AlintaGas's Access Arrangement Information for the Mid-West and South-West Gas Distribution Systems

Submitted 13 July 2000

AlintaGas
ABN 90 089 531 975
1 William Street
Perth WA 6000

Table of Contents

1. Introduction

1.1 Access Arrangement Information submitted by AlintaGas

This *Access Arrangement Information* is required under clause 2.2 of the *Code*.

1.2 Interpretation

Unless the text indicates otherwise, words in this *Access Arrangement Information* have the same meaning as in *AlintaGas's Access Arrangement for the Mid-West and South-West Gas Distribution Systems* submitted to the *Regulator* on 13 July 2000.

This *Access Arrangement Information* has been prepared to conform with the *Regulator's Final Decision: Access Arrangement Mid-West and South-West Gas Distribution Systems Submitted by AlintaGas*, issued on 30 June 2000.

Individual table entries may not add to the corresponding totals due to the rounding of those individual entries.

AlintaGas's conforming to the *Regulator's* final decision has resulted in some small differences in figures shown in the tables of this *Access Arrangement Information* as compared with the corresponding figures generated by the models *AlintaGas* has used to determine its *reference tariffs*. These differences are believed to be the result of the rounding of figures presented in the final decision which have now been included in this *Access Arrangement Information*.

2. Information regarding access and pricing principles

2.1 Tariff determination method

The *reference tariffs* in the *Access Arrangement* have been designed to recover a portion of *AlintaGas's total revenue*. *AlintaGas's total revenue* is an amount equal to the cost of providing all *services* that are provided by means of the *AlintaGas GDS*.

The *services* provided by means of the *AlintaGas GDS* are:

- *Reference Service A*;
- *Reference Service B1*;
- *Reference Service B2*;
- *Reference Service B3*;
- an *Interconnection Service*; and
- *listed ancillary services*.

The list above is not exhaustive of the *services* that *AlintaGas* is prepared to make available. *AlintaGas* will negotiate regarding any other *service* or element of a *service* requested by a *prospective user*.

The costs of providing *Reference Service A*, and *Reference Services B1*, *B2* and *B3* are to be recovered through *Reference Tariff A*, and *Reference Tariffs B1*, *B2* and *B3*, respectively. The price upon which an *Interconnection Service* will be made available is to be negotiated by *AlintaGas* and the person to whom that *Service* is provided. The *tariffs* for *listed ancillary services* are those set out in Schedule 8 of the *Access Arrangement* as amended or substituted from time to time by *AlintaGas* and approved by the *Regulator*.

The structure of the *reference tariffs* is described in subsection 2.2 of this *Access Arrangement Information*.

Reference Tariff A and *Reference Tariffs B1*, *B2* and *B3* are initially determined from the forecast total cost of providing *Reference Service A* and *Reference Services B1*, *B2* and *B3* in the first year of the *Access Arrangement*.

The forecast total cost of providing *Reference Service A* and *Reference Services B1*, *B2* and *B3* in the first year of the *Access Arrangement* is determined by subtracting the forecast cost of providing *listed ancillary services* and any other *services* from the forecast cost of providing all *services* by means of the *AlintaGas GDS* in that year. The forecast cost of providing all *services* by means of the *AlintaGas GDS* in the first year of the *Access Arrangement* has been determined using the *cost of service* method. It is calculated as the sum of:

- a *return* on the *capital base*;
- *depreciation* of the *capital base*; and
- *non-capital costs.*

The components of the forecast total costs of providing *Reference Service A* and *Reference Services B1*, *B2* and *B3* in the first year, and in subsequent years, of the *Access Arrangement* are set out in subsection 2.4 of this *Access Arrangement Information*.

Determination of the *Initial Reference Tariffs* proceeds through a multistage cost allocation approach. In this approach, the forecast total cost of providing *Reference Service A* and *Reference Services B1*, *B2* and *B3* in the first year of the *Access Arrangement* is allocated to *Reference Tariff A* and *Reference Tariffs B1*, *B2* and *B3*. The cost allocation approach and the determination of the *Initial Reference Tariffs* are described in subsection 2.6 of this *Access Arrangement Information*.

The Initial *Reference Tariffs* are set out in subsection 2.7.

Clause 25 and Schedule 2 of the *Access Arrangement* set out the way in which *reference tariffs* may be varied in the second and subsequent years of the *Access Arrangement*. *Reference tariffs* are to be varied in accordance with a predetermined price path. The price path - the form of regulation - is described in subsection 2.8 of this *Access Arrangement Information*.

2.2 Reference tariff structure

2.2.1 Reference Service A/Reference Tariff A

Reference Service A is a *service* for *users* requiring delivery of 35 TJ/year or more at a *delivery point* in each year of a *Haulage Contract*, and requesting a *contracted peak rate* greater than or equal to 10 GJ/hour. *Users* requiring *Reference Service A* tend to be those *users* making efficient use of the *AlintaGas GDS*. For this group of *users*, higher annual volumes tend to be associated with higher load factors.

The estimated number of *delivery points* for *users* requiring *Reference Service A* is shown in Table 6.6 of subsection 6 of this *Access Arrangement Information*. The total volumes of gas expected to be delivered at these *delivery points* in each year of the *Access Arrangement* are shown in Table 6.4 of section 6.

Users requiring *Reference Service A* require that *service* for the delivery of gas to larger commercial and industrial installations. Their requirements for service pipes, regulators, meters and associated facilities are generally specific to the installations to which *AlintaGas* delivers gas. *Reference Tariff A* has therefore been designed to recover from each *user*:

- the cost incurred in using the AlintaGas GDS; and
- the cost of providing *user specific delivery facilities.*

Relatively stable paths from *receipt points* to *delivery points* can be identified for gas flows through the *high pressure system*. The network assets used to deliver gas to each *delivery point* at which a *user* takes *Reference Service A* can therefore usually be identified. (Most *users* requiring *Reference Service A* require delivery of gas to *delivery points* located on the *high pressure system*.) In consequence, the component of *Reference Tariff A* that recovers the cost of network use can be designed to recover the costs of installing, operating and maintaining the assets required to provide a *user* with *Reference Service A*. The cost incurred by *AlintaGas* in providing a *user* with *Reference Service A* is determined by:

- the location of the *delivery point* at which gas is delivered to the *user*;
- the use the *user* makes of the c*apacity* of the *AlintaGas GDS*; and
- the volume of gas delivered to the *user* at the *delivery point*.

For network management, *AlintaGas* requires that metering installed immediately upstream of a *delivery point* at which a *user* requires delivery of 20 TJ/year or more be capable of measuring, storing, and transmitting by telemetry, peak flow. This measurement of peak flow is an indicator of the use made of the *capacity* of the *AlintaGas GDS* by a *user* requiring *Reference Service A*.

Reference Tariff A has therefore been designed to recover the cost of use of the *AlintaGas GDS* through:

- a standing charge;
- a demand charge;
- a usage charge; and
- a charge for *user specific delivery facilities*.

(The values of the components of *Reference Tariff A* are set out in Table 2.3 of subsection 2.7 of this *Access Arrangement Information*.)

The inclusion of a standing charge in *Reference Tariff A* is a recognition that the costs of installing, operating and maintaining a gas distribution system are largely fixed. It also serves the important purpose of ensuring that the structure of *reference tariffs* provides an appropriate signal for transfer from *Reference Service B1* to *Reference Service A* as the volume of gas delivered to a user approaches 35 TJ/year.

The demand charge recovers that portion of the cost of use of the *AlintaGas GDS* determined by the location of a *user's delivery point*, and by the use the *user* makes of the *capacity* of the network. It is a charge for use of the *AlintaGas GDS* measured as the product of use of *capacity* and location. For the purpose of determining this charge, a *user's* use of *capacity* is measured as the *user's contracted peak rate* expressed in

GJ per hour. Location is defined in terms of the distance, in kilometres, measured in a straight line, from the *user's delivery point* to the nearest transmission pipeline, irrespective of whether or not that pipeline is interconnected with the *AlintaGas GDS*. The demand charge is, in consequence, a charge per GJ-km.

Use of distance to the nearest transmission pipeline as the measure of distance in the demand charge of *Reference Tariff A* is intended to mitigate the risk of inefficient by-pass of the *AlintaGas GDS*.

The demand charge of *Reference Tariff A* is not a linear function of distance for a given *contracted peak rate.* A declining block structure, with two distance-based blocks, has been adopted to provide better cost reflectivity in the tariff. *Users* requiring *Reference Service A* for delivery of gas to *delivery points* located at distances greater than about 10 km from the nearest transmission pipeline are usually supplying at *delivery points* in urban fringe and rural areas. In these areas, the costs of pipe laying are lower than in more densely populated urban areas.

The usage charge of *Reference Tariff A* is a charge which recovers that portion of the cost of use of the *AlintaGas GDS* determined by the *user's* location, and by the volume of gas delivered to the *user* at a *delivery point*. It is a charge per GJ-km and, like the demand charge, has a distance-based declining block structure.

In addition to paying the demand and usage charges of *Reference Tariff A*, a user of *Reference Service A* will pay a charge for service piping, regulators, meters and associated facilities. That charge will be user-specific, being determined by the costs incurred by *AlintaGas* in connecting the *user's* facilities to the *AlintaGas GDS*.

2.2.2 Reference Service B1/Reference Tariff B1

Reference Service B1 is a *service* for *users* requiring less than 35 TJ/year at a *delivery point*, or having a *contracted peak rate* less than 10 GJ per hour.

The estimated number of *delivery points* for *users* requiring *Reference Service B1* is shown in Table 6.6 of section 6. The total volumes of gas expected to be delivered at these *delivery points* in each year of the *Access Arrangement* are shown in Table 6.4.

Users requiring *Reference Service B1* require that *service* for the delivery of gas to a wide range of commercial and industrial installations. These installations take between about 1 TJ/year and 35 TJ/year. For those *users* in this group taking smaller annual volumes, stable paths for gas flow through the network cannot be identified. Many of these *users* take gas at *delivery points* on the *medium pressure/low pressure system*. The largest part of the *medium pressure/low pressure system* is an integrated network supplied from over 120 points of interconnection with the *high pressure system*. The pattern of gas flow through the *medium pressure/low pressure system* varies

continuously over time with variations in flow through the *high pressure system*, and variations in the volume of gas taken at *delivery points.*
Furthermore, many *users* requiring *Reference Service B1* require less than 20 TJ/year at a *delivery point*. They will not require metering capable of measuring, storing, and transmitting by telemetry, peak flow.

Accordingly, the cost of providing *Reference Service B1* is not, in general, directly related to the location of the *user's delivery point* and to the use the *user* makes of the *capacity* of the *AlintaGas GDS*. In tariff design, the cost of providing *Reference Service B1* must be, at least in part, related to the volume of gas delivered to a *user* at a *delivery point*. The cost of providing *Reference Service B1* will also include a fixed component because the costs of installing, operating and maintaining the *AlintaGas GDS* are largely fixed.

Users requiring *Reference Service B1* require that *service* for the delivery of gas to a broad range of commercial and industrial installations. Their requirements for service pipes, regulators, meters and associated facilities are generally specific to the installations to which they deliver gas. They cannot be supplied using the standard facilities of *Reference Service B2* or *Reference Service B3*.

Reference Tariff B1 has therefore been designed to recover the cost of use of the AlintaGas GDS through:

- a standing charge;
- a usage charge; and
- a charge for *user specific delivery facilities*.

The standing charge for *Reference Tariff B1*, like the standing charge for *Reference Tariff A*, not only recovers fixed costs. It also ensures that the structure of *reference tariffs* provides an appropriate signal for transfer from *Reference Service B2* to *Reference Service B1* as the annual volume of gas delivered to a user increases.

The usage component of *Reference Tariff B1* is a charge which recovers that portion of the cost of use of the *AlintaGas GDS* determined by the volume of gas (measured in GJ) delivered to a *user* at a *delivery point*.

