes/ Parafield Gardens
41	Brougham St, Magill
24	Womma Rd, Elizabeth North

WorleyParsons notes that the Office of the Technical Regulator (OTR) undertook an audit of the processes in place to determine the projects needed for load growth and supply security in early June 2005. At this audit, OTR were briefed on the above-mentioned processes and was shown details of the planned projects. WorleyParsons understands that OTR did not raise any concerns with Envestra/OEAM in relation to either the process or the outcomes and were quoted by Envestra/OEAM members present as being generally impressed with the planning activities undertaken.

In support of each of these projects, a Network Capex Proposal document was prepared for each project, which detailed the following:

- Proposal details;
- Budget and cost breakdown;
- Background;
- Risk assessment;
- Options considered; and
- Recommendation.

WorleyParsons reviewed 8 Network Capex Proposal documents and undertook a high level review of the overall capital program and concluded the following:

- The program involves the creation of the Eastern Ring Main and Southern Loop. It also establishes the foundation for the later creation of a North East suburb loop.
- WorleyParsons considers the establishment of these loops/ring mains will substantially improve the network's security of supply.
- WorleyParsons considers the level of rigour applied to determine the projects was high and typical of what a gas distribution company would normally apply. On the

basis of the Network Capex Proposal documents reviewed and discussions held with the system planners, WorleyParsons considers that there has been an adequate level of investigation of alternatives.

- WorleyParsons considers the nominated projects were typical of what a gas distribution company would identify under similar circumstances.
- Project cost estimates are primarily based on current costs for similar works. WorleyParsons considers this to be a sound basis. In any event, as the majority of the work will be undertaken by contractors, costs will be at market rates and the extent to which these costs are inaccurate will be the extent to which the market has moved.

As detailed in Section in 8, WorleyParsons notes that in comparison with other utilities, Envestra is ranked at the low end for Capex/km, Capex as a percentage of RAB and Capex/customer. This is consistent with Envestra primarily focussing on meeting load growth needs while in recent years security of supply considerations have become more prominent in customer and community expectations. As discussed in Section 7.2, the supply security into Adelaide has doubled with the commissioning of the SEA Gas pipeline, while the security of supply within Adelaide has remained constant. Considering this and how the Adelaide security of supply compares with Melbourne, it is WorleyParsons opinion that there is a considerable "catch-up" component required for the next and following AA periods. The proposed Capex for the next AA will in part redress this and is expected to move Envestra toward the middle of the benchmark ranges.

WorleyParsons notes that the recently published 2005 South Australian Infrastructure Report Card (published by the Institution of Engineers Australia) states "Inadequate planning for extending, maintaining and replacing gas distribution assets could result in significant cost increases to consumers." WorleyParsons agrees with this statement and further considers that failure to invest significantly in such projects during the next AA period could result in much higher costs to consumers in subsequent AA periods.

9.2.2 Mains Replacement Capex

As discussed in Section 7.3, Envestra plans to continue with the mains renewal program. The program for the next AA has been developed using the following process for each suburb:

- The collection of:
    - Asset condition data (historic leakage data etc);
    - Cost of maintenance data (repair costs, rectification works for water ingress, poor pressures etc);
    - Cost of gas losses (based on UAFG wash-up data etc.); and
    - Cost of renewal data;

- Reviewing the above data and predicting the average rate of network deterioration and estimated gas losses for each suburb;
- Using current mains replacement costs together with associated pressure upgrading costs, conducting economic analyses for renewing the mains for each suburb; and
- Prioritisation of renewals on a suburb-by-suburb basis in order of IRR.

On the basis of economic evaluations to date, Envestra is able to justify approximately 750 km of mains replacement for the period 2006/07 to 2010/11. However, due to operational constraints, Envestra is planning to replace only 500 km, which is an average of approximately 100 km per year.

WorleyParsons reviewed the model used to calculate the IRR for the networks and noted that the model has several fields which are locked and regularly updated in accordance with external conditions. The model is used by the system planning personnel who input the following:

- Number of outstanding leaks;
- Historic leaks per year;
- Average cost to repair leaks for the specific suburb;
- Other costs associated with leaks (eg investigating and rectifying water ingress); and
- The latest cost to renew mains.

The model then automatically calculates the IRR. WorleyParsons reviewed the models for:

Windsor Gardens;

Ridgehaven;

Glengowrie;

Prospect;

Glenelg South; and

Woodville Gardens

and concurs that the process applied was consistent with the above-mentioned procedure. The models reviewed included suburbs which immediately exceed the required IRR, suburbs which will meet the IRR during the next AA period and suburbs which will not reach the IRR during the next AA period.

WorleyParsons considers the approach taken to be robust and appropriate to deliver a prudent expenditure outcome. WorleyParsons is satisfied that the IRR used for the evaluations is appropriate.

WorleyParsons considers it appropriate to plan the renewal works so that the works are divided evenly across the five-year period as is intended. This will be the optimal

arrangement from a resource management perspective. WorleyParsons also considers it appropriate to limit renewal works to a level that is operationally efficient, i.e. levels should match availability of resources, otherwise the law of supply and demand will result in contract payments being higher than desirable levels.

As detailed in Section 8.3.2, WorleyParsons notes that Envestra SA has the second highest percentage of cast iron in the country. Corresponding to this, Envestra SA is at the high end of OPEX/km. These benchmark comparisons support the planned renewal expenditure.

WorleyParsons is of the opinion that the extent to which Opex reduces in response to this expenditure will relate to the reduction in percentage cast iron in the system, recognising that as the current high maintenance cast iron networks are replaced, more high maintenance networks will emerge due to the constant deterioration of the remaining cast iron.

Table 9-4 sets out the suburbs where mains are to be replaced, with a ranking scale for each year of the period based on a IRR analysis. A ranking of 9 represents a pass in relation to the economic test applied by Envestra.

Table 9-4: Mains Replacement Projects - Ranking

Suburb	2006-07	2007-08	2008-09	2009-10	1010-11
MAGILL	14	15	15	16	16
RIDGEHAVEN	15	15	15	16	16
KENSINGTON GARDENS	14	14	15	15	16
KLEMZIG	14	14	15	15	15
GLENELG EAST	14	14	15	15	15
GLENELG NORTH	14	14	14	15	15
WINDSOR GARDENS	14	15	15	15	15
NETHERBY	12	13	13	14	14
DULWICH	12	13	13	14	14
PASADENA	14	14	14	14	14
GLENELG	11	12	12	12	13
MODBURY NORTH	11	12	12	12	13
ETHELTON	11	11	12	12	13
WEST BEACH	12	12	12	12	12
FITZROY	11	11	11	12	12
STURT	11	11	11	12	12
FULHAM	12	12	12	12	12
WARRADALE	10	11	11	11	12
TOORAK GARDENS	10	11	11	11	12
NORTH PLYMPTON	10	11	11	11	12
MODBURY	10	11	11	11	11
MARLESTON	10	10	11	11	11
DOVER GARDENS	10	10	11	11	11
MILE END	10	10	10	11	11

Suburb	2006-07	2007-08	2008-09	2009-10	1010-11
FIRLE	10	10	10	11	11
CAMPBELLTOWN	10	10	11	11	11
GLENGOWRIE	10	10	10	11	11
MELROSE PARK	11	11	11	11	11
SMITHFIELD PLAINS	10	10	10	10	11
COLLEGE PARK	9	10	10	10	11
LEABROOK	9	9	10	10	10
ROSSLYN PARK	9	9	9	10	10
SEACOMBE GARDENS	9	9	9	10	10
THEBARTON	9	9	9	10	10
NORTH ADELAIDE	9	9	9	10	10
HOPE VALLEY	9	9	10	10	10
SPRINGFIELD	9	9	9	10	10
CHELTENHAM	9	9	9	10	10
TRANMERE	8	9	9	9	10
PROSPECT	9	9	9	9	10
PLYMPTON	9	9	9	9	10
ADELAIDE CBD	8	9	9	9	10
ST GEORGES	8	9	9	9	10
NORTH BRIGHTON	8	9	9	9	9
WOODVILLE NORTH	8	9	9	9	9
SOMERTON PARK	8	9	9	9	9
PARADISE	8	8	9	9	9
PLYMPTON PARK	8	8	9	9	9
GLENELG SOUTH	8	8	9	9	9
WEST HINDMARSH	8	8	8	9	9
NORTHFIELD	8	8	8	9	9
PARAFIELD GARDENS	8	8	8	9	9
OVINGHAM	8	8	8	9	9
SEMAPHORE	8	8	8	8	9
HILLCREST	8	8	8	8	9
MITCHELL PARK	7	8	8	8	9
ST MARYS	7	8	8	8	9
GILLMAN	8	8	8	8	9
UNDERDALE	7	8	8	8	9
HACKNEY	8	8	8	8	9

9.2.3 Miscellaneous Capex

9.2.3.1 SCADA

Included in this category is a plan to upgrade the network's pressure surveillance and control capability to bring it into line with current industry practice. This proposed expenditure is supported by a strategy paper. WorleyParsons reviewed this paper and held discussions with network planning officers and concluded the following:

- The Envestra SA network does not have the same level of remote pressure surveillance and monitoring capability as other networks.
- This expenditure will bring the Envestra SA network more into line with other networks and increase the remote monitoring and system control capability. This will assist with:
    - Emergency management, (faster response times, reduced supply interruptions etc)
    - Optimising system pressures and reducing system leakage
    - Improving the accuracy of system modelling to give improved planning outcomes.

WorleyParsons concurs with this proposed expenditure and expects that in addition to the above, maintenance savings will be possible in the longer term through a reduced need for field visitation to monitor the health of the regulator stations.

9.3 Top down Capex Review

WorleyParsons also reviewed the high level SA Access Arrangement Summary Expenditure spreadsheet from a top down approach in the categories described in the spreadsheet. It should be noted that the Capex categories did not always align and reference to this is made as appropriate.

9.3.1 Stay in Business

Stay in business expenditure is generally that expenditure which must be spent on equipment upgrading to retain ongoing functionality. Each sub component of stay in business expenditure will be discussed separately.

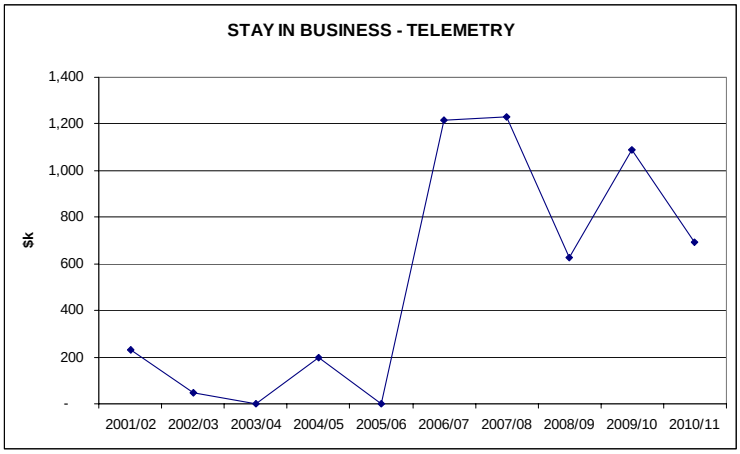
Table 9-5: Stay in Business Capex $k

Stay In Business	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	TOTAL 06/07-10/11
SCADA	230	49	-	199	-	1,218	1,230	626	1,088	695	4,858
Regulators	-	-	-	146	-	1,409	1,423	812	814	816	5,274
PMC - Domestic	1,029	1,168	1,351	1,019	3,125	3,420	3,537	3,397	3,256	2,762	16,372
PMC - I&C	250	302	419	356	1,261	1,053	811	1,234	1,249	1,159	5,506
Odorising	-	53	-	20	-	56	399	58	58	58	629
Corrosion Protection	-	-	-	152	-	45	23	46	23	47	184
Mains Renewal	4,495	4,043	4,135	4,067	7,199	8,797	8,585	7,967	8,228	9,081	42,658
Non-FRC IT Systems	602	537	123	717	-	254	553	4,416	258	260	5,742
FRC IT Systems						51	77	144	-	3,116	3,388
Other	3	335	-	483	145	477	465	454	443	432	2,269
Total	**6,608**	**6,488**	**6,028**	**7,159**	**11,730**	**16,781**	**17,103**	**19,154**	**15,417**	**18,424**	**86,879**

9.3.1.1 SCADA

WorleyParsons has reviewed this expenditure and concurs with the expenditure levels. As indicated in Section 9.2.3.1, this expenditure represents expenditure above and beyond previous expenditure to improve the network's surveillance and control capability.

Figure 9-1: SCADA



9.3.1.2 Regulators

This expenditure is required for the accelerated upgrading of district regulator stations which require new components and the replacement of the brick vaults. WorleyParsons has reviewed a paper supporting these works and concurs with both the need for these works and the budgeted expenditure.

Figure 9-2: Regulators

9.3.1.3 Programmed Meter Changes – Domestic

To ensure ongoing meter accuracy, meters are retained in service for set life periods. These life periods depend on the meter family type, the meter's previous service and repair history and past in-test performance. To manage this program, Envestra operates in accordance with the Gas Measurement Management Plan, which has been prepared in accordance with the Gas Metering Code.

Forecast costs are driven primarily by the composition of the field meter population. The meter population is composed of several meter families where a family is characterised by attributes, which include the meter type, manufacturer, year of manufacture, and past service and repair histories etc. Each meter family has a defined field life and some families have been approved for field life extension, subject to satisfactory sample in-testing. The current composition of the installed population therefore determines how many meters will be time expired for each year of the AA.

Meters used to replace time expired meters are a mix of partially repaired, fully repaired and new meters.

WorleyParsons understands that the following assumptions have been made for the establishment of the forecasts:

- Unit costs have been based on historic costs associated with each type of meter in the above mix;
- For the next AA period, unit costs are expected be higher due to a greater percentage of meters returning to the field being either fully repaired or new. This is due to a diminished inventory stockpile; and

- A similar field life extension success rate to that experienced in the past has been assumed. WorleyParsons notes that this success rate has been relatively poor and is unlikely to improve particularly if two-rate in-testing becomes mandated.

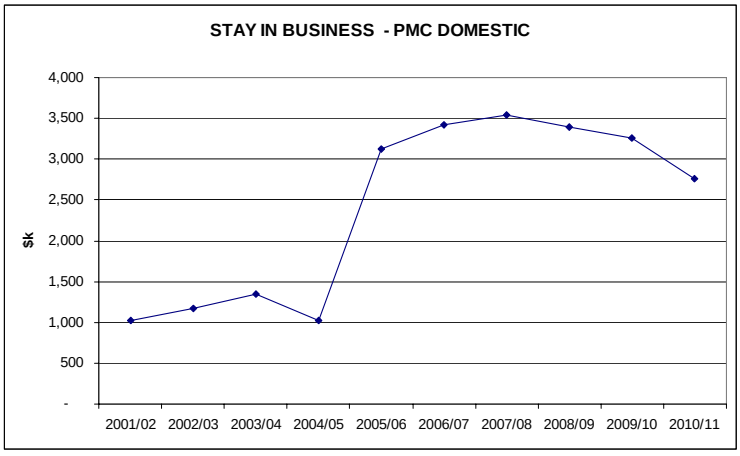
WorleyParsons considers the costing methodology to be appropriate for current meter management processes. WorleyParsons also considers the unit rate to be reasonable, noting that it compares favourably with benchmark comparisons with other utilities.

As shown in Figure 9.3, there is a large increase in PMC costs. This increase is due to the increase in unit rates discussed earlier as well as in increase in volume. WorleyParsons considers the unit rates applied to date to have been artificially low. WorleyParsons concurs with the proposed expenditure.

WorleyParsons notes that as part of the AMP, Envestra's metering strategies include the following:

- Keep abreast of new technologies;
- Seek to get the best out of field life extensions;
- Prudent purchasing decisions;
- Meet FRC requirements; and
- Meet regulatory obligations.

Figure 9-3: Programmed Meter Changes - Domestic

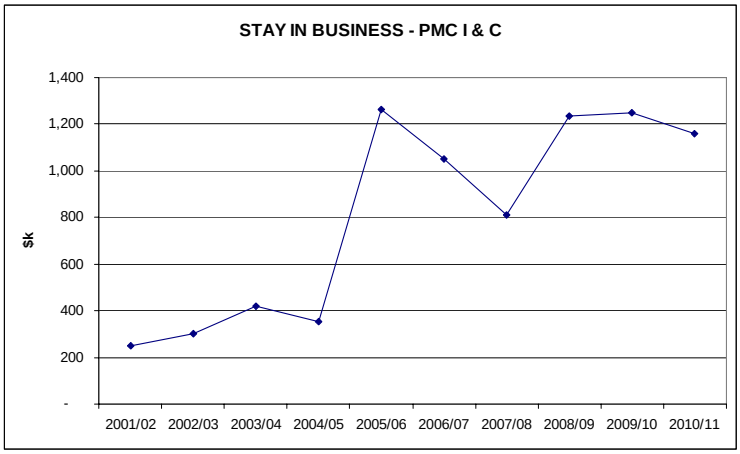


9.3.1.4 Programmed Meter Changes – I & C

All I&C meters are removed and given a full repair and recalibration every ten years. The forecast costs are driven by the age of the meters in the field and the meter type types. Repair and testing of I&C meters is very specialised, and requires considerable care, particularly recognising the fiscal impact on the customer and service providers.

WorleyParsons understands that the unit rates applied have been based on historic costs. Recognising that the cost of a meter repair will vary widely depending on the meter type, WorleyParsons concurs that this is the only practical approach to take. Not withstanding the above, WorleyParsons considers the proposed unit costs to be reasonable.

Figure 9-4: Programmed Meter Changes - I & C



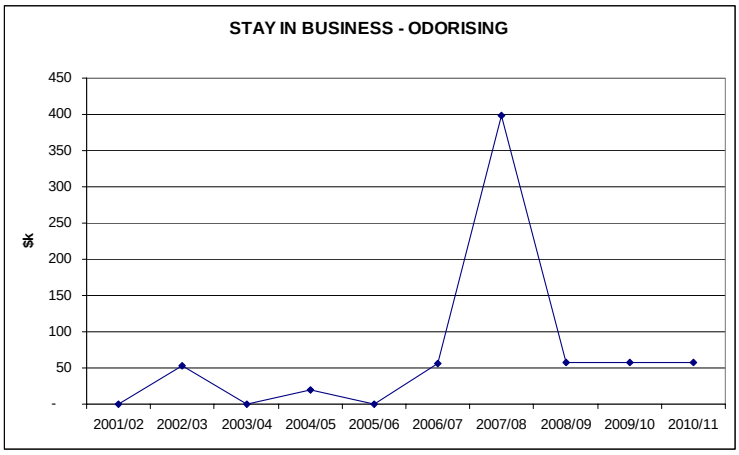
9.3.1.5 Odorising

WorleyParsons understands that the majority of the Envestra odorant injection stations are without back-up capability in the event of failure. The projected increase in expenditure in 2007/08 is to fabricate a limited number of back-up units which can be easily brought to site in the event of odorant station failure.

WorleyParsons regards back-up capability with odorisation as an important safety issue. Odorant injection failure can lead to lower levels of odour in the gas for which leaks may be not be as easily detected. This is particularly important for plastic systems where in comparison with metal pipes; there is very little residual odorant to retain the gas odour in such situations.

WorleyParsons concurs with the forecast expenditure.

Figure 9-5: Odorising

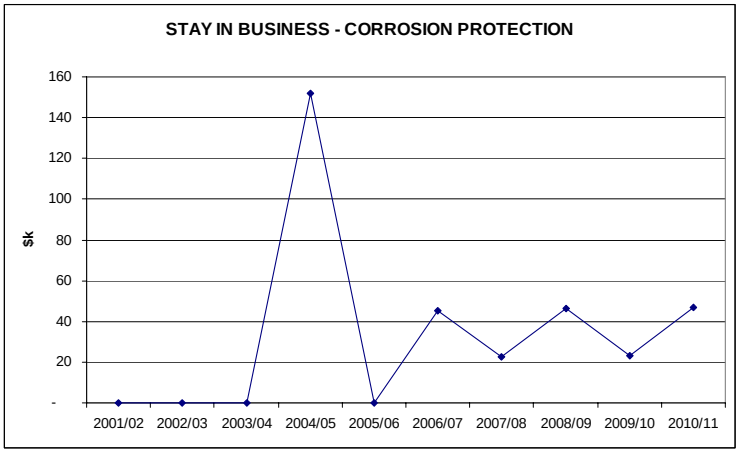


9.3.1.6 Corrosion Protection

Corrosion protection is fundamental to the long-term protection of the steel mains to ensure this class of assets reaches the assigned useful life.

WorleyParsons considers the proposed expenditure to be consistent with what would typically be required to keep the corrosion protection system functional and effective.

Figure 9-6: Corrosion Protection

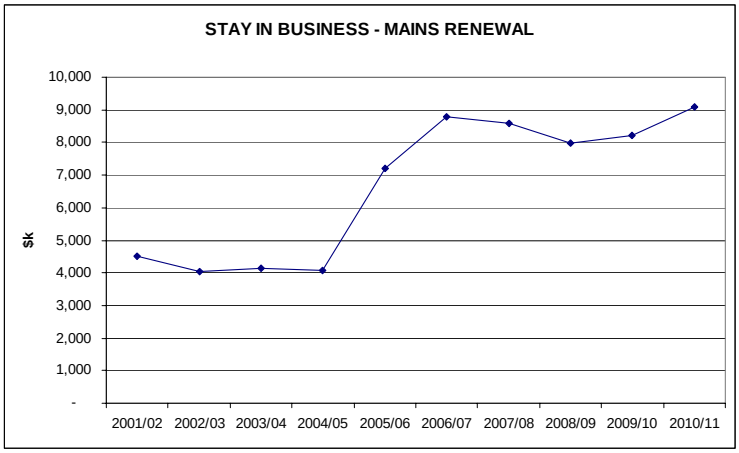


9.3.1.7 Mains Renewal

As discussed in Section 9.2.2, WorleyParsons concurs with this expenditure. WorleyParsons notes that in comparison with Victoria, the Envestra SA rates are probably slightly lower as there is less competition for contractors with the necessary skills. Envestra SA also benefits from the contract strategy of letting out renewal contracts on a suburb-by-suburb basis, which enables longer term planning on the part of the contractor and hence more efficient works.

WorleyParsons notes the increase in expenditure and notes that this is due to the increase in renewal rates from approximately 50km per year to 100km per year, consistent with the Asset Management Plan.

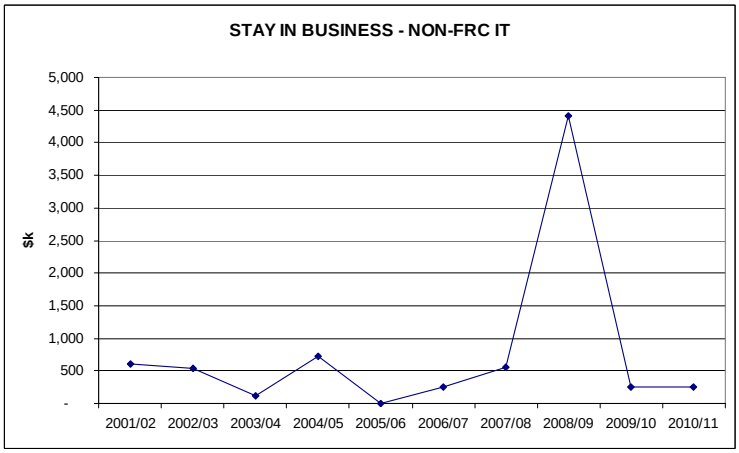
Figure 9-7: Mains Renewal



9.3.1.8 Non-FRC IT Systems

WorleyParsons understands that this item of expenditure has been reviewed by others and understands that the proposed expenditures relate to system and hardware upgrades, The large increase in expenditure in 2008/09 is due to the planned major upgrade to Maximo.

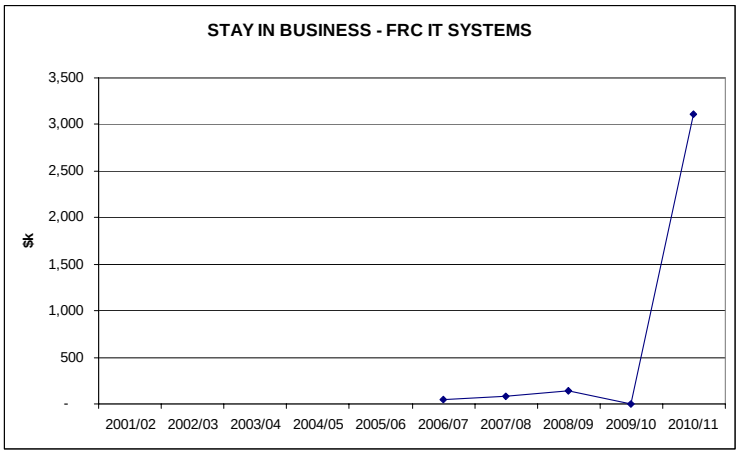
Figure 9-8: Non-FRC IT Systems



9.3.1.9 FRC IT Systems

WorleyParsons understands that this item of expenditure has been reviewed by others and also understands the large expenditure at the end of the AA relates to hardware upgrades.