2.2.3 Reference Services B2 and B3/Reference Tariffs B2 and B3

Reference Services B2 and *B3* are *services* for *users* requiring delivery of smaller volumes of gas at *delivery points* on the *medium pressure/low pressure system*. *AlintaGas* has standardised, to the extent technically and commercially reasonable, the types of facilities it uses at these *delivery points.* In particular, the metering makes use of either a *standard 12 m^3/hr meter*, or a *standard 6 m^3/hr meter*. These meters record volumes of gas delivered, but not peak flows.

Reference Service B2 is a *service* for *users* supplying smaller commercial and small industrial consumers requiring delivery of gas at a *delivery point* on the *medium pressure/low pressure system*, and requiring a meter capable of delivering up to 12 cubic metres of gas per hour.
Reference Service B3 is a *service* for *users* supplying residential and smaller commercial and industrial consumers requiring delivery of gas at a *delivery point* on the *medium pressure/low pressure system*, and requiring a meter capable of delivering up to 6 cubic metres of gas per hour.

The estimated number of *delivery points* for *users* requiring *Reference Services B2* and *B3* are shown in Table 6.6 of section 6 of this *Access Arrangement Information*. The total volumes of gas expected to be delivered at these *delivery points* in each year of the *Access Arrangement* are shown in Table 6.4 of section 6.

Reference Tariffs B2 and B3 will have two components:

- a standing charge; and
- a usage charge.

The standing charges of *Reference Tariffs B2* and *B3* are annual charges that recover fixed costs, including the costs of *standard delivery facilities*. The standing charge for *Reference Tariff B2* also ensures that the structure of *reference tariffs* provides an appropriate signal for transfer from *Reference Service B3* to *Reference Service B2* as the annual volume of gas delivered to a *user* increases.

The usage charges of *Reference Tariffs B2* and *B3* are charges which recover that portion of the cost of use of the *AlintaGas GDS* determined by the volume of gas (measured in GJ) delivered to a *user* at a *delivery point*. These charges have a declining block structure that is intended to encourage use of gas by residential consumers. The declining block structures of *Reference Tariffs B2* and *B3* are intended to complement the block structures in the retail prices payable by small business and residential consumers at the time the *Initial Reference Tariffs* were determined.

2.3 Reference Tariff zones

Consideration was given to the creation of pricing zones to permit *Reference Tariffs B1, B2* and *B3* to more accurately reflect the costs of providing the corresponding *reference services*. However, the implementation of a scheme of cost-reflective pricing zones was found to be impractical. A major part of the *AlintaGas GDS* in the Perth metropolitan area forms a single integrated gas distribution network. A number of smaller networks, separate from the Perth metropolitan network, can be identified. To use these smaller networks as a basis for separate pricing zones would result in increases in distribution charges for gas supplied to some *delivery points*, and would result in substantial retail price increases for at least some gas consumers.

2.4 Forecast total costs of providing reference services

The forecast total costs of providing *Reference Service A* and *Reference Services B1*, *B2* and *B3* in the first year, and in subsequent years, of the *Access Arrangement* are shown in Table 2.1. These costs exclude the costs of providing, operating and maintaining *user specific delivery facilities* which are to be recovered from *users* taking *Reference Service A* and *Reference Service B1*.

Table 2.1
Forecast total costs of providing reference services
Year ending 31 December

	2000 $m	2001 $m	2002 $m	2003 $m	2004 $m
Return on capital base	41.0	42.4	43.4	44.3	45.0
Depreciation	17.3	18.7	19.8	21.0	22.1
Return on working capital	1.1	1.1	1.1	1.1	1.1
Non-capital costs	36.7	35.8	36.2	36.7	37.7
Total	96.0	97.9	100.5	103.1	106.0

The methods by which the *return* on the *capital base*, *depreciation* and the *return* on working capital have been determined are set out in section 3 of this *Access Arrangement Information*. The principal components of the *non-capital costs* are set out in sections 4 and 5.

2.5 Goods and services tax

AlintaGas's forecast total costs of providing *reference services* have not been adjusted to reflect the removal of wholesale sales tax from 1 July 2000.

The *reference tariffs* set out in Figure 2.2 of this *Access Arrangement Information* do not include the effect of the goods and services tax which is to apply from 1 July 2000.

The *reference tariffs* set out in Table 2.3 include the net effect of the introduction of the goods and services tax, which is an increase of 9.3% in the tariffs determined from *AlintaGas's* forecast total costs of providing *reference services*.

2.6 Cost allocation

Reference tariffs have been determined by allocating the forecast total cost of providing *Reference Service A* and *Reference Services B1*, *B2* and *B3*, in the first year of the *Access Arrangement*, to *Reference Tariff A* and *Reference Tariffs B1*, *B2* and *B3*, using a multistage approach to cost allocation.

The forecast total cost of providing the *reference services* has been allocated to three "cost baskets", and costs in the three cost baskets have then been allocated to three "cost pools". The costs collected in the cost pools are allocated to *Reference Service A* and to *Reference Services B1*, *B2* and *B3*. These allocations are shown in Figure 2.1.

The allocation of cost pools to *reference services* is the basis for the allocation of costs to *user*s via the *reference tariffs*. This allocation of *reference service* costs to *reference tariffs* is shown in Figure 2.2.

The allocation of the forecast costs of providing the *reference services* to cost baskets is direct (that is, there is no apportionment of costs). The *return* on the *capital base* and *depreciation* are allocated directly to an Asset Costs cost basket. Operating and maintenance costs are allocated directly to an Operating and Maintenance (O & M) Costs cost basket, and *return* on working capital, marketing costs and corporate costs are directly allocated to an Other Costs cost basket.

Costs in the Asset Costs cost basket are allocated to three cost pools. These are a High Pressure (HP) System cost pool, a Medium Pressure/Low Pressure (MP/LP) System cost pool, and a Metering cost pool. The same allocator, Allocator 2 has been used for the three allocations. Allocator 2, replicates the calculation of the *return* on the *capital base* and the calculation of *depreciation*. The values of Allocator 2 are shown in Table 2.2.

Costs in the Operating and Maintenance Costs cost basket are also allocated to the High Pressure System cost pool, the Medium Pressure/Low Pressure System cost pool, and the Metering cost pool. The same allocator, Allocator 1 has been used for each of these allocations. Allocator 1 allocates costs to the cost pools on the basis of replacement value of assets. The values of Allocator 1 are shown in Table 2.2.

Costs in the Other Costs cost basket are not allocated to cost pools. They are not asset-related. They are allocated directly to *reference services* using a weighted average of Allocator 4 and Allocator 7. Allocator 4 allocates costs on the basis of proportion of forecast total volume delivered, and Allocator 7 allocates costs on the basis of proportion of forecast total number of *delivery points*. Allocator 4 and Allocator 7 are given weights of 20.0% and 80.0%, respectively, in the allocation of costs in the Other Costs cost basket to *reference services*. The values of Allocators 4 and 7 are shown in Table 2.2.

Costs in each of the cost pools have been allocated to the *reference services*. High Pressure System costs have been allocated to *Reference Service A* and to *Reference Services B1*, *B2* and *B3* on the basis of estimated contribution to system peak flow. These contributions (Allocator 3) are shown in Table 2.2. Medium Pressure/Low Pressure System costs have been allocated to *reference services* using Allocator 6. Allocator 6 reflects use of *AlintaGas GDS* assets by weighting the forecast volumes of gas delivered for *users* requiring each of the *reference services* by estimates of the

corresponding average load factors. These load factor weighted volumes (as proportions of their total) are shown in Table 2.2.

The final stage of cost allocation is the allocation of *reference service* costs to *reference tariffs*. These allocations are shown in Figure 2.2.

Reference Service A costs are allocated to the standing, demand and usage charges of *Reference Tariff A* in the ratio 30.0% : 35.0% : 35.0%. The costs being allocated are, predominantly, High Pressure System costs. (These costs were allocated in the ratio 60.0% : 40.0% to demand and usage charges in tariff construction under the previous access regime of the *Gas Corporation Act 1994* and the *Gas Distribution Regulations 1996*.)

Allocators 4, 5, and 8 were used to allocate the costs of *Reference Services B1*, *B2* and *B3* to the corresponding *reference tariffs*.

Allocator 5 allocates High Pressure System costs allocated to *Reference Services B1*, *B2* and *B3* to the corresponding *reference tariffs* on the basis of forecast gas volumes (excluding volumes deriving from *users* requiring *Reference Service A*). The values of Allocator 5 are shown in Table 2.2.

Allocator 8 is used for the allocation of Metering costs. It has been calculated by weighting the number of *delivery points* for each of the *reference services* for which *standard delivery facilities* are provided by the estimated cost of the *standard delivery facilities* for that category of *service*. The values of Allocator 8 are shown in Table 2.2.

Clause 38 of the *Access Arrangement* includes, among those *reference tariff* principles not subject to review for a *fixed period* of 10 years, the method of allocating costs between *services* as described in clause 33. AlintaGas notes, for the avoidance of doubt, that it is the methods by which the allocators of Table 2.2 are determined that are not subject to review for the *fixed period*. The numerical values produced by those methods may be amended in subsequent reviews of the *Access Arrangement*.

Table 2.2
Cost allocators

Allocator 1: replacement value of assets	
High Pressure System	17.3%
Medium Pressure/Low Pressure System	51.5%
Metering	31.2%
Allocator 2: capital-related cost (return plus depreciation)	
High Pressure System	21.1%
Medium Pressure/Low Pressure System	59.4%
Metering	19.5%
Allocator 3: contribution to system peak flow	
Reference Service A	35.0%
Reference Services B1, B2 and B3	65.0%
Allocator 4: volume delivered	
Reference Service A	55.3%
Reference Service B1	13.2%
Reference Service B2	3.2%
Reference Service B3	28.3%
Allocator 5: volume delivered (excluding Reference Service A volume)	
Reference Service B1	29.6%
Reference Service B2	7.2%
Reference Service B3	63.2%
Allocator 6: load factor weighted volume	
Reference Service A	1.9%
Reference Service B1	22.9%
Reference Service B2	6.7%
Reference Service B3	68.5%
Allocator 7: number of delivery points	
Reference Service A	0.01%
Reference Service B1	0.09%
Reference Service B2	0.90%
Reference Service B3	99.00%
Allocator 8: cost weighted number of delivery points	
Reference Service B2	3.6%
Reference Service B3	96.4%

Figure 2.1
Cost Allocation (costs excluding the effect of the removal of wholesale sales tax)