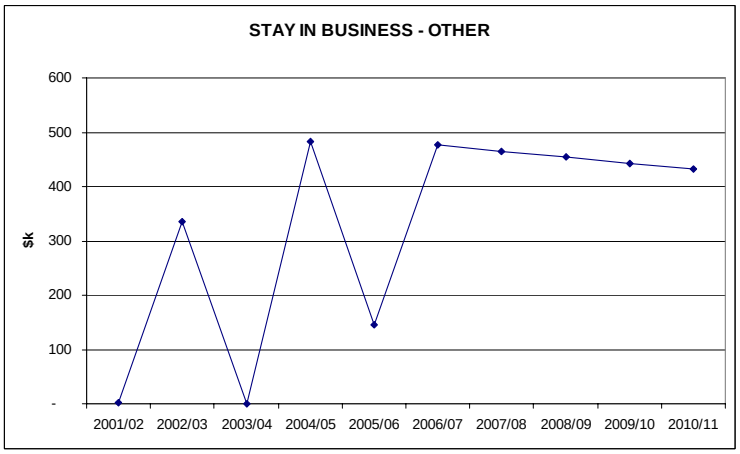
Figure 9-9: FRC IT Systems



9.3.1.10 Other

WorleyParsons understands that this category of cost pertains to the ad-hoc replacement of non-reticulation capital. This includes miscellaneous plant and equipment such as mains stopple equipment, earth boring equipment, gas detectors, etc. It is not always possible to predict the useful life of such plant and some of these specialised equipment items are expensive capital items. WorleyParsons considers it prudent to plan for the on-going replacement of such plant and equipment and that the forecasts are reasonable.

Figure 9-10: Other



9.3.1.11 Total Stay in Business

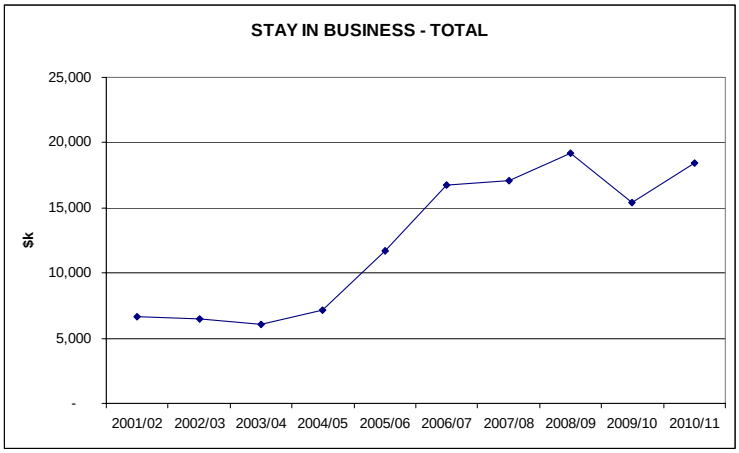
As the foregoing sections have demonstrated, WorleyParsons has reviewed each element of stay in business Capex. As the below graph depicts, the stay in business Capex increases from a historic value of approximately $7m to $15-20m.

The major reasons for this increase are as follows:

- Accelerated mains replacement program;
- An increase in meter unit rates from an artificially low level to a more realistic level; and
- An accelerated district regulator upgrade program to address safety and operational concerns; and
- An increase in IT expenditure.

WorleyParsons concurs with this expenditure, noting for example the need to reverse the deteriorating UAFG and leak reportage rates in support of this program. WorleyParsons further notes the benchmark Capex indicators in Section 8, which for nearly all indicators, Envestra SA has historically been at the low end of the range.

Figure 9-11: Total Stay in Business



9.3.2 Growth

Growth expenditure is that expenditure required to connect new customers and augment the system to meet increased loads.

Table 9-6: Growth $k

Growth	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	TOTAL 06/07-10/11
Large Consumers	1,496	1,656	967	936	129	655	797	580	586	588	3,207
Improve Supply	148	99	834	569	586	1,182	1,010	472	473	966	4,102
General Mains	3,890	3,798	3,624	2,674	4,741	5,686	5,489	5,158	5,417	5,952	27,701
Regulators	119	248	69	-	-	-	-	-	-	-	-
Meters	2,556	2,693	2,818	2,485	2,950	3,545	3,416	3,203	3,364	3,699	17,227
Services	6,546	6,497	6,451	6,762	6,794	7,673	7,752	7,341	7,845	8,336	38,947
Other	-	-	-	-	-	136	136	136	136	136	681
Total Growth	**14,755**	**14,990**	**14,763**	**13,426**	**14,750**	**18,876**	**18,601**	**16,889**	**17,821**	**19,678**	**91,866**

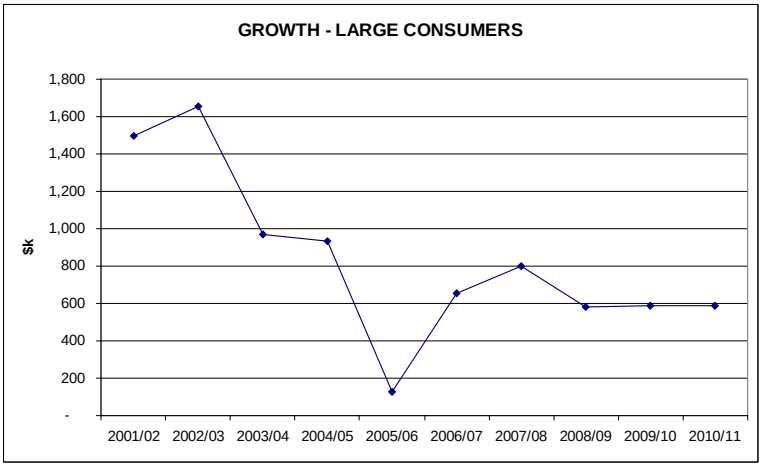
9.3.2.1 Large Customers

Forecasts for large customer growth are based on internal market intelligence and historic trends. Unit costs are based on historic averages and as discussed in Section 9.3.1.4, these costs will vary considerably. Large customer meter costs depending on:

- Load size;
- Supply and delivery pressures;
- Pressure class rating; and
- Telemetry requirements etc.

WorleyParsons concurs with the approach taken to forecast this expenditure and considers the amounts to be reasonable.

Figure 9-12: Large Customers

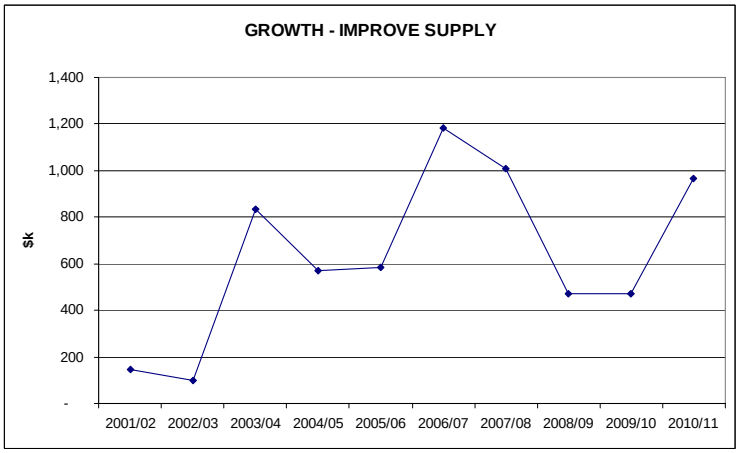


9.3.2.2 Improve Supply

Envestra has assigned those projects which cost less than $500k detailed in Section 9.2.1 into this category and those above $500k in the Security of Supply category under Material Changes detailed in Section 9.3.3.3.

WorleyParsons undertook a detailed bottom up review of the projects detailed in Section 9.2.1, and concurs with the proposed expenditure. Refer to the commentary in Section 9.2.1 for more details of the WorleyParsons' review.

Figure 9-13: Improve Supply



9.3.2.3 General Mains

This item of expenditure generally refers to the backbone and reticulation mains required to be constructed to bring gas to new and expanding growth areas. This expenditure is primarily driven by new housing and is based on forecasts derived from various sources as discussed in Section 7.1.

Cost forecasts hinge very heavily on unit rates. WorleyParsons understands that the unit rates used for these forecasts have been based on historic costs. WorleyParsons has undertaken a high level review of costs that drive these unit rates and concludes as follows:

- The cost of plastic pipe materials has risen in response to changing oil prices. Industry sources consulted by WorleyParsons have estimated that this caused finished pipe supply costs to have risen by between 25 and 50% in the last twelve months;
- Although used to a much lesser extent for distribution mains, there have been similar world price movements with steel pipe; and
- The cost of diesel fuel has risen by approximately 50% and given the fuel used by excavators and tippers during construction, this will have significantly impacted on the cost of mainlaying.

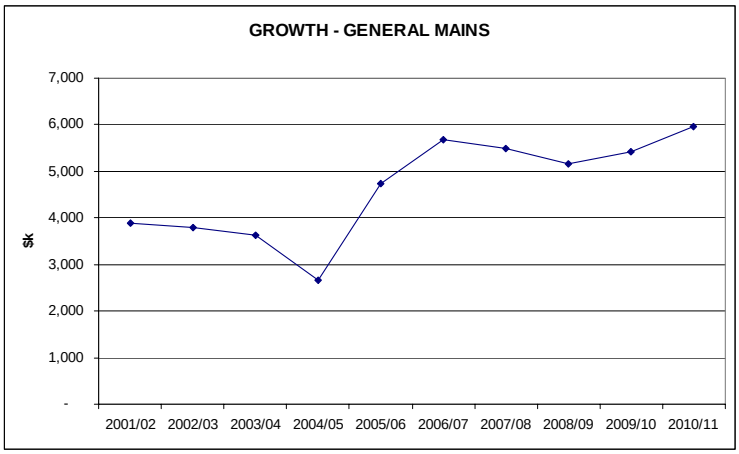
In consideration of the above, WorleyParsons considers the rates as proposed to be reasonable. WorleyParsons however considers that fuel and material price volatilities could cause these rates to move significantly during the next AA. WorleyParsons notes for example a recent press article[6] stating that ethylene prices have rebounded from an 18-month low and have moved 53% since May 2005, indicating the causes to be recent plant outages and Chinese demand on inventories. Ethylene is used to manufacture polyethylene. WorleyParsons does not know to what extent such price increases have already been factored into the current price of finished polyethylene pipe.

WorleyParsons notes the increase in the early years and understands this to be due to a greater percentage of backbone mains in the early years. In any event, the costs will be continually market tested as these works are undertaken by the contract work force.

WorleyParsons considers the forecast costs to be reasonable.

[6] Australian Financial Review 1/9/2005, Bloomberg article.

Figure 9-14: General Mains

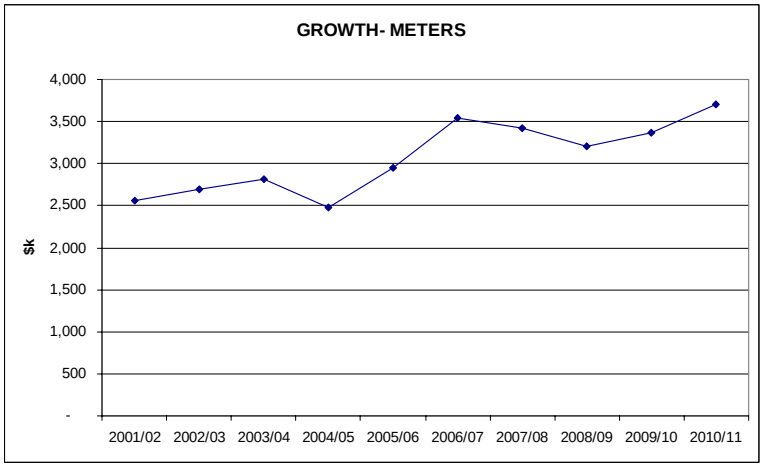


9.3.2.4 Meters

Growth meter volume forecasts align with market growth forecasts. The unit rates are significantly higher than those for program meter changes. The reason for this is that the unit cost includes the regulator, miscellaneous components and meter box and associated installation. Further to this, WorleyParsons understands the meter connection task also includes lighting and checking the safety aspects of the appliances and fitting lines. Envestra SA practice is unique in this aspect and cannot be compared with other jurisdictions.

Unit costs have been based on historic costs which WorleyParsons considers to be a sound basis for determining the unit rate. WorleyParsons has reviewed the build-up of the unit costs and considers the unit rate and the forecast expenditure to be reasonable.

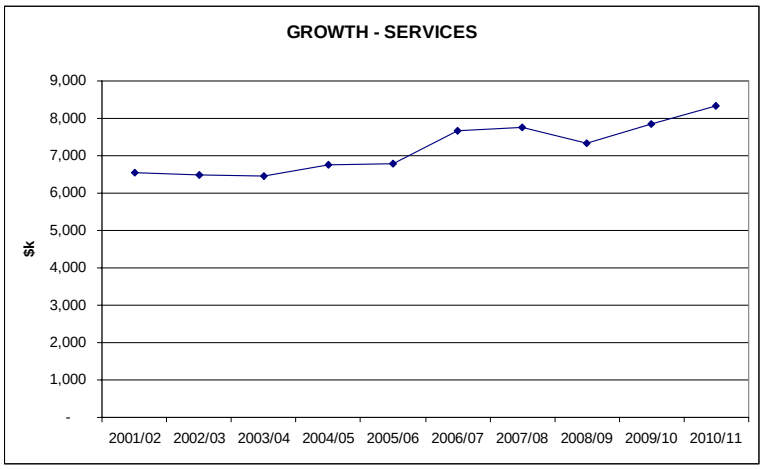
Figure 9-15: Meters



9.3.2.5 Services

Growth services are similar to growth meters in relation to forecasts. Unit costs are based on historic costs. WorleyParsons considers the unit costs and the forecast expenditure to be reasonable.

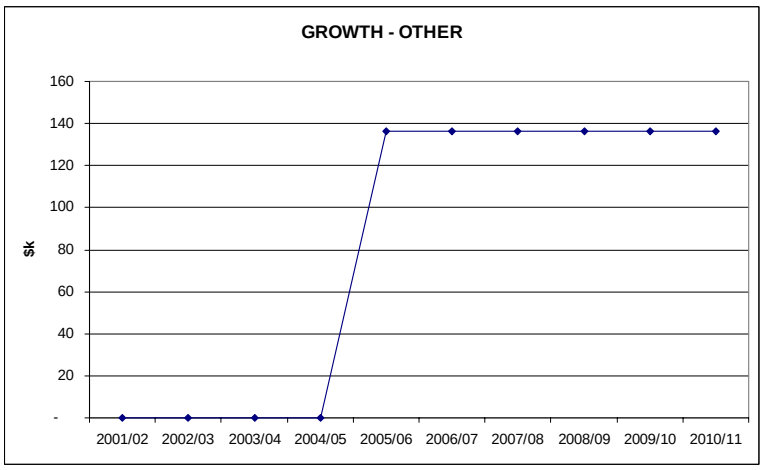
Figure 9-16: Services



9.3.2.6 Other

The forecast for this category is shown in the following chart:

Figure 9-17: Growth Other



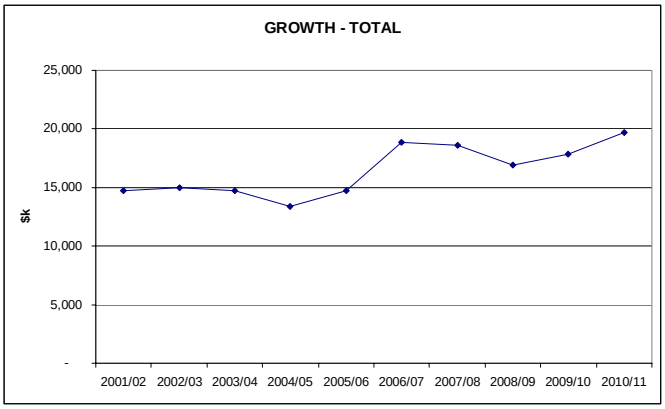
Whilst this category is not material relative to other Capex items, WorleyParsons understands that this additional Capex is due to:

- Envestra's commitment post-FRC to undertake to remove sub-meters from properties, in order to facilitate customer churn; and
- The forecast increase in use of higher capacity meters, this being due to the increased use of high flow hot water heaters.

9.3.2.7 Total Growth

WorleyParsons notes the growth forecast detailed in Section 9.3.2, and notes the increase in forecast growth. WorleyParsons notes the close correlation between growth forecasts and growth Capex and on the assumption that the growth forecasts are correct, concurs with the expenditure.

Figure 9-18: Total Growth



9.3.3 Material Change Capital Costs

9.3.3.1 IT

This expenditure is understood to be reviewed by others.

9.3.3.2 New Townships

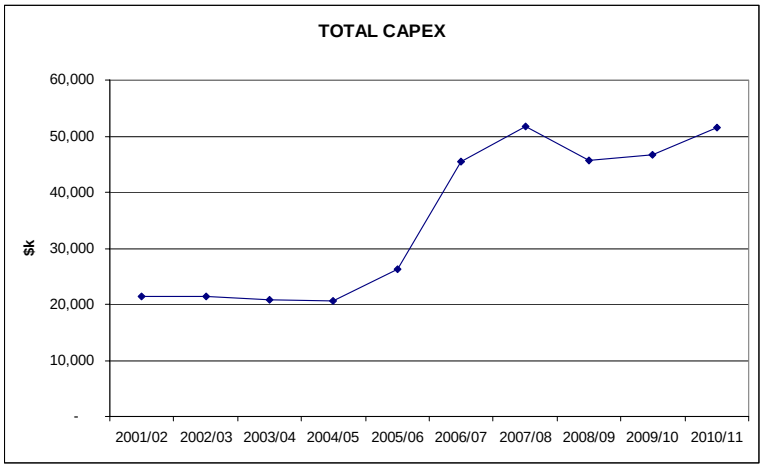
Envestra has undertaken analysis for the extension of the network to the townships of McLaren Vale, Tanunda and Monarto. The economic analysis has been conducted using reasonable assumptions and based on an appropriate IRR.

9.3.3.3 Security of Supply

As discussed in Section 9.3.2.2, security of supply projects in excess of $500k have been placed in this category. Similarly, these projects have been reviewed by WorleyParsons from a bottom up approach and WorleyParsons concurs with the proposed expenditure. Refer to the commentary in Section 9.2.1.

9.4 Total Capital Expenditure Summary

The total forecast Capex is shown in the following chart:



As the chart shows, Capex was typically less than $25m per year for the current AA period and increases to over $45m per year for the next AA period. The major reasons for this increase are as follows:

- A higher level of mains replacement;
- An increase in meter unit rates from artificially low levels;
- An accelerated district regulator vault upgrade program;
- SCADA enhancements;
- A commitment to security of supply expenditure; and
- IT expenditure.

WorleyParsons considers the expenditure in part to be a reflection of catch-up for being at the lower end of the capital related benchmarks.

The forecast Capex (excluding material changes) has been used to calculate Envestra SA's performance in the benchmarked high level KPIs relating to Capex detailed in Section 8.4, and the results are shown in the following table:

Table 9-7: Capex KPI Comparison

KPI	EXPECTED RANGE	ENVESTRA 06/07-10/11
Capex/km	4,000 – 5,000 $/km	4,713
Capex as % of RAB	2.7 – 4.5 %	4.08 %
Capex/Customer	75 – 95 $/Customer	93
(Capex + Opex)/km	7,500 – 8,500 $/km	7,763

It can be seen that in each case Envestra falls within the recommended range. WorleyParsons did not include the material change component in these comparisons as this represents “catch-up” capital not ordinarily included in such benchmarks.

With the exception of IT (which was outside the scope of this review), WorleyParsons considers the forecast Capex to be reasonable for the following reasons:

- The Capex program addresses a number of identified concerns:
    - The increased mains replacement is required to reverse deteriorating system leakage, as manifested by increasing UAFG figures as well as the increasing frequency of reported leaks.
    - The accelerated district regulator vault upgrade program required is required for safety and operational reasons.
    - SCADA enhancements are required to allow remote control and enhance operability of the network, which by industry standards is currently well below what is standard practice for prudent gas distributors.
    - The security of supply projects redress a past practice of focussing on load increases with lower priority to security of supply which has created a backlog of necessary projects which perhaps should have already been undertaken. One effect of this past practice has been to absorb the available spare capacity and leave very little in reserve. WorleyParsons notes, however, that while Envestra has been on the low side of Capex benchmarks, it has overspent compared with the regulatory Capex allowance.
- The processes used to identify the projects used iterative modelling over-laid with detailed risk assessments were sound and adhered to good industry practice. WorleyParsons further notes that OTR undertook an audit of the process and outcomes for the load growth and security of supply augmentation projects and understands the auditors were generally impressed.
- The costings for the forecasts have been based on historic costs for similar works, which in any event are constantly market tested as the majority of works is undertaken by contractors.

For the above-mentioned reasons, WorleyParsons considers the proposed Capex meets the requirements of Clause 8:16 of the Code.

10. NON CAPITAL COSTS

10.1 Operating & Maintenance Expenditure

Tabulated below are the actual expenditures against the forecast expenditures in the current AA.

Table 10-1: Current Period Comparison – Opex $k

YEAR	2001/2	2002/3	2003/4	2004/5	2005/6	TOTAL
Actual Opex	45,541	40,465	43,675	43,785	43,658	217,124
AA forecast Opex	40,533	41,196	40,288	40,792	41,065	203,874
Difference	5,009	-731	3,386	2,993	2,593	13,250

As indicated above, non capital expenditure is expected to be within 6.5% of that allowed in the current AA. WorleyParsons notes the following strategies applied by Envestra and OEAM to achieve the lowest sustainable cost of providing the reference service:

1. A contracting strategy that ensures a significant percentage of the field activities are continuously market tested has been adopted. This strategy involves the appointment of a first tier major contractor for a minimum of two years for undertaking baseline works. In addition to this, several second tier contractors are engaged on an as needs basis to cope with short-term increases in works. This contract workforce is used to supplement internal field work crews and is used to continuously benchmark the costs and efficiencies of the internal field crews.
2. Envestra/OEAM have adopted a productivity bonus incentive scheme (Probis Scheme) to provide employee work crews with a financial incentive to be as efficient and as productive as possible. Under this scheme overtime and penalty payments no longer exist, thus removing the incentive to drag out tasks to receive overtime payments etc. Importantly, the scheme effectively aligns the drivers of both employees and management and has paved the way for constructive outcomes from reviews undertaken in areas which include flexible work practices and multi-skilling etc.
3. Leveraging off the Australia wide purchasing power of Origin Energy has delivered substantial savings in areas like meter purchases, pipe, valves and fittings etc. The cost of domestic meters for example has fallen by 16% since SA purchasing has become part of the national purchasing strategy.
4. Envestra/OEAM have been able to lever off best practice for routine maintenance tasks and frequencies within the Envestra/OEAM suite of national assets. This for example has led to savings in cathodic protection monitoring.

5. Envestra/OEAM have adopted a Reliability Centred Maintenance (RCM) methodology to assist in determining the optimal tasks and frequencies for asset maintenance.
6. Envestra/OEAM have recently adopted the Maximo Asset Management System. This when combined with the above mentioned RCM will provide the foundation to optimise the balance between cost of maintenance and reliability. This is particularly important for PRIs, which do not have the same level of redundancy as designs used in other states.
7. Strategies which have had the effect of reducing employee costs are summarised below:
    a. Adoption of lower running cost vehicles.
    b. Redundancies in areas like metering and garage following changed workloads.
    c. Reorganisation of Network Development Department and associated redundancies.
    d. Amalgamation of departments to reduce management numbers.
    e. Reviewing the need to replace retirees and resignations in every instance has led to only replacing 30% of such departures.
    f. Rationalisation of warehouse function has led to staff reductions.
    g. Reduced uptake of entitlements like sick leave etc. by employees.

WorleyParsons considers Envestra/OEAM have, through the proactive introduction of employee incentive schemes, new systems, strategic re-organisation and levering off the national based organisation, been able to absorb many new functions while remaining within 5% of the allowed non capital expenditure.

10.1.1 Maintenance Practices

WorleyParsons notes from the review of the Asset Management Plan that a Reliability Centred Maintenance (RCM) program has been introduced. This program, when combined with the Maximo asset management system, serves to determine the correct maintenance tasks and frequencies to optimise the balance between maintenance costs and reliability. This is particularly pertinent for the Envestra pressure regulating assets, as these have not been designed with the same levels of equipment redundancy as applied by other gas distribution companies. RCM techniques originated out of the aircraft maintenance industry and have been used elsewhere in the gas industry to establish maintenance regimes.

WorleyParsons also notes that OEAM monitors several KPIs that are lead indicators. Such indicators include:

- Number of instances of 3rd party damage

- Number of locations provided to third parties

The above KPIs are monitored and trends reviewed. Adverse trends are addressed by reviewing the mitigation strategies and resources.

Based on reports and other documentation reviewed, WorleyParsons is satisfied that Envestra/OEAM are applying an appropriate level of science to the development of the maintenance practices. WorleyParsons further considers that the assets are being adequately maintained to ensure optimal life expectancy.