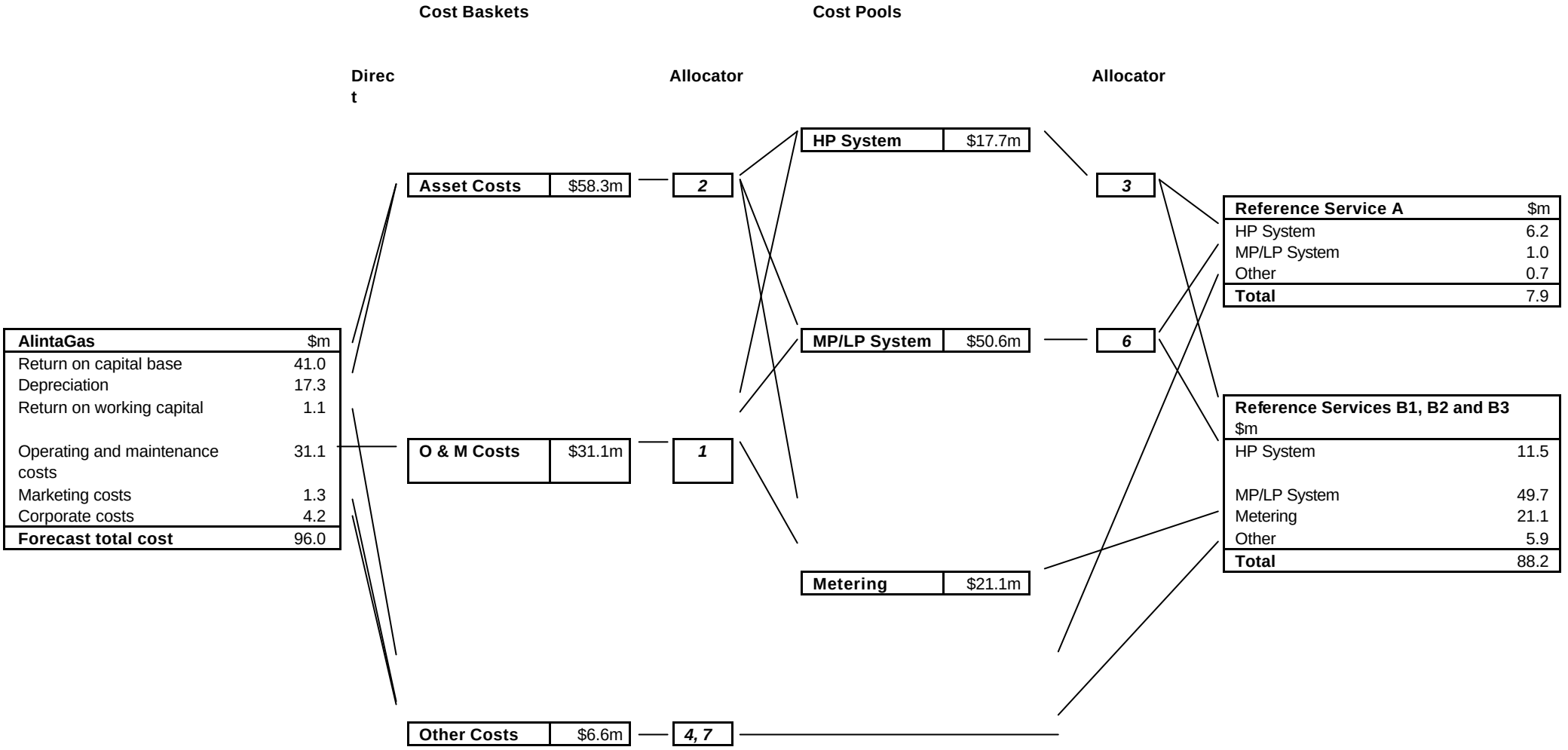
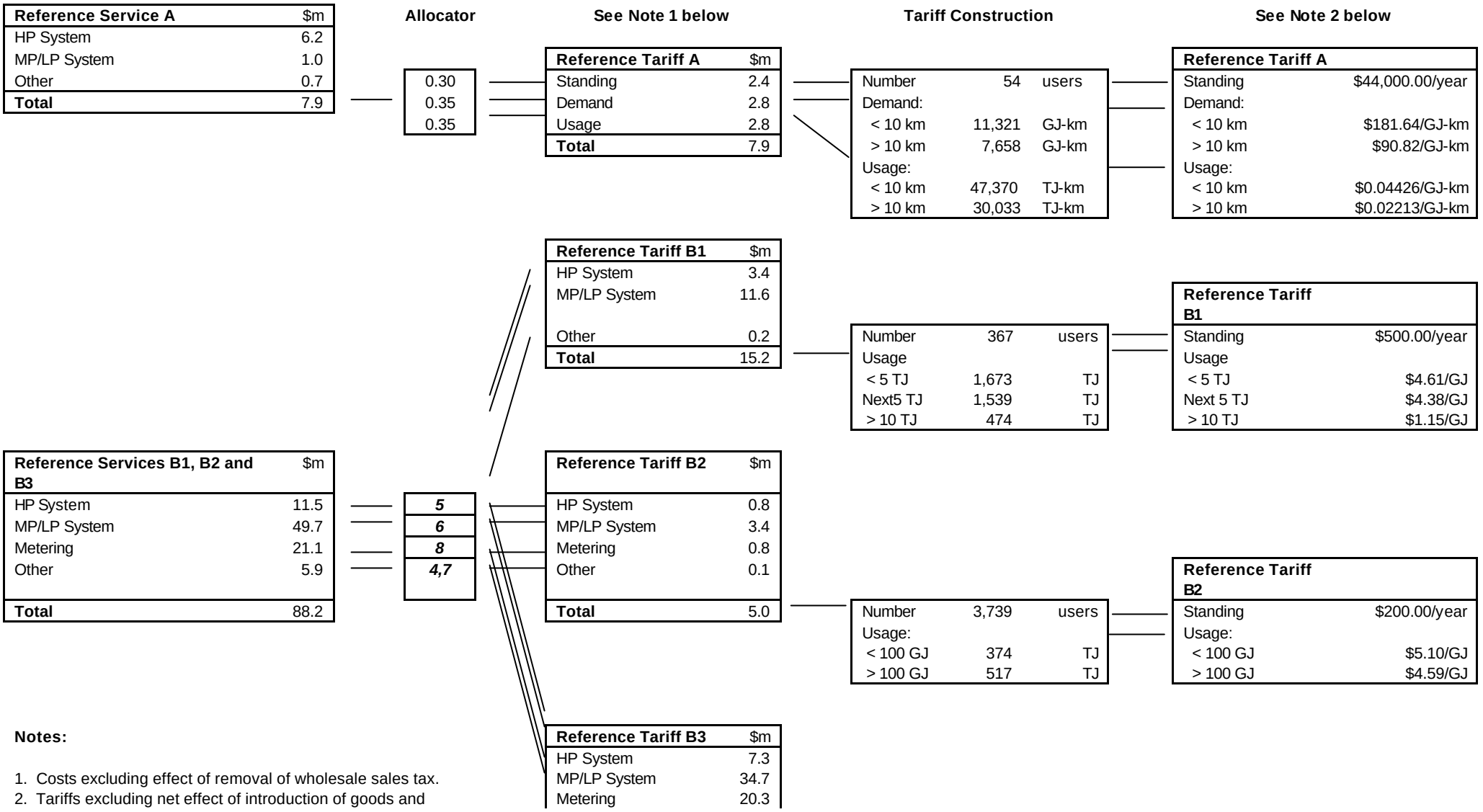


Figure 2.2
Cost Allocation and Tariff Construction



Notes:

1. Costs excluding effect of removal of wholesale sales tax.
2. Tariffs excluding net effect of introduction of goods and

services tax at rate of 9.3 per cent, and excluding user specific charges where applicable.

Other	5.6
Total	67.8

Number	412,139	users
Usage:		
< 15 GJ	4,631	TJ
Next 30 GJ	2,556	TJ
> 45 GJ	677	TJ

Reference Tariff B3	
Standing	$25.00/year
Usage:	
< 15 GJ	$8.55/GJ
Next 30 GJ	$5.98/GJ
> 45 GJ	$3.93/GJ

2.7 Reference tariffs

The *reference tariffs*, inclusive of the net effects of the goods and services tax, determined in accordance with the policies described in the preceding subsections of this *Access Arrangement Information* are summarised in Table 2.3. These tariffs exclude the *user* specific charges for *user specific delivery facilities* payable by *users* taking *Reference Service A* and *Reference Service B1*.

Table 2.3
Reference Tariffs (excluding user specific charges where applicable)

Tariff	Standing Charge	Block Structure	Demand Charge	Usage Charge
	$/year		**$/GJ-km/year**	**$/GJ-km**
A	48,092.00	First 10 km	198.53	0.04838
		> 10 km	99.27	0.02419
				$/GJ
B1	546.50	First 5 TJ	n.a.	5.04
		Next 5 TJ	n.a.	4.79
		> 10 TJ	n.a.	1.26
B2	218.60	First 100 GJ	n.a.	5.57
		> 100 GJ	n.a.	5.02
B3	27.32	First 15 GJ	n.a.	9.35
		Next 30 GJ	n.a.	6.54
		> 45 GJ	n.a.	4.30

* n.a. = not applicable

2.8 Variation of reference tariffs

The *reference tariff principles* of section 8 of the *Code* permit the setting of *reference tariffs* for the first year of the *Access Arrangement*, and adjustment of those tariffs in subsequent years. The approach to future tariff adjustment is referred to as the form of regulation. The form of regulation may be:

- tariff adjustment in accordance with a pre-determined price path; or
- tariff adjustment on the basis of actual outcomes (such as sales volumes and actual cost) in subsequent years; or
- tariff adjustment in accordance with a variation or combination of these two approaches.

The *Reference Tariff Policy* set out in the *Access Arrangement* provides for tariff adjustment in accordance with a pre-determined price path.

The method by which the *reference tariffs* are to be adjusted in each year of the *Access Arrangement* after the first is set out in Schedule 2 of the *Access Arrangement*.
AlintaGas has adopted a simple price-cap approach to the variation of the *reference tariffs* during the *Access Arrangement period*. Under the price-cap, *AlintaGas* may vary any tariff component (and thereby the corresponding *reference tariff*) for each year by an amount equal to CPI - X, where CPI is the year on year increase in the Consumer Price Index (as defined in Schedule 2).

The value of X is a specified productivity improvement factor that is set prior to the commencement of the *Access Arrangement* (in the process of determining the *Initial Reference Tariffs*) and is not varied during the *Access Arrangement* period. The value of X for the *Access Arrangement* period is 2.55% per annum.

AlintaGas will give the *Regulator* a *variation report* at least 30 *business days* prior to the end of each *reference year* that sets out the basis on which variations in *reference tariffs* are calculated and includes a demonstration of how the varied *reference tariffs* comply with the price-cap.

3. Information regarding capital costs

3.1 Asset values for each category of asset

AlintaGas has considered all of the factors listed in sections 8.10(a) – (j) of the *Code* in establishing the *capital base* of the *AlintaGas GDS* for the purpose of determining *reference tariffs* for *reference services*.

Factors which have been given particular weight are discussed in detail below.

AlintaGas notes that determination of the *capital base* was carried out over an extended period from September 1998. Some values were determined as at 30 June 1998; others were determined more recently. The *initial capital base* has been established as a value at 31 December 1999.

3.1.1 Depreciated actual cost of the AlintaGas GDS (Code, section 8.10(a))

AlintaGas established, and considered in setting the *capital base*, the depreciated actual cost of the *AlintaGas GDS* at 30 June 1998. The depreciated actual cost, prepared from *AlintaGas's* asset register and other accounting records, was $299.7 million.

An independent auditor's report on the depreciated actual cost of the *AlintaGas GDS* was sought from the Auditor General. The Auditor General reported that the value of $299.7 million presented fairly the written down historical value of the distribution system assets at 30 June 1998.

3.1.2 Depreciated optimised replacement cost of the AlintaGas GDS (Code, section 8.10(b))

The assets that form the *AlintaGas GDS* were valued using the depreciated optimised replacement cost method. The resulting valuation, a valuation at 31 December 1998, comprised:

- a depreciated optimised replacement cost valuation of the pipeline assets of the *AlintaGas GDS* existing at 30 June 1998 made for *AlintaGas* by engineering consultants Gutteridge, Haskins and Davey Pty Ltd (GHD);
- a valuation of the non-network assets of the *AlintaGas GDS* at 30 June 1998; and
- adjustments taking into account estimates of:
  - the capital cost of additions to the *AlintaGas GDS* during the period from 1 July 1998 to 31 December 1998; and
  - accumulated depreciation on both the assets forming the *AlintaGas GDS* at 30 June 1998, and the additions to those assets, for the period from 1 July 1998 to 31 December 1998.

Valuation of pipeline assets

GHD's application of the depreciated optimised replacement cost method to valuation of the pipeline assets of the *AlintaGas GDS* proceeded through six main steps. These were as follows.

(1) Defining the scope of the valuation

GHD made the following assumptions to define the scope of the depreciated optimised replacement cost valuation.

Gas was delivered into the *AlintaGas GDS* from *receipt points* at meter stations on the Dampier to Bunbury Natural Gas Pipeline (the transmission pipeline owned by Epic Energy (WA) Nominees Pty Ltd) at the following locations:

Geraldton (Nangetty Road);
Eneabba;
Muchea;
Della Road, Bullsbrook;
Ellenbrook;
Harrow Street, West Swan;
Caversham;
Welshpool;
Forrestdale;
Russell Road, Wattleup;
Barter Road, Naval Base;
Rockingham;
Pinjarra;
Oakley Road (Pinjarra);
Harvey;
Kemerton; and
Clifton Road, Bunbury.

These were the existing meter station sites at 30 June 1998.

The locations of *delivery points* supplied from the *AlintaGas GDS* at 30 June 1998 were taken to be fixed.

The geographical extent of the *AlintaGas GDS* was fixed. The valuation is based on a pipe network covering the same geographic area as the network existing at 30 June 1998.

(2) Identification of the assets forming the AlintaGas GDS and verification of the data available on those assets

Information on the attributes of the assets forming the *AlintaGas GDS*, including information on location, material type, size, length, and date installed, was obtained from *AlintaGas's* Distribution Facilities Information System (DFIS) database. (The DFIS database has subsequently been replaced by a new GIS system.)

Before relying on the information in the DFIS database, GHD carried out the following verifications for selected samples of assets:

- information in the database was checked for consistency with the "as built" drawings for the assets; and
- information in the database was checked for consistency with the facilities actually installed.

(3) Pipeline optimisation

Pipeline optimisation studies required for the depreciated optimised replacement cost valuation of the *AlintaGas GDS* were undertaken using Stoner network optimisation software. The Stoner software is used by *AlintaGas* for network planning, and substantial set-up costs were avoided by having *AlintaGas* undertake the optimisation studies acting on instructions from GHD.

The optimisation studies assumed that an optimal network would have sufficient capacity to satisfy current requirements for service, and the expected future growth in those requirements over a period of five years.

Modelling for the optimisation studies proceeded as follows.

- Subnetworks were defined in each of the following areas:

  Geraldton;
  Eneabba;
  Muchea;
  the Perth metropolitan area (including Ellenbrook and Mandurah);
  Pinjarra;
  Harvey;
  Kemerton; and
  Bunbury (including Capel and Busselton).

- A peak hour demand was forecast for each *delivery point* in each of these subnetworks and a subnetwork operating regime was established.

- The Stoner software was run to determine:

  - redundancy (lengths of pipe not required, and unnecessary regulators) in each subnetwork; and

- the optimal diameters of pipes comprising each subnetwork.

Using the results of the modelling, optimal subnetworks were defined for subsequent costing.

(4) Determination of modern engineering equivalents for the assets forming the optimal subnetworks

The modern engineering equivalent materials and components that would be used to replace the assets forming each of the optimal subnetworks, and accepted good industry practice replacement methods, were identified.
In accordance with accepted good industry practice, the low and medium/low pressure parts of the optimal subnetworks would be replaced with components designed to operate at medium pressure.

(5) Establishing unit replacement costs and determination of optimised replacement value

GHD established a set of unit costs for determination of the cost of replacing each of the optimal subnetworks. These unit replacement costs included:

- design, planning and survey costs;
- materials acquisition, storage and handling costs;
- contract-based construction costs;
- costs of altering other services (for example roads, and water and electricity services);
- supervision and commissioning costs; and
- restoration costs.

GHD's unit costs were established on the assumption of "brownfields" replacement conditions. That is, they were established on the assumption that all existing infrastructure (including roads, footpaths, and water and electricity services) is in place and must be taken into account in the replacement of gas distribution assets.

GHD determined the optimised replacement cost of *AlintaGas's* pipeline network by applying its unit costs to replacement of the assets forming each of the optimal subnetworks using modern engineering equivalent materials and components, and accepted good industry practice replacement methods. In applying the unit costs, adjustments were made to reflect different types of land use, and differences in ground conditions.

(6) Establishing asset lives and remaining lives, and determination of depreciated replacement costs of optimal subnetworks

Estimates of the economic lives of the assets forming the optimal subnetworks, and of the remaining lives of these assets, were made by GHD.

To make these estimates, GHD first established technical lives for the assets after reviewing the engineering literature on pipe materials, seeking *AlintaGas* experience with asset durability, and examining estimates of technical lives used by other gas distribution utilities in Australia.

The economic lives of the assets forming the optimal subnetworks were taken to be their technical lives. There were, in *AlintaGas's* view, no material economic constraints that would require the economic lives of the assets to be less than their technical lives. In particular, gas reserves in Western Australia were expected to be sufficient to allow long lived distribution assets to be utilised over their technical lives.

The estimates of the economic lives of assets made by GHD are set out in subsection 3.2 of this *Access Arrangement Information*. Table 3.4 in subsection 3.2 shows both the estimated economic lives and the average remaining lives of assets. The averages have been determined from the expected remaining lives of the assets forming each of the optimal subnetworks.

The cost of replacing each of the assets forming each of the optimal networks was depreciated on a straight line basis to determine a depreciated optimised replacement cost of assets having the same remaining lives as the existing network assets. The depreciated replacement costs for the optimised subnetworks are summarised in Table 3.1.

Table 3.1
Depreciated replacement cost of optimal subnetworks
30 June 1998

Category of asset	Replacement Cost $m	Optimised Replacement Cost $m	Depreciated Replacement Cost $m
Mains:			
High pressure	192.6	172.2	153.2
Medium pressure	275.4	242.6	206.6
Medium low pressure	175.8	172.3	118.4
Low pressure	61.8	61.8	34.6
Secondary gate stations	3.8	3.4	2.2
Regulators	26.4	11.9	9.0
Meters and service pipes	335.0	335.0	160.3
Telemetry and monitoring systems	2.1	2.1	1.1
Total	1,072.9	1,001.4	685.4

Valuation of non-network assets

Non-network assets, including land and buildings, easements, information systems, plant and equipment, and motor vehicles, were not valued by GHD. They were valued as described below, and the resulting values were added to GHD's depreciated optimised replacement cost valuation of the optimal subnetworks to obtain a depreciated optimised replacement cost of the *AlintaGas GDS*.

Property valuers Stanton Hillier Parker (WA) Pty Ltd were appointed to value land and buildings. Buildings were valued at the lower of market value and depreciated replacement value. The valuation obtained, $4.8 million, was a value at January 1999. This figure was taken to be indicative of the value of land and buildings at 31 December 1998.

The Valuer General was appointed to determine a market value for all network easements. The valuation obtained, $1.5 million, was a value at February 1999. This figure was taken to be indicative of the value of easements at 31 December 1998.

AlintaGas has recently upgraded its principal information systems, and the assets have not been revalued for the purpose of determining a depreciated optimised replacement cost valuation of the *AlintaGas GDS*. The value for information system assets included in the depreciated optimised replacement cost valuation of the *AlintaGas GDS* is the written down value at 30 June 1998, adjusted for capital expenditure and depreciation during the period from 1 July 1998 to 31 December 1998.

Individual valuations were not made for the remainder of the non-network assets. Their written down value at 30 June 1998 was taken to be indicative of their depreciated optimised replacement cost value at 31 December 1998.

Depreciated optimised replacement cost valuation

The valuation made by applying the depreciated optimised replacement cost method to the assets which form the *AlintaGas GDS* is summarised in Table 3.2.

Table 3.2
Depreciated optimised replacement cost valuation of the AlintaGas GDS
31 December 1998

Category of asset	**$m**
Depreciated replacement cost of optimal subnetworks at 30 June 1998	685.4
Value of non-network assets at 30 June 1998	22.7
Additions to the *AlintaGas GDS* (pipeline and non-network assets) from 1 July 1998 to 31 December 1998	12.1
	720.2
Less: Depreciation from 1 July 1998 to 31 December 1998	13.2

Depreciated optimised replacement cost of AlintaGas GDS	707.0

3.1.3 Application of other recognised asset valuation methods (Code, section 8.10(c))

Section 8.10 of the *Code* sets out factors that should be considered in establishing the *capital base* when *reference tariffs* are first proposed for *reference services* provided by a covered pipeline. These factors include the depreciated actual cost of the covered pipeline, and its depreciated optimised replacement cost. They also include the value that would result from applying other well recognised valuation methods in valuing the covered pipeline.

Further guidance is provided by section 8.11. The *initial capital base* of a covered pipeline that was in existence prior to commencement of the *Code* normally should be a value in the range from depreciated actual cost to depreciated optimised replacement cost.

Beyond this, the *Code* is not prescriptive about the *capital base*.

Consideration has therefore been given - as the *Code* intends - to the use of other recognised asset valuation methods in establishing the capital base of the *AlintaGas GDS*. In particular, consideration has been given to establishing its *capital base* using a deprival value method of asset valuation. *AlintaGas* considers deprival value to be a well recognised asset valuation method for the purposes of section 8.10(c) of the *Code*.

The deprival value of an asset is the value of the future economic benefits that a service provider would forego if it were deprived of the asset.

If the purpose of asset valuation is the determination of prices for services provided by a monopoly asset, a deprival value method may not be immediately applicable. The future economic benefits foregone if the service provider were deprived of the asset may be difficult to estimate because prices for the services provided are not available.

In the context of valuing the assets that form the *AlintaGas GDS*, this circularity arising in the use of deprival value methods can be overcome by:

- assuming prices in the retail sector of the gas market cannot be significantly increased through the process of setting distribution *reference tariffs*; and
- estimating the structure of costs (costs of gas, gas transmission, and retail operations) and margins in the retail sector.

With fixed prices in the retail sector, and a known structure of costs and margins, upper limits are placed on *reference tariffs* for distribution *reference services*. These upper limits become the "prices" required for estimating the future economic benefits foregone if *AlintaGas* were deprived of its distribution network.

To establish the *capital base* of the *AlintaGas GDS*, and *reference tariffs* for *reference services*, the values of the assets that form the network have been adjusted downward

(from their depreciated optimised replacement cost values). The extent of this downward adjustment has been just sufficient to achieve estimates of prices in the retail market consistent with the level of prices expected to prevail in that market during the period of the *Access Arrangement*.

The downward adjustment of the asset values has not been uniform. To avoid increases in the retail price payable by residential and small business consumers, relatively larger reductions in the values of the classes of assets used to deliver gas to those consumers have been necessary.

The result of applying this deprival value method is a value of capital assets, excluding *user specific delivery facilities*, that form the *AlintaGas GDS* of $535.9 million at 31 December 1999. *User specific delivery facilities* were valued at $12.7 million at 31 December 1999. The values adopted for each of the categories of assets which form the network are shown in Table 3.3.

Table 3.3
Value of assets forming the AlintaGas GDS
31 December 1999

Category of asset	**$m**
Mains:	
High pressure	149.1
Medium pressure	177.0
Medium low pressure	96.2
Low pressure	27.8
Secondary gate stations	2.0
Regulators	9.7
Meters and service pipes	52.8
Equipment and vehicles (including telemetry and monitoring systems)	15.1
Buildings	1.7
Land	4.5
	535.9
User specific delivery facilities	12.7
Total	548.6

3.1.4 Advantages and disadvantages of alternative asset valuation methods (Code, section 8.10(d))

Natural gas pipeline systems are capital intensive and asset values are a major determinant of *reference tariffs*. Valuing pipeline system assets at their depreciated actual costs is relatively simple, with use being made of costs recorded and depreciation calculated using well established and widely understood accounting conventions. Asset valuation, using depreciated actual costs, is relatively free from the subjective assessments which must be made in applying other asset valuation methods.

However, valuing assets at their (depreciated) actual costs ignores the current or market values of those assets. To the extent that asset values based on actual costs are significantly different from these current or market values (which may well be the case for the long lived assets that comprise pipeline systems), *reference tariffs* may not provide the correct signals for *new facilities investment*. Furthermore, when major new investment is required, users of the assets provided are likely to be faced with significant price increases.

The use of replacement costs as a basis for asset valuation avoids the difficulty of *reference tariffs* not providing the correct signals for *new facilities investment*. It also enables the effects of technological change, and of asset redundancy as a result of changes in gas demand, to be reflected in asset values and, in consequence, in *reference tariffs*. Furthermore, basing *reference tariffs* on the economic cost of providing gas transportation services reduces the likelihood of economically inefficient investment decisions in upstream and downstream industries.