10.1.2 Operating & Maintenance Cost Components

Envestra's recent historical and forecast operating and maintenance costs (excluding material changes) are shown in the following table:

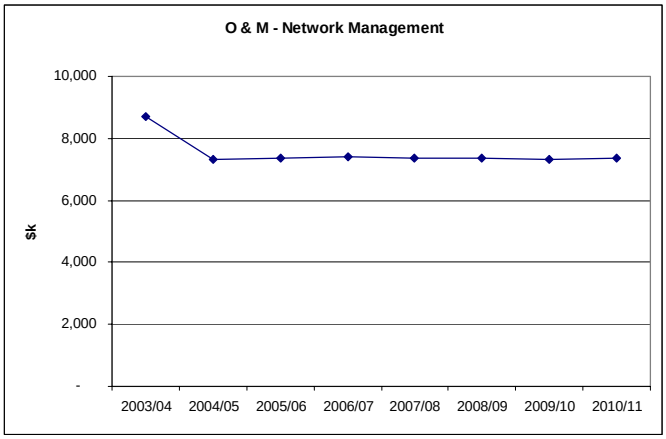
Table 10-2: Operating & Maintenance Costs $k (Excluding Material Changes)

Operating & Maintenance	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	TOTAL 06/07-10/11
Network Management	8,699	7,320	7,361	7,430	7,398	7,405	7,366	7,395	36,993
Network Maintenance	2,589	2,512	2,550	2,628	2,685	2,728	2,784	2,843	13,669
Meter Reading & Billing	2,524	2,416	2,425	2,465	2,496	2,520	2,554	2,586	12,621
Leak Repairs	3,402	3,701	3,741	4,990	5,032	5,068	5,105	5,140	25,336
Self Insurance	-	619	605	619	619	619	619	619	3,096
Network Planning	2,171	1,720	1,540	1,423	1,408	1,276	1,401	1,394	6,903
Facilities Management	3,900	4,294	3,894	3,554	3,487	3,320	3,412	3,356	17,129
Government Charges	1,858	1,854	1,833	1,830	1,829	1,830	1,837	1,837	9,164
Total	**25,143**	**24,437**	**23,948**	**24,940**	**24,954**	**24,767**	**25,079**	**25,169**	**124,910**

10.1.2.1 Network Management

Network management costs include the One Call Centre, operations administration, operations management and training. The network management costs are shown in the following chart:

Figure 10-1: Network Management

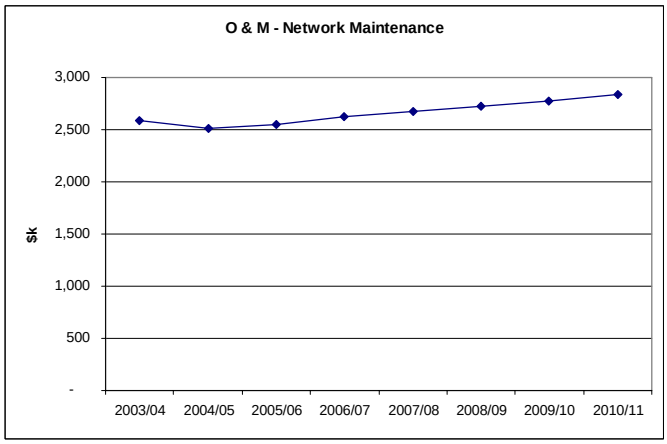


The reduction from 2003/04 to 2004/05 was due to a one-off reduction in general management costs. Envestra have forecast a flat rate of expenditure over the forecast period, at the same level as 2004/05 and the projected 2005/06. WorleyParsons considers the forecast expenditure to be reasonable.

10.1.2.2 Network Maintenance

Network maintenance includes general maintenance, cathodic protection, odorising, and operating and maintaining gas control and telemetry equipment. The network maintenance costs are shown in the following chart:

Figure 10-2: Network Maintenance

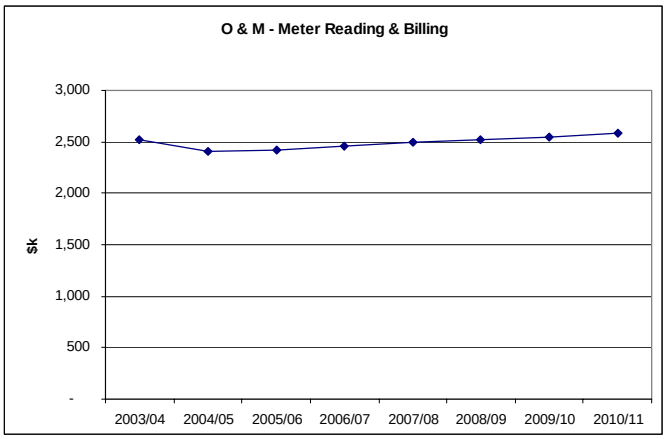


The slight increase over the forecast period is due to increases in the level of telemetry (consistent with the Capex forecasts), the projected increase in Average Weekly Earnings (it is noted that maintenance activities carry a high labour component) and the increasing size of the network. WorleyParsons considers the forecast expenditure to be reasonable.

10.1.2.3 Meter Reading & Billing

Meter reading and billing covers the handling of requests for disconnections and reconnections, meter reading, billing and account investigations. The meter reading and billing costs are shown in the following chart:

Figure 10-3: Meter Reading & Billing

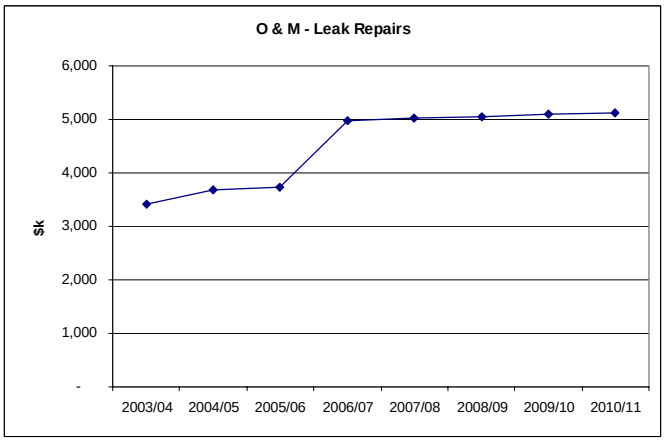


It can be seen that a gradual increase is projected, which is to be expected with increasing customer numbers. WorleyParsons considers the forecast costs for this activity to be reasonable.

10.1.2.4 Leak Repairs

Leak repairs covers leak repairs, piecemeal renewals and inlet service renewals (including the costs associated with pre-investigations). The leak repairs costs are shown in the following chart:

Figure 10-4: Leak Repairs

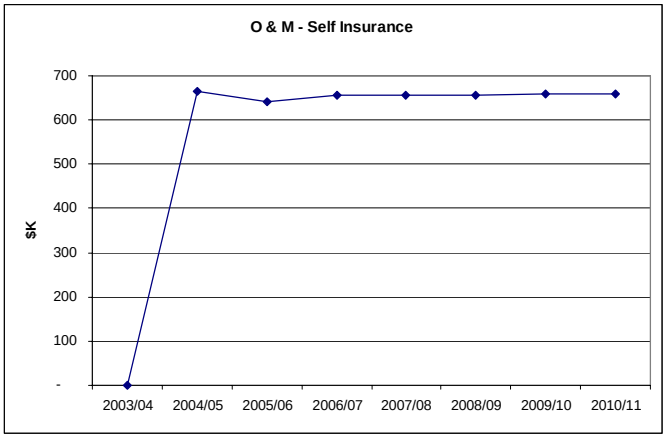


The large increase from 2005/06 to 2006/07 is due to a change in policy to expense short length piecemeal repairs, as opposed to the previous policy for this work to be capitalised. WorleyParsons considers the forecast costs for this activity to be reasonable.

10.1.3 Self Insurance

Self insurance costs are shown in the following chart:

Figure 10-5: Self Insurance

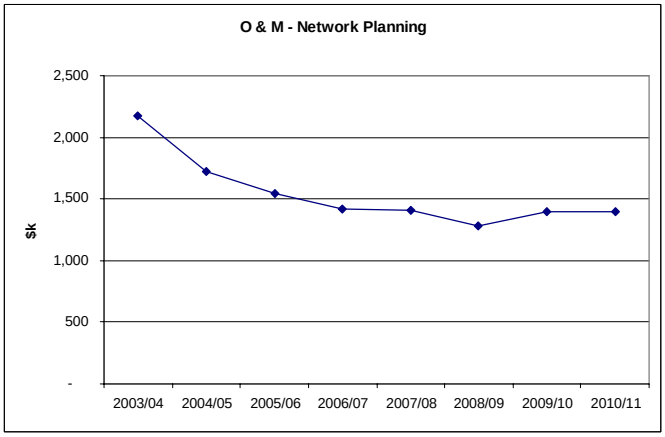


Envestra currently self-insures for Property Damage and Business Interruption, but has not previously accounted for the costs as part of the regulated business. In order to quantify the costs of self-insurance, Envestra obtained an external market based estimate. The 2003/04 Segment Asset Values were then used to apportion the costs to the respective parts of Envestra's business. WorleyParsons considers that it is appropriate to include self-insurance costs as part of the regulated business and that the basis around which market based estimates were sought was reasonable.

10.1.3.1 Network Planning

Network planning incudes the non-capital costs associated with network planning and system design, technical and engineering support, and engineering design and project management of major facilities. The network planning costs are shown in the following chart:

Figure 10-6: Network Planning

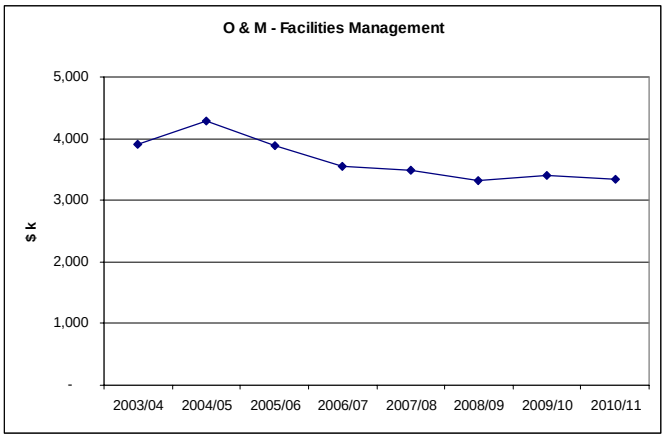


It can be seen that the network planning costs are expected to decline slightly from the 04/05 level, with a reduction in costs, and then remain fairly stable over the forecast period. WorleyParsons considers the forecast costs for this activity to be reasonable.

10.1.3.2 Facilities Management

Facilities management includes property costs (rates and maintenance), site remediation and equipment rental. The facilities management costs are shown in the following chart:

Figure 10-7: Facilities Management

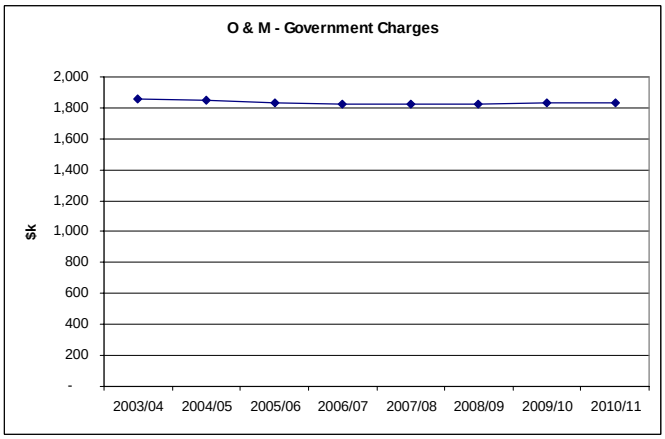


It can be seen that the facilities management costs are projected to decline slightly over the forecast period, due largely to the impact of planned remediation work in the early part of the period. WorleyParsons considers the forecast costs for this activity to be reasonable. However, if the remediation work proposed by Envestra in its submission is not approved, these costs will need to increase.

10.1.3.3 Government Charges

The costs for government charges (which covers license fees) are shown in the following chart:

Figure 10-8: Government Charges

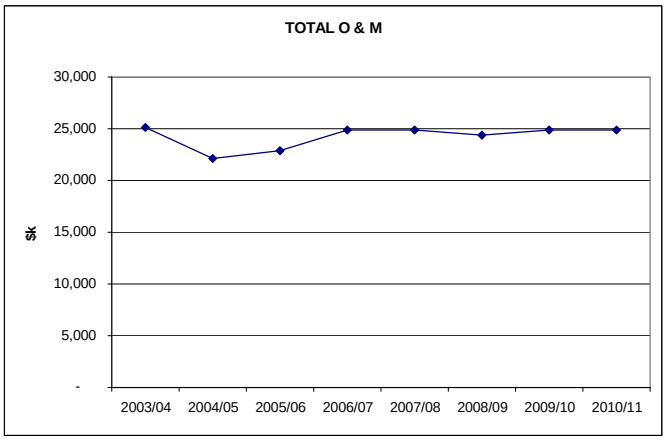


It can be seen that government charges are projected to remain at current levels over the forecast period. WorleyParsons considers the forecast costs for this activity to be reasonable.

10.1.3.4 Total Operating & Maintenance Costs

The total operating and maintenance costs (excluding scope changes) are shown in the following chart:

Figure 10-9: Total Operating & Maintenance Costs



The total operating and maintenance costs are projected to increase in 2006/07 (mainly due to the change in policy regarding capitalisation of leak repairs) and then remain steady over the forecast period, at the same level as 2003/04. WorleyParsons considers the forecast total operating and maintenance costs to be reasonable.