If reference tariffs are based on asset values determined from replacement costs, large increases are likely to be avoided when tariffs are redetermined at the time of *Access Arrangement* review.

Users and gas consumers may, however, face large price increases in the transition from a regime in which gas transportation charges have been based on asset values determined from actual costs, to a regime in which *reference tariffs* are based on asset values determined from replacement costs.

Selecting the depreciated optimised replacement cost as the c*apital base* of the *AlintaGas GDS* results in *reference tariffs* which, if implemented, would substantially increase prices in the retail sector of the gas market in the mid-west and south west of Western Australia. *AlintaGas* is of the view that the increases in charges for gas distribution services, and the increases in retail prices, that would result, are likely to be inconsistent with the reasonable expectations of persons under the regulatory regime that applied to the *AlintaGas GDS* prior to the commencement of the *Code*.

3.1.5 Initial capital base

Consideration of the factors noted above has resulted in an *initial capital base* of the *AlintaGas GDS*, excluding the value of *user specific delivery facilities*, as approved by the Regulator in his final decision on 30 June 2000, of $535.9 million at 31 December 1999. This figure, which lies between depreciated actual cost and depreciated optimised replacement cost, is a valuation of the assets that form the *AlintaGas GDS* that results from the application of a deprival value approach to valuation.

The value of *user specific delivery facilities*, which value is to be recovered through the *user* specific charges of *Reference Tariff A* and *Reference Tariff B1*, is $12.7 million at 31 December 1999.

3.2 Assumptions on economic lives of assets for depreciation

The economic and average remaining lives of the assets forming the *AlintaGas GDS* are set out in Table 3.4. These asset lives were used in determining *depreciation*.

Table 3.4
Economic lives of assets
At 30 June 1999

Category of asset	Economic life (years)	Average remaining life (years)
Mains:		
High pressure	120	105
Medium pressure	60	50
Medium low pressure	60	40
Low pressure	60	32
Secondary gate stations	40	24
Regulators	40	27
Meters:		
Residential	25	10
Commercial and industrial	25	10
Equipment and vehicles (including telemetry and monitoring systems)	10	5
Buildings	40	23

3.3 Depreciation

The forecast total cost of providing all *services* by means of the *AlintaGas GDS*, determined, in accordance with the *cost of service* method, is the sum of a *return* on the *capital base*, *depreciation* of the *capital base*, and the *non-capital costs.*

Depreciation of the *capital base* is to be determined in accordance with the requirements of section 8.32 of the *Code*.

In accordance with the requirements of that section, *AlintaGas* has determined a depreciation schedule for each group of assets that form the *AlintaGas GDS*. The set of depreciation schedules, the *Depreciation Schedule*, establishes the methodology for calculation of *depreciation* to be used for the purpose of determining *reference tariffs.*

Depreciation for each group of assets that form the *AlintaGas GDS* has been calculated using the Current Cost Accounting (CCA) method.

Depreciation is set out in Table 3.5.

Table 3.5
Depreciation: Current Cost Accounting method
Year ending 31 December

Asset group	2000 $m	2001 $m	2002 $m	2003 $m	2004 $m
Mains:					
High pressure	1.5	1.5	1.6	1.7	1.7
Medium pressure	3.6	3.8	3.9	4.1	4.2
Medium low pressure	2.5	2.5	2.6	2.7	2.7
Low pressure	0.9	1.0	1.0	1.1	1.2
Secondary gate stations	0.1	0.1	0.1	0.1	0.1
Regulators	0.4	0.4	0.4	0.4	0.4
Meters and service pipes	5.1	5.5	6.0	6.5	6.9
Equipment and vehicles (including telemetry and monitoring systems)	3.2	3.8	4.1	4.4	4.8
Buildings	0.1	0.1	0.1	0.1	0.1
Total	17.3	18.7	19.8	21.0	22.1

The calculations required are complex and, for one asset class, high pressure mains, are shown in Table 3.6 and described in detail below.

Table 3.6
Depreciation: Current Cost Accounting method: high pressure mains
Year ending 31 December

	1999	2000	2001	2002	2003	2004
Expected inflation (%)	1.8	2.5	2.5	2.5	2.5	2.5
Initial asset value ($m)[(1)]	142.7					
Remaining life (years)	106					
Capital expenditure ($m)	5.2	3.1	3.4	2.8	2.6	2.0
Life of new assets (years)	120					
Initial assets:						
Opening value ($m)	145.2	148.9	152.6	156.4	160.3	164.3
Acc. depreciation ($m)	1.4	2.8	4.3	5.9	7.6	9.3
Capital expenditure:						
Opening ($m)	-	5.3	8.7	12.4	15.6	18.8
Closing ($m)	5.2	8.5	12.1	15.3	18.3	20.8
Acc. depreciation ($m)	0.0	0.1	0.2	0.3	0.4	0.6
Closing asset value ($m)	149.1	154.4	160.2	165.5	170.6	175.2
Depreciation:						
Initial assets ($m)	1.4	1.4	1.4	1.5	1.5	1.6
Capital expenditure ($m)	0.0	0.1	0.1	0.1	0.1	0.2
Total depreciation ($m)	1.4	1.5	1.5	1.6	1.7	1.7

(1) December 1998 value

In accordance with the CCA method, the opening value of initial assets in each year of the *Access Arrangement* is the previous year's value of initial assets adjusted for the change in nominal asset values during the year caused by inflation.

The initial assets in each asset group are depreciated on a straight line basis over their remaining lives. In each year, the accumulated straight line depreciation charge is determined from the previous year's accumulated depreciation charge adjusted for the change in nominal asset values during the year caused by inflation.

Forecast capital expenditure during the period of the *Access Arrangement* is progressively added in to the capital base and depreciated. Opening capital expenditure in each year is the closing capital expenditure in the previous year adjusted for the change in nominal asset values during the year caused by inflation. Closing capital expenditure in each year is the opening capital expenditure for that year, plus capital expenditure for the year adjusted for the change in nominal asset values over one half of the year caused by inflation.

Forecast capital expenditure in each asset group is depreciated on a straight line basis over the corresponding new asset life. In each year, the accumulated depreciation charge is determined from the previous year's accumulated depreciation, adjusted for the change in nominal asset values during the year caused by inflation, plus the depreciation charge for the asset group for the year. The depreciation charge for the asset group for the year is the average of the opening and closing capital expenditures divided by the new asset life for the group.

The closing asset value at the end of each year is the opening value of initial assets, less accumulated depreciation on the initial assets, plus closing capital expenditure, less accumulated depreciation on the capital expenditure.

The sum, across all asset groups, of the closing asset values for the year ended 31 December 1999 is $535.9 million. This sum is the portion of the *initial capital base* used in the determination of all components of all *reference tariffs*, other than the *user* specific charges for *Reference Tariff A* and *Reference Tariff B1*.

The *depreciation* calculations are summarised in Table 3.7

Table 3.7
Depreciation: Current Cost Accounting method: calculations summarised
Year ending 31 December

	1999 $m	2000 $m	2001 $m	2002 $m	2003 $m	2004 $m
Initial assets[(1)]	517.6					
Capital expenditure	24.5	25.5	20.5	17.7	17.7	15.3
Opening initial assets:						
Opening value	526.9	540.1	553.6	567.4	581.6	596.1
Acc. Depreciation	15.5	31.8	48.9	66.9	85.7	105.4
Capital expenditure:						
Opening	-	25.4	52.4	75.0	95.2	115.9
Closing	24.8	51.2	73.2	92.9	113.1	131.4
Acc. depreciation	0.4	1.8	4.2	7.4	11.5	16.4
Closing asset value	535.8	557.6	573.6	586.0	597.6	605.9
Depreciation:						
Initial assets	15.5	15.9	16.3	16.7	17.1	17.6
Capital expenditure	0.4	1.4	2.4	3.1	3.9	4.6
Total depreciation	15.9	17.3	18.7	19.8	21.0	22.1

(1) December 1998 value

3.4 Return on the capital base

Consistency in the determination of the forecast cost of providing all *services* by means of the *AlintaGas GDS* in accordance with the *cost of service* method requires use of a CCA method in determining the *return* on the *capital base* when *depreciation* is determined using the CCA method.

The *return* on the assets that form the *AlintaGas GDS* has been calculated, for each year of the *Access Arrangement*, by applying a pre-tax real rate of return (weighted average cost of capital; see subsection 3.7 below) to an average of opening and closing asset values for the year. The opening and closing asset values are expressed in (constant) 1 January 2000 dollar values. The return on the capital base is then obtained by adjusting the return on average asset value by the change in nominal asset values caused by inflation over the period from 1 January 2000 to the middle of the year for which the return is calculated.

The calculations are summarised in Table 3.8.

Table 3.8
Return on capital base: Current Cost Accounting method
Year ending 31 December

	2000 $m	2001 $m	2002 $m	2003 $m	2004 $m
Asset values (1 January 2000 dollars):					
Opening	535.6	543.7	545.4	543.4	540.3
Closing	543.7	545.4	543.4	540.3	534.2
Average	539.7	544.5	544.4	541.8	537.3
Return on average asset value	40.5	40.9	40.8	40.6	40.3
Return on capital base (nominal dollars)	41.0	42.4	43.4	44.3	45.0

3.5 Committed capital works and capital investment

Section 8.20 of the *Code* permits forecast capital expenditure on new facilities to be taken into account in determining *reference tariffs*, provided that expenditure is reasonably expected to pass the requirements in section 8.16 when the *new facilities investment* is forecast to occur.

AlintaGas's forecast capital expenditure on new facilities taken into account in determining *reference tariffs* is summarised in Table 3.9.

Table 3.9
Forecast capital expenditure
Year ending 31 December

Category of asset	2000 $m	2001 $m	2002 $m	2003 $m	2004 $m
Gate stations	0.6				
Mains:					
High pressure	3.1	3.4	2.9	2.6	2.0
Medium pressure	4.0	3.9	2.6	1.4	1.4
Medium low pressure	0.1				
Low pressure	2.2	2.5	2.5	2.7	2.8
Regulators	0.2	0.2	0.4	0.2	0.1
Meters and service pipes	8.2	7.8	7.8	7.6	7.5
Equipment and vehicles (including telemetry and monitoring systems)	6.9	2.6	1.4	3.1	1.4
Buildings	0.1	0.1	0.1	0.1	0.1
Total	25.5	20.5	17.7	17.7	15.3

3.6 Description of nature of and justification for planned capital investment

3.6.1 Nature of planned new facilities investment

The planned *new facilities investment* shown in Table 3.9 comprises:

- investment required to maintain the safety and integrity of the *AlintaGas GDS*, to maintain service levels, and to comply with regulatory requirements; and
- investment to extend the network to meet new *user* demand.

The main items of *new facilities investment* are shown in Table 3.10.

Table 3.10
Forecast capital expenditure: by type of investment
Year ending 31 December

Type of investment	2000 $m	2001 $m	2002 $m	2003 $m	2004 $m
High pressure mains	3.8	3.5	3.0	2.6	2.0
Medium/low pressure mains:					
Capacity reinforcement	0.3	0.1	0.2	0.2	0.1
Infill	0.5	0.2			
Relaying program	2.2	2.5	1.1		
Mains extensions	3.5	3.7	4.0	4.1	4.2
Meters and service pipes	8.2	7.8	7.8	7.6	7.5
Equipment and vehicles:					
Telemetry and monitoring systems	0.1	0.1	0.1	0.3	0.1
Information systems	3.8	1.4	0.5	1.6	0.6
Vehicles, plant and equipment	3.0	1.1	0.8	1.2	0.7
Buildings	0.1	0.1	0.1	0.1	0.1
Total	25.5	20.5	17.7	17.7	15.3

The main items of *new facilities investment* include the following.

- High pressure mains

  Investment in expansion of the *capacity* of the *High Pressure System* to accommodate the forecast growth in volumes of gas to be delivered to *users* during the *Access Arrangement period*.

- Medium/low pressure mains

  Investment in this category has two principal components:

- investment in expansion of the *capacity* of the *Medium Pressure/Low Pressure System*, including further investment in a program of mains infill, to accommodate the forecast growth in volumes of gas to be delivered to *users* and to maintain system integrity during the *Access Arrangement period*; and
- continuation of a program for replacement of cast iron pipes in the *AlintaGas GDS*.

The replacement of all major cast iron pipes is expected to be completed in 2002.

- Telemetry and monitoring systems

  Investment in this category is in new and replacement computing and communications equipment specifically for the monitoring and control of the *AlintaGas GDS*.

- Equipment and vehicles

  The principal components of investment in this category are:

  - expenditure on information systems including a Customer Information System (CIS Open Vision) for the management of all meter information and meter readings, and a version upgrade of existing SAP business software, and expenditure on the replacement and upgrading of computing infrastructure; and
  - replacement of motor vehicles and other items of plant and equipment.

- Buildings

  Investment in the replacement and upgrading of buildings and accommodation.

- Mains extensions and meters and service pipes to meet new demand

  Investment in this category is in mains, meters and service pipes specifically to provide new *delivery points* on the *AlintaGas GDS* for the delivery of gas to new and existing *users*.

3.6.2 Justification of new facilities investment

The planned *new facilities investment* described in subsection 3.6.1 has been taken into account in the determination of the *reference tariffs* for the following reasons:

- the capital expenditures are forecast to occur within the period of the *Access Arrangement*, and the forecasts represent best estimates of expenditure arrived at on a reasonable basis;

- the amounts included are only the amounts that would be invested by a prudent service provider, acting efficiently, in accordance with good industry practise and to achieve the lowest sustainable cost of delivering services; and
- the investment is reasonably expected to pass the requirements of section 8.16 of the *Code* when the capital expenditures are forecast to occur.

Gutteridge Haskins and Davey Pty Ltd (GHD) were appointed to undertake an independent review of *AlintaGas's* forecast capital expenditure with a view to establishing that the *new facilities investment* met the requirements of the *Code*. Their review found that the planned investment in the *AlintaGas GDS* described in the preceding subsection of this *Access Arrangement Information* met the requirements of section 8.16.

The forecasts made by AlintaGas, and reviewed by GHD, were subsequently reduced to conform with the Amendment 28 of the *Regulator's Final Decision: Access Arrangement Mid-West and South-West Gas Distribution Systems Submitted by AlintaGas*, issued on 30 June 2000. The conforming forecasts are shown in Tables 3.9 and 3.10.

3.7 Rates of return - on equity and on debt

The forecast cost of providing all *services* by means of the *AlintaGas GDS* is determined, in accordance with the *cost of service* method, as the sum of a *return* on the *capital base*, *depreciation*, and the *non-capital costs.*

As described in subsection 3.4 of this *Access Arrangement Information*, the *return* on the *capital base* in each year of the *Access Arrangement* is the product of the *rate of return* and an average asset value for that year. *AlintaGas* has used, as the *rate of return* to be applied to the average asset value, a weighted average of the returns applicable to the equity and debt used to finance the assets which form the *AlintaGas GDS*.

The returns applicable to the equity and debt used to finance the assets which form the *AlintaGas GDS* are weighted in accordance with the following formula:

$$\text{WACC} = \frac{\text{E}}{\text{V}} \times \text{K}_\text{e} + \frac{\text{D}}{\text{V}} \times \text{K}_\text{d}\,.$$

WACC is the weighted average cost of capital. E and D are, respectively, the market values of the equity and debt used to finance the assets which form the *AlintaGas GDS*, and V is the sum of E and D. K_e is the return applicable to equity, and K_d is the return applicable to debt.

K_e can be estimated from capital market data using the Capital Asset Pricing Model:

$$K_e = R_f + b_e \times MRP.$$

$$K_d = R_f + DM.$$

R_f is a risk free rate of return, b_e is the equity beta, b_d is the debt beta, MRP is the equity market risk premium, and DM is the debt margin.

The data used to estimate K_e are post-tax nominal values, and therefore K_e is a post-tax value. Pre-tax nominal values are used to estimate K_d, and the resulting pre-tax nominal K_d is converted into a post-tax nominal value for the purpose of calculating a post-tax nominal WACC:

$$\text{Post - tax nominal } K_d = \frac{\text{Pre} - \text{tax nominal } K_d}{1 - T(1 - g)}.$$

g is the value attributed by investors to each dollar of franking credit, and T is the statutory corporate tax rate.

The post-tax nominal WACC is then:

$$\text{Post} - \text{tax nominal WACC} = K_e \times \frac{E}{V} + \text{Post} - \text{tax nominal } K_d \times \frac{D}{V}$$

This post-tax nominal WACC must be converted into a pre-tax real WACC for application to a CCA average asset value for the purpose of determining *reference tariffs*. The conversion is carried out in two steps:

- the post-tax nominal WACC is first converted into a pre-tax nominal WACC by dividing it by the imputation adjusted corporate tax rate:

  $$\text{Pre - tax nominal WACC} = \frac{\text{Post - tax nominal WACC}}{1 - T(1 - g)}; \text{ and}$$

- the pre-tax nominal WACC is then converted into a pre-tax real WACC using the following equation:

  $$\text{Pre - tax real WACC} = \left[\frac{1 + \text{Pre - tax nominal WACC}}{1 + p_e}\right] - 1$$

  where p_e is the expected rate of inflation.

The determination of the WACC to be used as the *rate of return* for calculation of the *return* on the *capital base* is summarised in Table 3.11.

Table 3.11
Estimation of the rate of return

Return parameter		Value used to determine Rate of Return
Risk free rate of return	R_f	6.27%
Market risk premium	MRP	6.00%
Equity beta	b_e	1.08
Debt margin	DM	1.20
Corporate tax rate	T	31.4%
Franking credit value	g	0.50
Debt to total assets ratio	D/V	60.0%
Equity to total assets ratio	E/V	40.0%
Pre-tax cost of debt	R_f + DM	7.5%
Post-tax cost of debt	$K_d(1 - T(1 - g))$	6.3%
Post-tax cost of equity	$R_f + b_e$ x MRP	12.7%
Expected inflation	p_e	2.78%
Post-tax nominal WACC		8.9%
Pre-tax nominal WACC		10.5%
Pre-tax real WACC		7.5%

3.8 Capital structure - debt/equity split assumed

Section 8.31 of the *Code* provides guidance on how the returns applicable to the equity and debt used to finance the assets which form the *AlintaGas GDS* are to be weighted in determining the *rate of return*:

> *In general, the weighted average of the return on funds should be calculated by reference to a financing structure that reflects standard industry structures for a going concern and best practice.*

A de facto standard for the financing structure of going concerns in the electricity and gas industries is emerging in Australia. That standard is a financing structure comprising 60% debt and 40% equity. Accordingly, a financing structure comprising 60% debt and 40 % equity was adopted for determination of the WACC used as the *rate of return* for calculation of the *return* on the *capital base*.

3.9 Equity returns assumed – variables used in derivation

As noted in subsection 3.7, the rate of return on equity used in determining the WACC for the *AlintaGas GDS* was calculated using the Capital Asset Pricing Model.

$$K_e = R_f + b_e \times MRP,$$

where R_f is a risk free rate of return, b_e is the equity beta, and MRP is the equity market risk premium.

The yield to maturity on Commonwealth Government 10 year Treasury Bonds was used to estimate the risk free rate of return. That rate could be estimated using the yield on 10 year Treasury Bonds at the time of WACC determination, or it could be estimated using an average of past bond yields. An average of past bond yields - over 20 trading days from 18 May to 15 June 2000 - was used.

The risk free rate of return used in calculating a return on equity for the purpose of determining the WACC was 6.27%.

Equity betas must be estimated from market data and, in consequence, are available only for companies listed on a stock exchange. For unlisted entities, like the business unit within *AlintaGas* responsible for provision of *reference services* using the *AlintaGas GDS*, equity betas must be estimated from the betas of listed companies engaged in comparable business activities. Beta estimation therefore involves a degree of subjectivity.

A beta of 1.08 was used in the calculation of the WACC.

An equity market risk premium of 6.0% was used in applying the Capital Asset Pricing Model in calculating the return on equity for the purpose of determining the WACC for the *AlintaGas GDS*.

3.10 Debt costs assumed – variables used in derivation

The rate of return on debt used in determining the WACC has been calculated as the sum of the risk free rate and an estimate of the margin applying to corporate debt. A debt margin of 1.20 percentage points has been assumed. Using the assumed values for the risk free rate and the debt margin yields the return on debt of 7.5% used in the calculation of the WACC.

3.11 Return on working capital

An allowance for a *return* on the working capital employed in providing *reference services* has been included in the forecast total cost from which the *reference tariffs* have been determined. This allowance has been determined by applying the pre-tax

nominal WACC to an estimated working capital requirement of $10.0 million in each year of the *Access Arrangement*.

4. Information regarding operations and maintenance

4.1 Non-capital costs

In providing the *reference services* in each year of the *Access Arrangement*, *AlintaGas* expects to incur the *non-capital costs* shown in Table 4.1.

Table 4.1
Non-capital costs incurred in providing the reference services
Year ending 31 December

	2000 $m	2001 $m	2002 $m	2003 $m	2004 $m
Wages and salaries	12.1	12.4	12.8	13.2	13.5
Materials and supply	14.4	14.0	14.4	14.4	15.1
Outsourced services	1.5	1.5	1.5	1.6	1.6
Property taxes	0.2	0.2	0.2	0.2	0.2
Marketing	1.3	1.4	1.4	1.4	1.5
Corporate overheads	4.2	3.4	2.9	2.9	2.9
Unaccounted for gas	3.0	3.0	2.9	3.0	2.9
Total	36.7	35.8	36.2	36.7	37.7

Section 8.37 of the *Code* requires that the *non-capital costs* used in *reference tariff* determination be only those costs that would be incurred by a prudent *service provider*, acting efficiently, in accordance with accepted good industry practice, and to achieve the lowest sustainable costs of delivering the *reference services*. *AlintaGas* has, therefore, obtained an independent review of its *non-capital costs* to ensure that they satisfy the requirements of section 8.37. The review was undertaken by the PA Consulting Group.

The costs of providing *listed ancillary services* and other *services* are not included in the forecast *non-capital costs* shown Table 4.1. These costs of providing *listed ancillary services* and other s*ervices* are shown in Table 4.2.

Table 4.2
Non-capital costs incurred in providing listed ancillary and other services
Year ending 31 December

	2000 $m	2001 $m	2002 $m	2003 $m	2004 $m
Listed ancillary services	0.6	0.6	0.6	0.7	0.7
Other services	0.8	0.8	0.8	0.8	0.8
Total	1.4	1.4	1.4	1.5	1.5

4.2 Gas used in operations

The *AlintaGas GDS* has no compression and, in consequence, no gas is used in operations. A small amount of gas used during commissioning and maintenance is classed as operational losses and is included in unaccounted for gas.

4.3 Unaccounted for gas

Unaccounted for gas is defined as the difference between the measurement of the quantity of gas delivered into the *AlintaGas GDS* in a given period, and the measurement of the quantity of gas delivered from the *AlintaGas GDS* during that period. This difference is the total effect of:

- errors in gas measurement;
- operational losses resulting from leakage and third party damage to pipe work, and from the use of gas to "blow down", purge and pressurise during the commissioning of new facilities, and after maintenance;
- system line pack variations; and
- errors in the estimation of volumes of gas delivered from the *AlintaGas GDS*.

Measurement errors associated with the more than 416,000 meters at *delivery points*, and operational losses, are the main contributors to unaccounted for gas.

System line pack variations - variations in the total quantity of gas in the *AlintaGas GDS* - are the result of pressure variations. These pressure variations are small because the various parts of the network have been designed to operate at pressures that are essentially fixed. System line pack variations are relatively small and make a negligible contribution to unaccounted for gas.