10.2 Administration & General

Envestra's recent historical and forecast administration and general costs (excluding material changes) are shown in the following table:

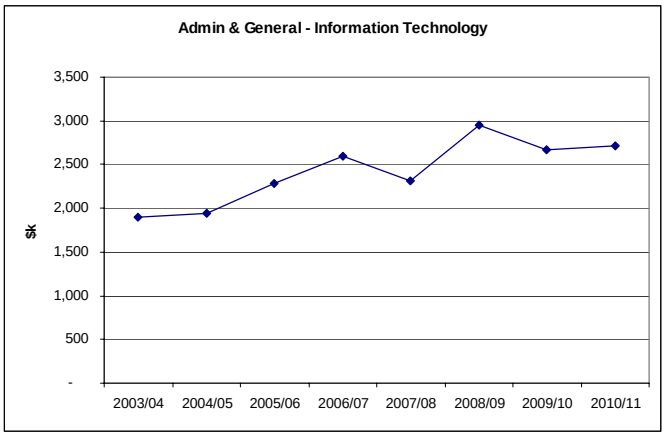
Table 10-3: Administration & General $k (Excluding Material Changes)

Administration & General	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	TOTAL 06/07-10/11
Information Technology	1,902	1,949	2,288	2,592	2,318	2,944	2,669	2,721	13,245
Human Resources	562	646	678	671	675	660	678	676	3,359
Accounting & Finance	2,802	3,266	3,475	3,491	3,556	3,504	3,631	3,663	17,845
Network Services	307	364	395	407	421	419	440	450	2,137
Total	**5,572**	**6,225**	**6,837**	**7,160**	**6,971**	**7,527**	**7,417**	**7,510**	**36,585**

10.2.1 Information Technology

Information technology costs include operation and management of existing IT systems, infrastructure and application system renewal. The information technology costs are shown in the following chart:

Figure 10-10: Information Technology

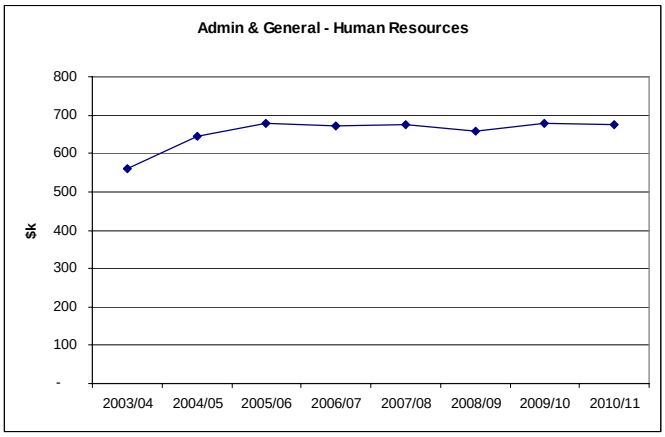


The peaky nature of IT costs reflects the timing of software licence renewals (the program for this has been reviewed by WorleyParsons). The underlying increase in costs is consistent with an increasing reliance on IT systems in running the business. WorleyParsons considers the forecast IT costs to be reasonable.

10.2.2 Human Resources

Human resources covers HR support and includes health, safety and environmental management. The human resources costs are shown in the following chart:

Figure 10-11: Human Resources

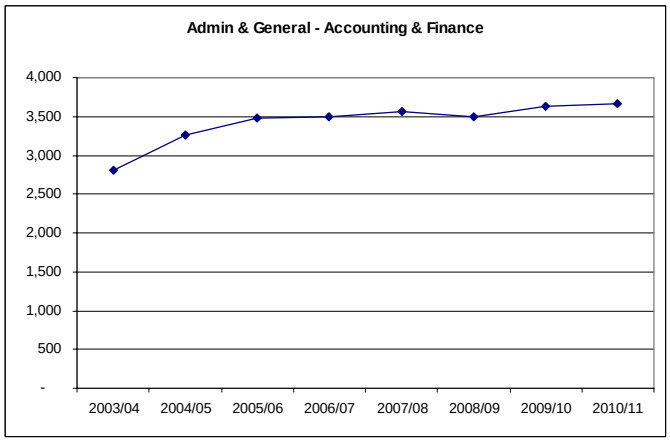


Although a slight increase is noted in 2004/05 and 2005/06, the amount is not material. WorleyParsons considers the forecast HR expenditure to be reasonable.

10.2.3 Accounting & Finance

Accounting and finance includes finance transaction processing, audit, fleet management, procurement tenders, contract management and insurance. The costs are shown in the following chart:

Figure 10-12: Accounting & Finance

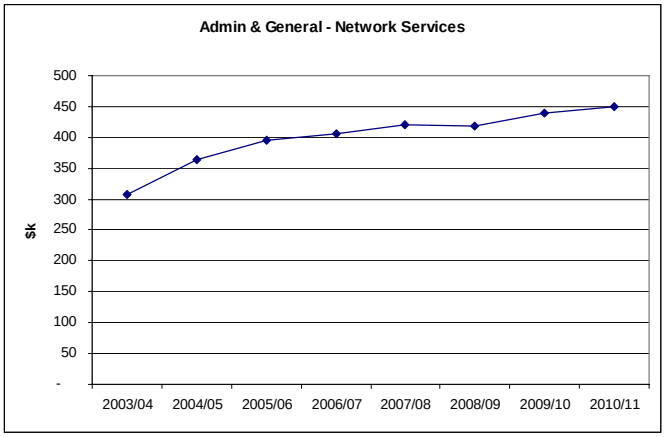


The increase reflects increased obligations in meeting International Accounting Standards and the implementation of an upgraded (and improved) financial reporting system. WorleyParsons considers the forecast accounting and finance costs to be reasonable.

10.2.4 Network Services

Network services includes strategic development and analysis, regulatory management, consumer contacting and pricing. The network services costs are shown in the following chart:

Figure 10-13: Network Services

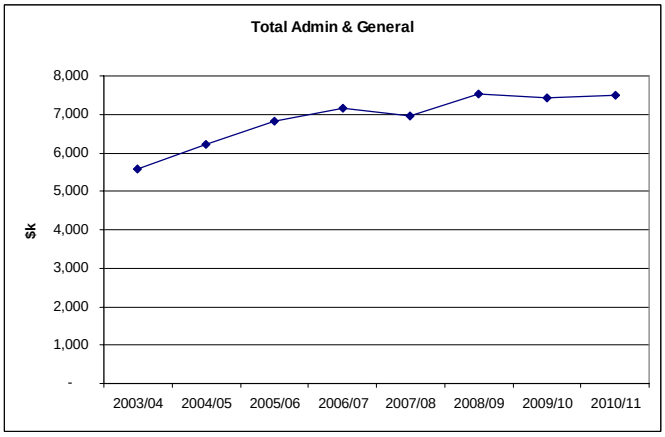


The increases are due to the increased workload associated with the introduction of FRC. With contestability, Envestra has been required to allocate increased resources to manage retailer relationships eg. providing pricing quotes, developing haulage agreements, monitoring MDQs. WorleyParsons considers the forecast network services costs to be reasonable.

10.2.5 Total Administration & General

The total administration and general costs (excluding scope changes) are shown in the following chart:

Figure 10-14: Total Administration & General



The main contributor to the increase in forecast administration and general costs is in the area of network services.

10.3 Network Development

Envestra's recent historical and forecast network development costs (excluding material changes) are shown in the following table:

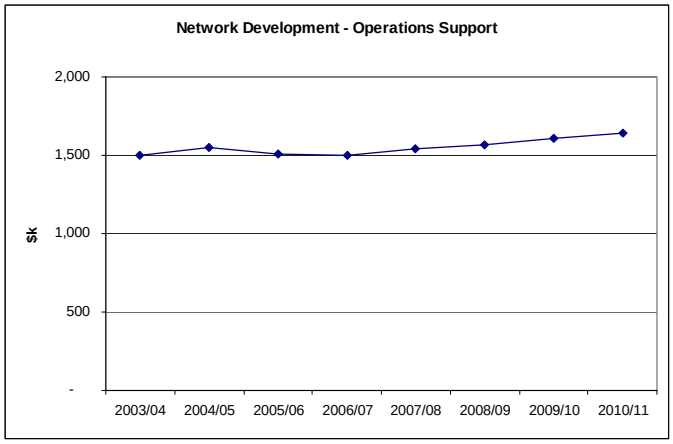
Table 10-4: Network Development Costs $k

Network Development	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	TOTAL 06/07-10/11
Operations Support	1,998	1,797	1,448	1,501	1,539	1,569	1,605	1,644	7,858
Market Development	4,773	4,727	4,759	4,775	4,789	4,803	4,831	4,848	24,046
Total	**6,771**	**6,524**	**6,207**	**6,276**	**6,328**	**6,372**	**6,436**	**6,493**	31,905

10.3.1 Operations Support

Operations support includes processing connection orders and mains extensions requests and co-ordination of installation activities. The Operations Support costs are shown in the following chart:

Figure 10-15: Operations Support

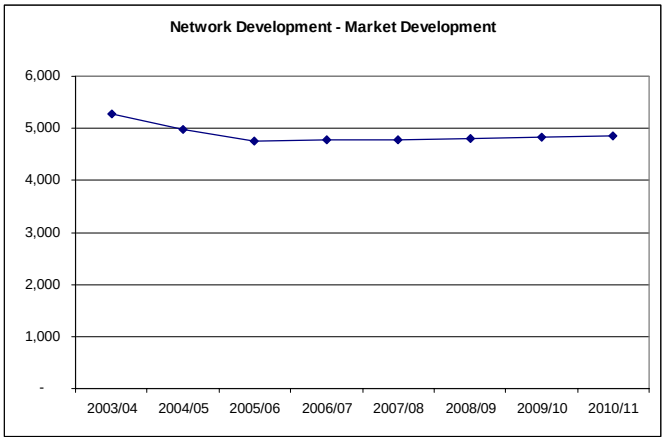


The slight increase over the forecast period is due to increases in Average Weekly Earnings. WorleyParsons considers the forecast costs to be reasonable.

10.3.2 Market Development

Market development covers influencing market behaviour to increase natural gas uptake, including marketing programs, advertising, promotion and incentives. The Market Development costs are shown in the following chart:

Figure 10-16: Market Development

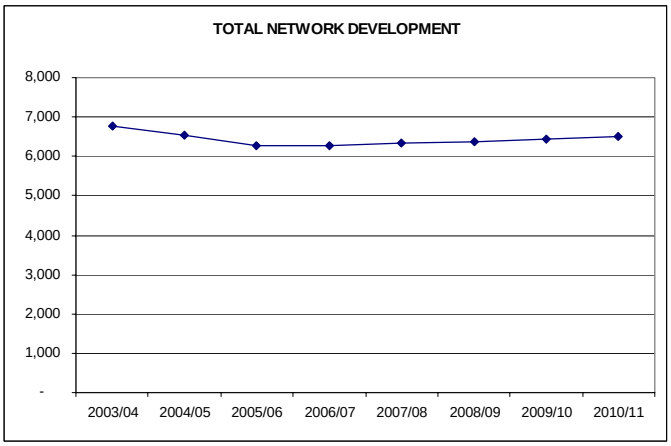


It can be seen that expenditure levels are forecast to remain at current levels throughout the forecast period. WorleyParsons considers the forecast costs to be reasonable.

10.3.3 Total Network Development

The total network development costs are shown in the following chart:

Figure 10-17: Network Development



It can be seen that the total network development costs are expected to increase slightly over the forecast period, driven by an increase in operations support costs. WorleyParsons considers the forecast costs to be reasonable.

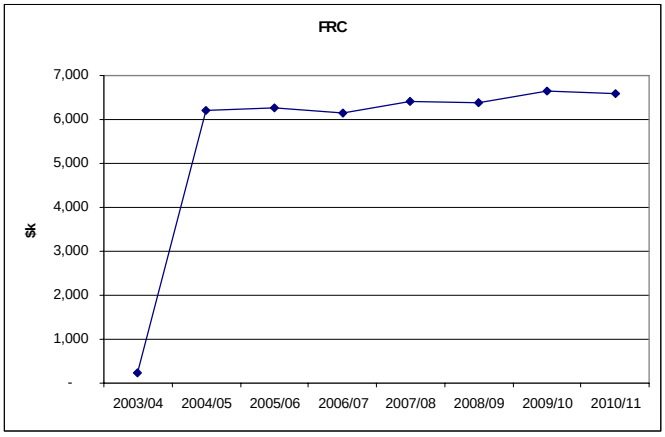
10.4 Full Retail Contestability

Envestra's recent historical and forecast FRC costs (excluding scope changes) are shown in the following table and chart:

Table 10-5: FRC Costs $k

	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	TOTAL 06/07-10/11
FRC Operating Costs	**229**	**6,191**	**6269**	**6,133**	**6,425**	**6,372**	**6,633**	**6,598**	**32,160**

Figure 10-18: Full Retail Contestability



The large increase in costs in 2004/05 was due to the implementation of systems to accommodate the introduction of FRC. The slight increase over the forecast period is attributed to increases in Average Weekly Earnings, together with the transition from 3-year to annual infrastructure IT support costs. WorleyParsons considers the forecast expenditure to be reasonable.

10.5 Material Changes

Envestra has applied an approach in determining an estimate of efficient non-capital costs for the second Access Arrangement Period that infers that the current level of expenditure is efficient. It has then applied an adjustment for material changes between the first and second Access Arrangement Periods. The non-capital costs are essentially fixed costs; they do not vary materially with variation in the volume throughput of gas.

Envestra has identified six material changes, totalling $26M over the forecast period:

- The impact of the ageing workforce;
- New regulatory, governance and service requirements;
- Increased focus on risk management activities, including operation of the extended SCADA system;
- General cost pressures;
- Environmental management; and
- Office & Equipment costs.

These are summarised in the following table (values in nominal $k):

Table 10-6: Summary of Material Changes (from 2004/05 Expenditure)

MATERIAL CHANGE	2006/07	2007/08	2008/09	2009/10	2010/11	TOTAL
Ageing Workforce	956	1,061	1,110	1,001	973	5,100
Regulatory, Governance & Service	986	1,025	1,345	1,501	1,707	6,564
Risk Management	958	944	1,042	654	729	4,326
General Cost Pressures	658	503	444	590	618	1,812
Environmental Management	349	5,688	-196	-201	-206	5,433
Office & Equipment	414	250	313	358	412	1,747
TOTAL	**4,320**	**9,471**	**4,057**	**3,902**	**4,231**	**25,981**

For each material change, Envestra has provided a description of the change and a supporting spreadsheet with the details of the cost estimates (including the assumptions behind the cost estimates), together with supporting reports where relevant.

10.5.1 Ageing Workforce

Changes in the SA gas industry have resulted in a highly skilled, small and ageing workforce (between 40 and 60 years old) that is very difficult to replace without a concerted, long-term strategy. The impact of this is that Envestra must:

- Invest in greater numbers of field workers and graduate engineers over the second Access Arrangement period;
- Recognise and factor within its expenditure the costs that accrue when older workers shift away from field work into less physically demanding activities; and
- Budget for the medical and consultation costs that come from reliance on an ageing workforce.

The forecasts for these costs are shown in the following table:

Table 10-7: Ageing Workforce

Ageing Workforce (values in nominal $)					
	2006/07	**2007/08**	**2008/09**	**2009/10**	**2010/2011**
Additional Field Workers	514,674	593,695	621,622	511,068	503,332
Additional Graduate Engineers	211,652	250,701	262,649	254,063	222,393
Productivity Costs from Ageing Workers	149,392	158,355	166,115	174,587	184,538
Increased Medical and Health Costs	79,848	58,152	59,606	61,096	62,623
Total	**955,565**	**1,060,903**	**1,109,992**	**1,000,813**	**972,887**

WorleyParsons has reviewed the basis for these material changes, the underlying assumptions and the detailed cost estimates. WorleyParsons supports the material changes and considers the forecast expenditure to be reasonable.

10.5.2 New Regulatory, Governance and Service Requirements

Envestra argues that there are elements of its regulatory, governance and service requirements which will differ significantly from the base 2004/05 year. These are:

- The introduction of new national pipeline standards which will increase ongoing operational costs, which impact on the forecast costs for network operations;
- New national and jurisdictional regulatory costs due to the new national regulatory regime, as well as increased KPI, workplace safety and environmental planning obligations which impact on Envestra's forecast corporate and administration costs;
- Increased costs for disposals of soil and quarry materials, which impact on the forecast costs for network operations;
- Increased governance and risk management requirements, which impact on Envestra's forecast corporate and administration costs;
- Corporate Governance review and auditing, which impact on Envestra's forecast corporate and administration costs;
- Notification to customers of periodic meter changeover gas supply interruptions, which impact on the forecast costs for network operations;
- Increased community expectations of service response, which impact on the forecast costs for network operations;
- Costs of responding to increased external enquiries due to increased customer churn throughout the second Access Arrangement Period, which impact on the forecast costs for network operations;

The forecasts for these costs are shown in the following table:

Table 10-8: Regulatory, Governance & Service Requirements

Regulatory Governance and Service Requirements (values in nominal $)					
	2006/07	**2007/08**	**2008/09**	**2009/10**	**2010/2011**
Changes to Australian Standards	151,122	151,526	63,890	67,149	70,976
Increased Regulatory Compliance Costs	113,439	103,540	358,955	342,458	361,978
Corporate Governance Review and Auditing	94,556	16,153	16,557	16,971	17,395
Notification of PMCs	88,977	87,828	91,486	95,434	99,969
Increased Service Response	219,653	215,024	224,785	235,388	247,719
Responding to External Inquiries	118,692	116,463	121,859	127,730	134,576
Costs of Servicing New Customers	199,405	334,677	467,675	615,631	773,959
TOTAL	**985,844**	**1,025,212**	**1,345,208**	**1,500,762**	**1,706,572**

WorleyParsons has reviewed the basis for these material changes, the underlying assumptions and the detailed cost estimates. WorleyParsons supports the material changes and considers the forecast expenditure to be reasonable.

10.5.3 Increased Focus on Risk Management Activities

Envestra has proposed an increased focus on risk management activities, in the following areas:

- Envestra has resolved to provide additional resources to the Dial Before You Dig (BFYD) service, with particular focus on local government;
- Recording of the location of inlet services to industrial and commercial customers and larger unit developments;
- A review of security management systems and asset security by security consultants every second year, in recognition of the vulnerability of gas distribution systems to malicious attack; and
- Non-capital costs (additional personnel, software licences and telemetry equipment) associated with planned extensions to the SCADA system.

Table 10-9: Risk Management

Risk Management Activities (values in nominal $)					
	2006/07	**2007/08**	**2008/09**	**2009/10**	**2010/2011**
Promotion of DBYD	294,248	291,484	303,156	315,718	330,058
Map Services for I & C Customers	637,303	541,902	568,455	64,621	68,305
Terrorist Risk Management	26,431	0	29,390	0	32,649
Extension of SCADA System	0	110,194	140,518	273,257	298,120
Total	**957,982**	**943,579**	**1,041,518**	**653,596**	**729,131**

WorleyParsons has reviewed the basis for these material changes, the underlying assumptions and the detailed cost estimates. WorleyParsons supports the material changes and considers the forecast expenditure to be reasonable. In expressing this opinion, WorleyParsons notes the comment attributed to the Technical Regulator in the recently published 2005 South Australian Infrastructure Report Card that states, “there has not been any significant decrease in the number of instances of third party damage….”, which in WorleyParsons’ opinion, supports an increase in such resources.

10.5.4 General Cost Pressures

Envestra has allowed for some general cost increases in the following areas:

- Increased contractor charges in 2006/07 and 2007/08 as a “catch-up” following an extended period during which Envestra has enjoyed contractor costs rising more slowly than inflation;

- The relocation of the Brompton Depot to meet OH&S requirements; and
- anticipated increases in the Superannuation Guarantee Levy (SGL) beyond the current rate of 9%.

Table 10-10: General Cost Pressures

General Cost Pressures (values in nominal $)					
	2006/07	**2007/08**	**2008/09**	**2009/10**	**2010/2011**
Increase in Contractor Costs	52,873	109,9752	112,725	115,543	118,431
Increasing Material Costs	116,641	74,122	44,153	45,256	46,388
OEAM Depot Relocation	408,142	202,967	161,681	165,723	175,665
Increase in SGL	0	115,899	125,210	263,558	277,071
Additional Smallworld GIS Edit Licences	79,848	0	0	0	0
Total	**657,502**	**502,963**	**443,768**	**590,080**	**617,555**

WorleyParsons has reviewed the basis for these material changes, the underlying assumptions and the detailed cost estimates. WorleyParsons supports the material changes and considers the forecast expenditure to be reasonable.

10.5.5 Environmental Management

Envestra expects the EPA to require substantial site remediation at Osborne as well as the continuation of some clean-up and monitoring activities at other sites. Following the works proposed for 2006/07 and 2007/08, expenditure is forecast to fall below the 2004/05 base year.

Table 10-11: Environmental Management

Environment Management Pressures (values in nominal $)					
	2006/07	**2007/08**	**2008/09**	**2009/10**	**2010/2011**
Ongoing Monitoring and Remediation	348,808	5,688,136	-196,479	-201,391	-206,425
Total	**348,808**	**5,688,136**	**-196,479**	**-201,391**	**-206,425**

WorleyParsons has reviewed the basis for these material changes, the underlying assumptions and the detailed cost estimates. WorleyParsons supports the material changes and considers the forecast expenditure to be reasonable.

10.5.6 Office and Equipment Costs

Envestra has included a consequential material change for the new full time equivalent personnel included as material changes. These have been prepared on a marginal cost basis to allow for additional office space, marginal fit out costs and rent and office facilities including computers. New field based personnel require standard issue equipment.

Table 10-12: Office & Equipment Costs

Office & Equipment Costs (values in nominal $)					
	2006/07	**2007/08**	**2008/09**	**2009/10**	**2010/2011**
Incremental FTE Costs	414,153	249,958	313,285	357,848	411,770
Total Incremental FTE Costs	**414,153**	**249,958**	**313,285**	**357,848**	**411,770**

WorleyParsons has reviewed the basis for these material changes, the underlying assumptions and the detailed cost estimates. WorleyParsons supports the material changes and considers the forecast expenditure to be reasonable.

10.5.7 Conclusion

WorleyParsons has reviewed Envestra's proposed material changes in detail, including the underlying assumptions, the supporting spreadsheets and other documentation (where relevant). As a result of WorleyParsons initial review of the material changes, some were removed from the forecasts and others were reduced, leaving only those items that WorleyParsons considered meet the requirements of the Code. WorleyParsons has concluded that the forecast expenditure is reasonable. WorleyParsons is also satisfied that the material changes represent activities that would be undertaken by a prudent distributor acting efficiently.

10.6 Efficiency Gains

10.6.1 Historical Performance

10.6.1.1 Performance Projected in 2001 Determination

In its December 2001 Gas Access Arrangement Final Decision, the South Australian Independent Pricing & Access Regulator (SAIPAR) determined an efficiency gain[7] of 4% to be applied to all non-capital costs excluding those specifically identified by SAIPAR for individual amendments (namely System Use of Gas, Licence Fees, Contaminated Sites and Telemetry) over the full period of the Access Arrangement. The efficiency gain of 4% was applied for each year of the Access Arrangement.

For System Use of Gas, SAIPAR required a 6% reduction each year of the Access Arrangement[8], representing a total reduction of 30% of the submitted forecasts.

10.6.1.2 Actual Performance

Although unable to quantify the efficiency gains made by Envestra in South Australia, WorleyParsons notes that initiatives to improve efficiency have included the following:

[7] SAIPAR Gas Access Arrangement Final Decision, December 2001, Page 121
[8] SAIPAR Gas Access Arrangement Final Decision, December 2001, Page 122

- As discussed in Section 5.1, there is a strong commercial incentive for OEAM to implement efficiency gains.
- OEAM has significantly reduced the size of its field workforce over the last five years, achieved through the implementation of a range of initiatives;
- OEAM has been able to make cost savings in material purchases through leveraging its Origin Energy purchasing power across Australia;
- Reductions in stockholding levels;
- Internal benchmarking of OEAM operations across three States, allowing identification and implementation of the most efficient practices; and
- Standardisation of procedures and reports.

10.6.2 Decisions in Other Jurisdictions

10.6.2.1 Queensland

For Allgas, the Queensland Competition Authority (QCA) determined a non-capital productivity gain of 2.5% per annum in real terms[9]. Envestra was required to close a one-off performance gap of 4.3% and then achieve real productivity improvements of 2.5% per annum. The QCA accepted that there is a degree of uncertainty surrounding the assessments of productivity improvements and the likely future direction and development of the Queensland gas industry. On this basis the QCA reduced its consultant's recommended improvement of 3.5% down to 2.5%.

10.6.2.2 Victoria

In Victoria, the Essential Services Commission (ESC) determined a productivity improvement of 1% per annum to apply to Envestra, Multinet and SP AusNet. The ESC commented that this was appropriate in light of the external estimates of productivity growth used by other regulators and the distributors' initial proposals[10]. The ESC considered it reasonable to infer that the distributors were efficient (as a result of their commercial incentives to minimise cost)[11], so it did not require any "catch-up" productivity improvements.

10.6.2.3 Australian Capital Territory

The Independent Competition & Regulatory Commission (ICRC) determined an efficient controllable cost per customer[12] (i.e. the cost of asset management and asset services) as a starting point, and then included a 1.5% per annum productivity improvement factor[13].

[9] QCA Gas Access Arrangements Final Decision, October 2001, Page 247
[10] ESC Gas Access Arrangements Final Decision, October 2002, Page 106
[11] ESC Gas Access Arrangements Final Decision, October 2002, Page 100
[12] ICRC Gas Access Arrangement Final Decision, October 2004, Page 90

10.6.2.4 New South Wales

The Independent Pricing and Regulatory Tribunal (IPART) determined a real efficiency saving of 1.5% per annum for operating and maintenance expenditure (as well as for administration and overheads)[14]. IPART also noted the comments by its consultant, ECG, that the trends in productivity in the gas industry had slowed dramatically and that the 3 % per annum efficiency saving in the current access arrangements could not be sustained[15].

10.6.2.5 Western Australia

The Economic Regulation Authority (ERA) accepted efficiency gains equating to 2.3 per annum for the first three years and 1% per annum for the remaining two years[16], giving an average of 1.8% per annum. The ERA recognised that Service Providers face substantial incentives to be efficient, but did not accept that it was appropriate to infer that Alinta's current operating and maintenance costs were efficient[17].