To determine the quantity of unaccounted for gas, the volume of gas delivered from the *AlintaGas GDS* in a given period must be estimated. An estimate is required because meters at *delivery points* are not all read simultaneously at the end of the period. Estimation introduces a small error into the volume of gas delivered from the network.

The quantity of unaccounted for gas is likely to fluctuate over short periods of time, principally because of the random nature of gas measurement errors. Over an extended period, a small systematic loss should be observed.

The systematic loss of the volume of gas delivered from the network is projected to be in accordance with Table 4.3 below.

Table 4.3
Unaccounted for Gas as Percentage of Volume of Gas Delivered
Year ending 31 December

	2000 %	2001 %	2002 %	2003 %	2004 %
Total	2.7	2.7	2.6	2.6	2.5

Users are not required to make any allowance for unaccounted for gas. All of the gas lost as unaccounted for gas is replaced by *AlintaGas*. *AlintaGas* purchases, and transports via the Dampier to Bunbury Natural Gas Pipeline, gas for this purpose. Forecasts of the costs of the gas purchased and transported are included in the *non-capital costs* for recovery through the *reference tariffs.*

Approximately six months after the end of each year of the *Access Arrangement*, after all meters have been read, and after all meter readings have been verified and, if necessary, corrected, *AlintaGas* will determine the volume of unaccounted for gas for the year. If the volume of unaccounted for gas so determined for a year exceeds the volume obtained by multiplying the pecentage for the year from Table 4.3 by the volume of gas delivered during the year, each *user* will be reimbursed for value of the additional gas it has had to supply during the year. All reimbursements will be made at the average price at which *AlintaGas* purchases and transports gas for the purpose of replacing gas that is lost as unaccounted for gas.

If the quantity of unaccounted for gas in any year of the *Access Arrangement* is less than the corresponding percentage in Table 4.3, no reconciliation or compensation will be required. *Users* will have had the benefit of gas they did not purchase.

Any reimbursement for unaccounted for gas is a penalty for poor performance by *AlintaGas*. The prospect of penalty is an incentive for *AlintaGas* to reduce the rate at which gas is systematically lost as unaccounted for gas. Any sustained reduction in the rate will ultimately benefit *users* through its lowering of the forecast cost of unaccounted for gas used in the determination of *reference tariffs* at the next review of the *Access Arrangement*.

4.4 Fixed versus variable costs

The *non-capital costs* are fixed costs; they do not vary materially with the throughput of the *AlintaGas GDS*.

4.5 Cost allocation between services and categories of asset, and between regulated and unregulated business segments

The allocation of costs between categories of asset and services has been described in subsection 2.5.

5. Information regarding overheads and marketing costs

5.1 Total costs at corporate level

Corporate overheads are allocated to each of the business units within *AlintaGas*, including the business unit responsible for provision of the *reference services* using the *AlintaGas GDS*. These overheads include the costs of the board and the chief executive's office, and business services costs. The latter are the costs of centrally provided services including accounting, human resources policy, information technology, legal counsel, risk management and treasury.

Corporate overheads are allocated to each business unit using an established allocation procedure. Forecast total costs at corporate level, and the percentages allocated to provision of the *reference services* using the *AlintaGas GDS*, are shown in Table 5.1.

Table 5.1
Total costs at corporate level and overhead allocation
Year ending 31 December

	2000	2001	2002	2003	2004
Total costs at corporate level	$7.5m	$5.9m	$5.1m	$5.2m	$5.3m
Overhead allocation rate	56.1%	57.3%	57.3%	56.4%	55.7%
Allocation to *reference services*	$4.2m	$3.4m	$2.9m	$2.9m	$2.9m

5.2 Allocation of costs between regulated and unregulated business segments

The business unit within *AlintaGas* responsible for provision of the *reference services* using the *AlintaGas GDS* is also involved in a number of business activities not the subject of regulation under the *Access Arrangement*. The costs expected to be incurred in carrying out these unregulated activities have been excluded from the forecast of *non-capital costs* incurred in providing the *reference services*.

5.3 Allocation of costs between services and categories of asset

The allocation of overhead and marketing costs between services and categories of assets is part of the overall allocation of costs described in subsection 2.5.

6. Information regarding system capability and volume assumptions

6.1 Description of system capabilities

The *AlintaGas GDS* is not a contiguous system of gas distribution pipes and associated facilities, but comprises of a number of discrete segments or subnetworks. At the time of submission of this *Access Arrangement Information* to the *Regulator*, the *AlintaGas GDS* comprised approximately 10,500 kilometres of gas distribution pipelines and associated facilities located in the following areas of Western Australia:

Geraldton;
Eneabba;
Muchea;
the Perth metropolitan area (including Ellenbrook, Rockingham and Mandurah);
Pinjarra;
Harvey;
Kemerton;
Bunbury;
Capel; and
Busselton.

Each of these subnetworks has been constructed using similar methods and materials, and each operates under the same pressure regime. Each is supplied with gas from one or more *receipt points* immediately downstream of meter stations on the Dampier to Bunbury Natural Gas Pipeline. These meter stations and *receipt points* are at the following locations:

Nangetty Road (Geraldton);
Eneabba;
Muchea;
Della Road (Bullsbrook);
Ellenbrook;
Harrow Street, West Swan;
Caversham;
Welshpool;
Forrestdale;
Russell Road, Wattleup;
Rockingham;
Oakley Road (Pinjarra);
Harvey;
Kemerton; and
Clifton Road (Bunbury).

Gas delivered into the *AlintaGas GDS* is delivered into the *High Pressure System*. The *High Pressure System* comprises all pipelines in the *AlintaGas GDS* operating at a nominal pressure greater than or equal to 300 kPa. These pipelines are listed in Table 6.1 and shown in the maps of subsection 6.2 of this *Access Arrangement Information*.

Table 6.1
AlintaGas GDS operating pressures

Network segment	Maximum Allowable Operating Pressure (kPa)	Nominal Operating Pressure (kPa)	Minimum Operating Pressure (kPa)
Geraldton lateral	6,900	3,300	2,400
Narngulu high pressure	1,900	1,000	700
Geraldton town high pressure	1,900	800	700
Geraldton town medium pressure	70	40	15
Eneabba lateral	1,900	1,500	700
Muchea lateral	1,900	1,200	700
Perth metropolitan:			
Della Road lateral	6,900	3,000	2,200
Harrow Street lateral	6,900	3,000	2,500
East Perth lateral	5,300	4,000	2,400
Barter Road high pressure	1,900	1,800	700
Class 150 high pressure	1,900	1,800	700
Rockingham h.p. (including Mandurah)	1,900	1,800	700
Fremantle high pressure	600	600	350
Perth city block	200	200	160
Neerabup polyethylene	200	200	60
Ellenbrook polyethylene	200	200	60
Medium pressure	70	40	15
Medium low pressure	7	4	2
Low pressure	3	1.5	1.25
Pinjarra high pressure	700	600	350
Pinjarra medium pressure	70	40	15
Harvey high pressure	1,900	1,800	700
Harvey medium pressure	70	40	15
Kemerton high pressure	1,900	1,000	900
Bunbury high pressure steel	3,300	1,800	700
Bunbury medium pressure	70	40	15
Capel to Busselton polyethylene	500	450	350
Busselton polyethylene	200	200	60

A number of secondary gate stations, at which pressure is reduced and gas flow is metered, are an integral part of the *High Pressure System*. These secondary gate stations are located:

- in the Geraldton area, at Narngulu and Bootenal, and in the town of Geraldton;
- in the Perth metropolitan area, at Wanneroo (Neaves Road), South Caversham, Viveash, Ballajura, Bayswater and East Perth; and
- in the Bunbury-Busselton area, at Capel.

Gas flows from the *High Pressure System* into the *Medium Pressure/Low Pressure System* through approximately 140 high pressure regulator sets. These regulator sets reduce pressure to nominal pressures less than 300 kPa. The *Medium Pressure/Low Pressure System* comprises these high pressure regulator sets together with those pipelines that operate at nominal pressures less than 300 kPa.

The nominal operating pressures of the pipelines that comprise the *Medium Pressure/Low Pressure System* are listed in Table 6.1, and the extent of that system is shown in the maps of subsection 6.2. The nominal operating pressure of a network segment is the pressure (measured at the start of the segment) at which the segment is normally operated. The nominal operating pressure may be less than the segment's maximum allowable operating pressure for a number of reasons including the provision of operating margins for control equipment and load management.

The maximum allowable operating pressure for a network segment shown in Table 6.1 is the maximum pressure at which that network segment may be operated.

Pipelines comprising the *Medium Pressure/Low Pressure System* are constructed predominantly from polyvinyl chloride pipe, although some sections of main have been constructed using polyethylene, steel, galvanised iron or cast iron pipe.

Approximately 330 medium pressure regulator sets reduce pressure within the *Medium Pressure/Low Pressure System* from medium to medium low and low pressures.

Gas is delivered from the mains of both the *High Pressure System* and the *Medium Pressure/Low Pressure System* through service pipes, valves, regulators, and meters, all of which are usually located immediately upstream of *receipt points*. These facilities are integral parts of the *High Pressure* and *Medium Pressure/Low Pressure Systems*, as are the meters and data logging facilities at secondary gate stations, regulator sets and *receipt point* metering. These data logging facilities record gas flows, temperatures and pressures for the monitoring of system operation and performance, and for the billing of users.

The *capacity* of the *AlintaGas GDS* - its potential, as currently configured, to deliver a particular *service* between a *receipt point* and a *delivery point* at a point in time - is determined by the minimum pressures at which the various segments of the network

operate. These minimum operating pressures are shown in Table 6.1. They are the minimum pressures which must be sustained in the various segments of the network so as to meet *user* delivery requirements under peak load conditions.

If the delivery requirements of a *prospective user* were expected to cause the pressure in a network segment to fall below the minimum operating pressure of that segment, system enhancement would be required before a *service* could be provided to that *prospective user*.

6.2 Maps of the pipeline system

Maps of the *AlintaGas GDS*, showing the pipelines comprising the *High Pressure System* at the time of submission of this *Access Arrangement Information* to the *Regulator*, and showing the extent of the *Medium Pressure/Low Pressure System* at that time, are included in this subsection of this *Access Arrangement Information*.

These maps are:

- Natural Gas Reticulation Area, Country Region, Geraldton, dated June 2000;
- Natural Gas Reticulation Area, Country Region, Eneabba, dated June 2000;
- Natural Gas Reticulation Area, Perth Region, North Sheet, dated June 2000;
- Natural Gas Reticulation Area, Perth Region, South Sheet, dated June 2000;
- Natural Gas Reticulation Area, Country Region, Harvey, dated June 2000;
- Natural Gas Reticulation Area, Country Region, Bunbury, dated June 2000; and
- Natural Gas Reticulation Area, Country Region, Busselton, dated June 2000.

6.3 Average daily and peak demands

Table 6.2 shows the current average and peak daily demands for the *AlintaGas GDS*, and current maximum hourly demand.