10.6.2.6 Electricity – South Australia

Implicit in the recent Final Decision on electricity distribution prices by the Essential Services Commission of South Australia (ESCOSA), is a labour productivity improvement of 2.2% per annum[18], with a net increase in real labour costs of 2.1% per annum, reflecting the pressure on wages that might arise as a result of the high demand for skilled electrical workers across Australia.

10.6.2.7 Conclusions

The operations and maintenance efficiency gains for the various gas distributors are summarised in the following table:

Table 10-13: Operating Efficiencies

	Envestra VIC	Multinet	SP AusNet	ActewAGL	AGLGN	Envestra QLD	Allgas	Alinta WA	Envestra SA
Efficiency % p.a.	1	1	1	1.5	1.5	2.5	2.5	2.3 x 3 1 x 2	4
Year of Determination	2002	2002	2002	2004	2004	2001	2001	2005	2001

Given comments by consultants and regulators in regard to the slowing down of efficiency gains within the gas industry, and the timing of the various Determinations, WorleyParsons

[13] MMA Review of Expenditure, Demand Forecasts & Cost Attributions, June 2004, Page 158

[14] IPART Gas Access Arrangement Draft Decision December 2004, Page 90

[15] IPART Gas Access Arrangement Draft Decision December 2004, Page 91

[16] ERA Gas Access Arrangement Final Decision, July 2005, Page 77

[17] ERA Gas Access Arrangement Draft Decision, February 2005, Page 81

[18] ESCOSA Electricity Distribution Price Final Determination, April 2005, Page 87

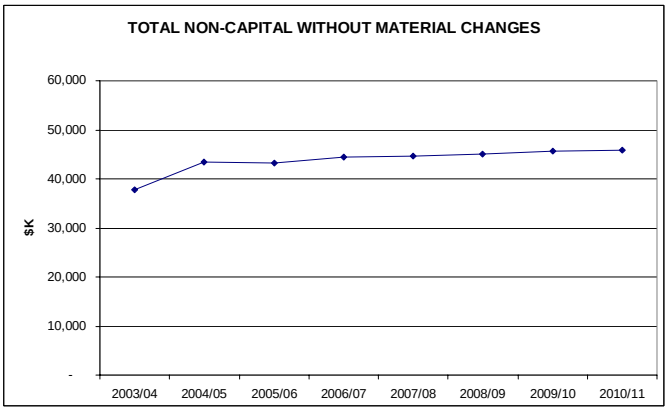
considers that comparisons with other jurisdictions indicate that an appropriate efficiency gain would be in the range 1 to 1.5 % per annum.

Envestra has included productivity gains in its forecasts of Opex, averaging out at 1.24% over the period, which is in the mid range. WorleyParsons considers that the allowance made by Envestra for productivity gains to be reasonable.

10.7 Total Non-Capital Expenditure Summary

The total forecast Opex (excluding material changes) is shown in the following chart:

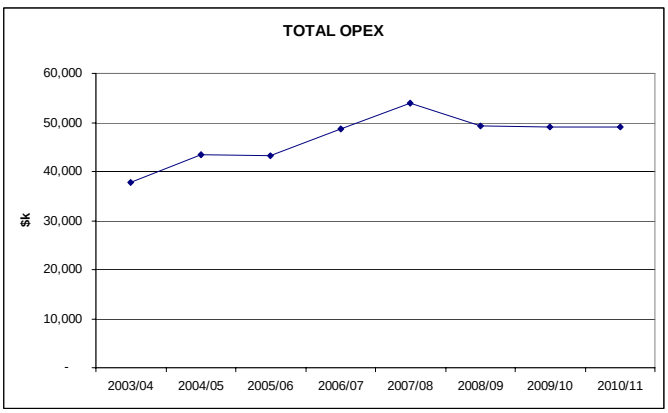
Figure 10-19: Total Opex Excluding Material Changes



It can be seen that total Opex (excluding material changes) is projected to increase slightly from historical levels over the next AA period, driven largely by increases in customer numbers and Average Weekly Earnings. WorleyParsons considers the forecast expenditure to be reasonable.

The total Opex (including material changes) is shown in the following chart:

Figure 10-20: Total Opex



The increase from 2005/06 to 2006/07 is due mainly to the following:

- Increases in leak repair cost due to a change in capitalisation policy, i.e. expensing of piece-meal mains replacements ($1.2M); and
- A range of material changes ($4.2M).

The forecast Opex (excluding material changes) has been used to calculate Envestra SA's performance in the benchmarked high level KPIs relating to Opex detailed in Section 8.4, and the results are shown in the following table:

Table 10-14: KPI Comparison

KPI	EXPECTED RANGE	ENVESTRA SA 06/07-10/11
Opex/km	4,100 –4,5 00 $/km	4,258
Opex as % of RAB	3.5 – 4.0 %	3.7 %
Opex/Customer	80 – 90 $/Customer	84
Opex as % of Revenue	25-30 %	23

It can be seen that in each case Envestra SA falls within the recommended range, with the exception of Opex as a percentage of revenue, where Envestra SA is slightly better than the expected range. WorleyParsons did not include the material changes as these are changes from the base case around which the KPIs have not been derived.

With the exception of IT (which was outside the scope of this review), WorleyParsons considers the forecast Capex to be reasonable and representative of a prudent distributor acting efficiently.

11. GLOSSARY

AA	Access Arrangement
AMP	Asset Management Plan
CI	Cast Iron
Capex	Capital Expenditure
ECG	Energy Consulting Group
ERA	Economic Regulation Authority
ESCOSA	Essential Services Commission of South Australia
ESCV	Essential Services Commission Victoria
FRC	Full Retail Contestability
GJ	giga joule
ICRC	Independent Competition and Regulatory Commission
I&C	Industrial and Commercial
IPART	Independent Pricing and Regulatory Tribunal
IPO	Initial Public Offering
IRR	Internal Rate of Return
KPI	Key Performance Indicator
MMA	McLennan Magasanik Associates
OEAM	Origin Energy Asset management
Opex	Operating Expenditure
OTR	Office of Technical Regulation
PB	Parsons Brinckerhoff
PEG	Pacific Economics Group
PRI	Pressure Regulator Installation
RAB	Regulatory Asset Base
RBA	Reserve Bank of Australia
SAIPAR	South Australian Independent Pricing and Access Regulator
TJ	Tera joule

TP	Transmission Pressure
QCA	Queensland Competition Authority
UAFG	Unaccounted for Gas
UMS	UMS Group Australia

12. APPENDICES

12.1 Appendix 1: Documents Accessed

Asset Management Plan (SA)

ESCV – Review of Gas Access Arrangements Final Decision, October 2002

Envestra (Victoria) – Access Arrangement Information, 2 April 2002

Multinet – Gas Access Arrangement Information, 28 March 2002

TXU – Gas Access Arrangement Information,28 March 2002

PEG – TXU Gas Distribution Operations & Maintenance Cost Performance, September 2001

ICRC – Draft Decision Review of Access Arrangement, July 2004

ICRC – Final Decision Review of Access Arrangement, October 2004

ActewAGL – Access Arrangement Information, December 2003

ActewAGL – Access Arrangement Information, November 2004

MMA – Review of Expenditure, Demand Forecasts& Cost Attribution for ActewAGL Gas Distribution Network in the ACT, Queanbeyan & Yarrowlumla, 28 June 2004

IPART – Revised Access Arrangement for AGL Gas Networks Draft Decision, December 2004

ECG – Review of AGL GN Gas Access Arrangement, August 2004

PB – Review of AGL Gas Networks Operating Expenditure, December 2004

ECG – Review of AGL GN Gas Access Arrangement Supplementary Report, October 2004

AGL GN – Access Arrangement Information, December 2003

QCA – Proposed Access Arrangement for Gas Distribution Networks Final Decision, October 2001

Allgas Energy – Access Arrangement Information, 12 November 2001

Envestra (Queensland) – Access Arrangement Information, 21 December 2001

UMS – Queensland Natural Gas Distribution Efficiency Study, July 2001

ERA – Draft Decision on the Proposed Revisions to the Access Arrangements for the Mid-West and South-West Gas Distribution Systems, 28 February 2005

ERA – Final Decision on the Proposed Revisions to the Access Arrangements for the Mid-West and South-West Gas Distribution Systems, 12 July 2005

AlintaGas Networks – Access Arrangement information, 21 March 2005

SAIPAR – Final Decision Access Arrangement, December 2001

Envestra (SA) – Access Arrangement Information for the SA Gas Distribution System (Undated)

South Australian Cathodic Protection Management Plan

OEAM Risk and Opportunity Manual

ESCOSA Gas Metering Code

Envestra Gas Measurement Management Plan

Envestra Safety Management Plan for Distribution networks in South Australia

ESCOSA Gas Distribution Code

Envestra Annual Return, 1 July 2002 to 30 June 2003

Envestra Annual Return, 1 July 2003 to 30 June 2004

Asset Management Plan (SA)

12.2 Appendix 2: Projects Audited

WONUM	WORKTYPE	JOBTYPE	ADDRESS	TOTAL BUDGET COST	
11258X3	NMAIN	NMICL	PULTENEY ST ADELAIDE 5000 SA	$ 33,790.99	
7012X1	NMAIN	NMEDO	SHIRLEY AVE TRANMERE 5073 SA	$ 2,073.74	
8095X1	NMAIN	NMICL	QUEBEC MALL PORT ADELAIDE 5015 SA	$ 4,873.91	
21455X4	NMAIN	NMICL	YORK ST ADELAIDE 5000 SA	$ 19,366.84	
22731X3	NMAIN	NMICL	CEDAR ST MOUNT GAMBIER 5290 SA	$ 6,267.56	
24364X4	NMAIN	NMICL	368 RICHMOND RD NETLEY 5037 SA	$ 15,190.17	
59624X3	NMAIN	NMICL	181 ANGAS ST ADELAIDE 5000 SA	$ 3,085.87	
64026X3	NMAIN	NMICL	HOME AVE GLYNDE 5070 SA	$ 12,161.07	
75119X4	NMAIN	NMICL	SOUTH RD ST MARYS 5042 SA	$ 4,372.40	
56075X4	NMAIN	NMICL	NORTH ARM RD OTTOWAY 5013 SA	$ 25,857.45	
88433	NMAIN	NMEST	DONCASTER TCE BURTON 5110 SA	$ 2,354.81	
40095X3	NMAIN	NMICL	WALKLEYS RD INGLE FARM 5098 SA	$ 1,297.28	
92387X2	NMAIN	NMICL	ELLISTON AVE HIGHBURY 5089 SA	$ 4,289.61	
82074X2	NMAIN	NMICL	45 (LA20) THE PARADE NORWOOD 5067 SA	$ 4,107.67	
103631	NMAIN	NMEST	STATES RD HACKHAM 5163 SA	$ 1,426.47	
113078X1	NMAIN	NMEDO	CUDMORE TCE HENLEY BEACH 5022 SA	$ 1,403.09	
113970X2	NMAIN	NMICL	LANGFORD ST POORAKA 5095 SA	$ 974.15	
3027	RENEW	RPICE	MINNA TCE SEMAPHORE PARK 5019 SA	$ 6,017.00	
7391	RENEW	RBLOC	CLANSMAN AVE WINDSOR GARDENS 5087 SA	$ 227,141.96	
7405	RENEW	RBLOC	VICTORIOUS ST SALISBURY EAST 5109 SA	$ 181,147.40	
8498	RENEW	RBLOC	WHELAN AVE CAMDEN PARK 5038 SA	$ 57,204.00	
		Job Type	**Description**		
		NMEST	New Main - New Estate		
		NMEDO	New Main - Existing Domestic		
		NMICL	New Main - I&C < 10 TJ		
		NMIMS	New Main - Improving Supply		
		RBLOC	Replacement Main - Block		
		RPICE	Replacement Main - Piecemeal		

12.3 Appendix 3: Capital Project Audit Proforma

PROJECT NO ……..PROJECT CATEGORY…… PROJECT NAME……
PROJECT DESCRIPTION……..
……
ESTIMATED COST…… ACTUAL COST…… IN ANNUAL ENVESTRA BUDGET YES/NO
AUTHORISED BY…… TITLE……..... DATE……
PROJECT REVISION YES /NO REVISION DATE…..…… APPROVED BY…… BASIS ……
COMPLETION DATE…… POST IMPLEMENTATION REVIEW DATE……
PIR COMMENTS……
……
PROJECT CLOSURE DATE…….. AUTHORISED BY…….. TITLE……
BASIS FOR COSTING ……

CRITERION	RATING	COMMENTS
Current & projected capacity/asset utilisation		
Asset condition & renewal requirements		
Appropriate planning		
Alternatives considered		
Minimising life cycle cost/economic evaluation		
Efficient design		
Risk analysis		
Correct project categories		
Correct allocation of overheads		

OVERALL ASSESSMENT
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