Table 6.2
System average and maximum quantities
1998

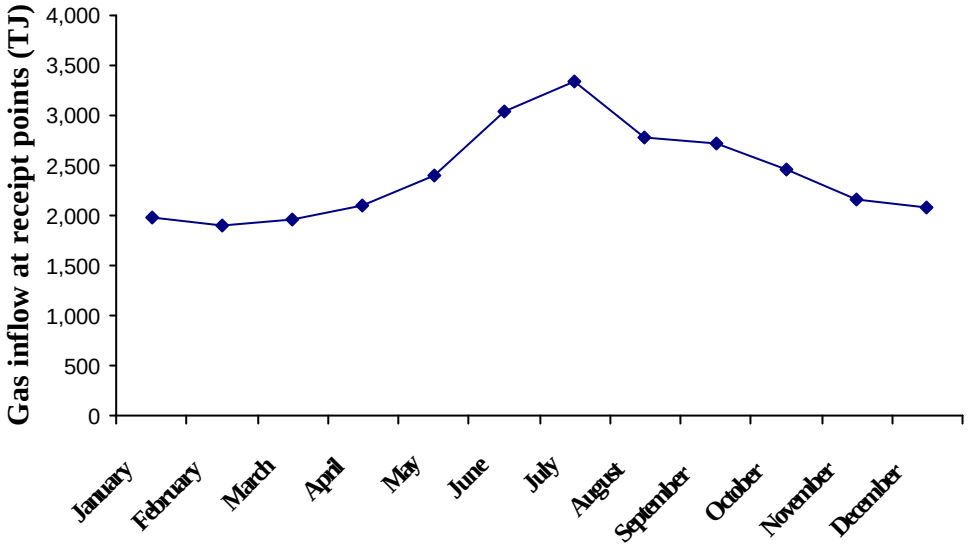
	TJ
Average daily quantity	79.2
Maximum daily quantity	124.3
Maximum hourly quantity	7.8

The load profile of the *AlintaGas GDS* is shown in Table 6.3 and Figure 6.1.

Table 6.3
System load profile by month
1998

Month	**Total gas inflow at receipt points (TJ)**
January	1,980.2
February	1,903.7
March	1,954.4
April	2,102.8
May	2,408.9
June	3,040.9
July	3,338.9
August	2,783.9
September	2,710.1
October	2,454.9
November	2,151.4
December	2,086.1
Total	28,916.1

Figure 6.1
System load profile by month
1998



6.4 Annual volume across each service and category of asset

Forecast volumes by service are shown in Table 6.4, and forecast volumes by category of asset are shown in Table 6.5. The forecasts are based on projections made by AlintaGas and independently reviewed by Economics Consulting Services.

Table 6.4
Forecast volumes by service
Year ending 31 December

Service	2000 TJ	2001 TJ	2002 TJ	2003 TJ	2004 TJ
Reference Service A	15,383.8	15,119.8	15,112.6	15,381.8	15,532.0
Reference Service B1	3,686.0	3,637.1	3,649.4	3,728.8	3,780.0
Reference Service B2	891.3	892.6	906.2	933.8	955.6
Reference Service B3	7,863.8	8,134.3	8,408.8	8,678.4	8,940.2
Total - by service	27,824.9	27,783.8	28,077.0	28,722.8	29,207.8

Table 6.5
Forecast volumes by category of asset
Year ending 31 December

Category of asset	2000 TJ	2001 TJ	2002 TJ	2003 TJ	2004 TJ
High pressure:					
Reference Service A	14,894.6	14,639.0	14,632.0	14,892.7	15,038.0
Reference Service B1	653.0	641.8	641.5	652.9	659.3
Medium Pressure/Low Pressure:					
Reference Service A	489.2	480.8	480.6	489.1	493.9
Reference Service B1	3,033.0	2,995.3	3,007.9	3,075.9	3,120.7
Reference Service B2	891.3	892.6	906.2	933.8	955.6
Reference Service B3	7,863.8	8,134.3	8,408.8	8,678.4	8,940.3
Total - by category of asset	27,824.9	27,783.8	28,077.0	28,722.8	29,207.8

6.5 Total number of customers in each pricing zone, service or category of asset

The estimated numbers of *delivery points* at which gas is delivered to *users* are shown in Table 6.6.

Table 6.6
Estimated numbers of Delivery Points
2000

Service	Estimated number of Delivery Points
Reference Service A	54
Reference Service B1	367
Reference Service B2	3,739
Reference Service B3	412,139
Total - by service	416,299

Category of asset	
High pressure:	
Reference Service A	46
Reference Service B1	52
Medium Pressure/Low Pressure:	
Reference Service A	8
Reference Service B1	315
Reference Service B2	3739
Reference Service B3	412,139

Total – by category of asset	416,299

7. Information regarding key performance indicators

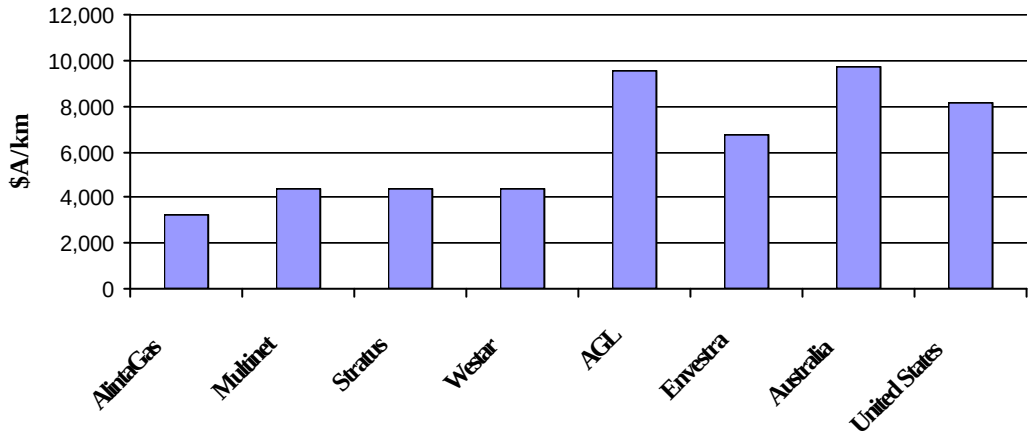
A number of key performance indicators have been used as benchmarks against which the forecast of capital expenditure, and the *non-capital costs*, used in determining the *reference tariffs* have been assessed for reasonableness. They are presented in the following subsections of this section.

These key performance indicators were compiled by the PA Consulting Group as part its review of *non-capital costs.*

7.1 Operating and maintenance cost per kilometre of main

AlintaGas's operating and maintenance cost per kilometre of main compares favourably against that of other gas distribution businesses, both in Australia and in the United States. The comparison is presented graphically in Figure 7.1. Operating and maintenance cost per kilometre of main is probably the most important of the available measures for assessing the reasonableness of non-capital costs because network size is a fundamental cost driver.

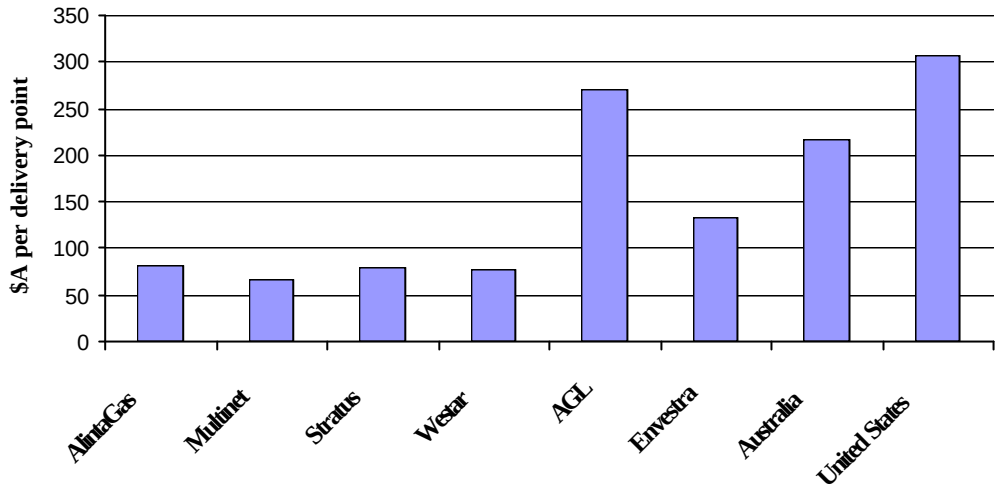
Figure 7.1
Operating and maintenance cost per kilometre of main



7.2 Operating and maintenance cost per delivery point

Operating and maintenance cost per delivery point ranks fourth in the Australian comparisons and well below the national average. This is shown in Figure 7.2.

Figure 7.2
Operating and maintenance cost per delivery point

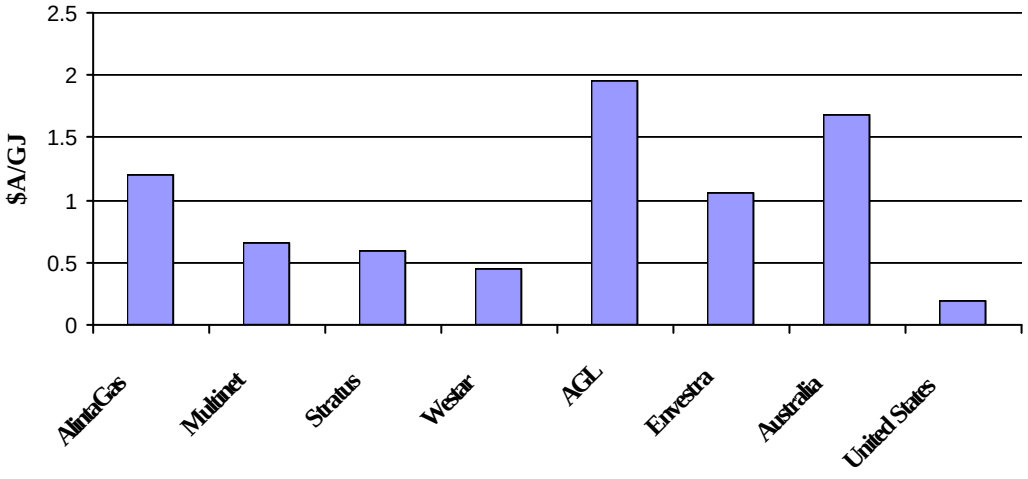


Only the Victorian gas distributors are superior in terms of operating and maintenance cost per delivery point. This is because Melbourne has a higher density of delivery points (the number of delivery points per kilometre of main is higher in Victoria than elsewhere in Australia), and a higher incidence of winter heating, than Perth. Western Australia's mild winters, hot summers and low delivery point density constrain the demand for reticulated natural gas and limit *AlintaGas's* performance on this measure.

7.3 Operating and maintenance costs per GJ delivered

AlintaGas's operating and maintenance cost per GJ delivered is below the national average, and superior for a mild-weather state. This is shown in Figure 7.3.

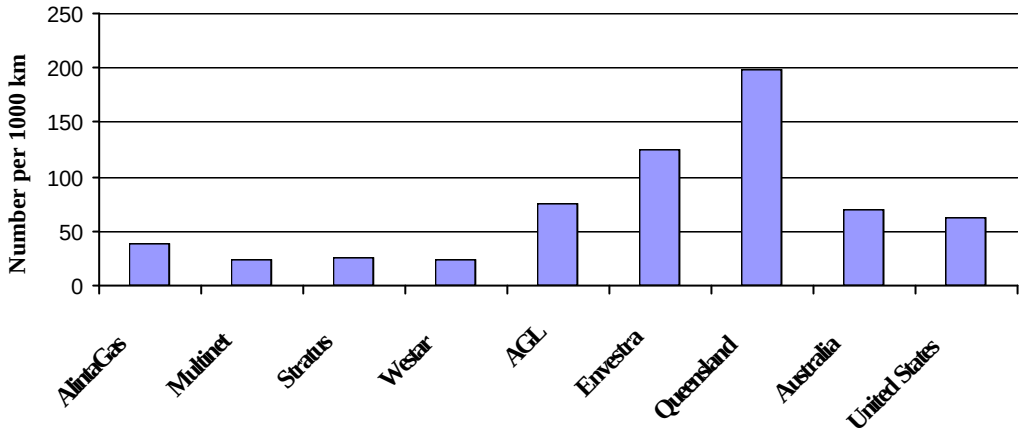
Figure 7.3
Operating and maintenance cost per GJ delivered



7.4 Number of employees per 1000 kilometres of mains

The ratio of employees to assets provides a broad measure of the reasonableness of employee numbers which are, in turn, an important cost driver. *AlintaGas* compares well on this measure, as is shown in Figure 7.4.

Figure 7.4
Number of employees per 1000 kilometres of mains

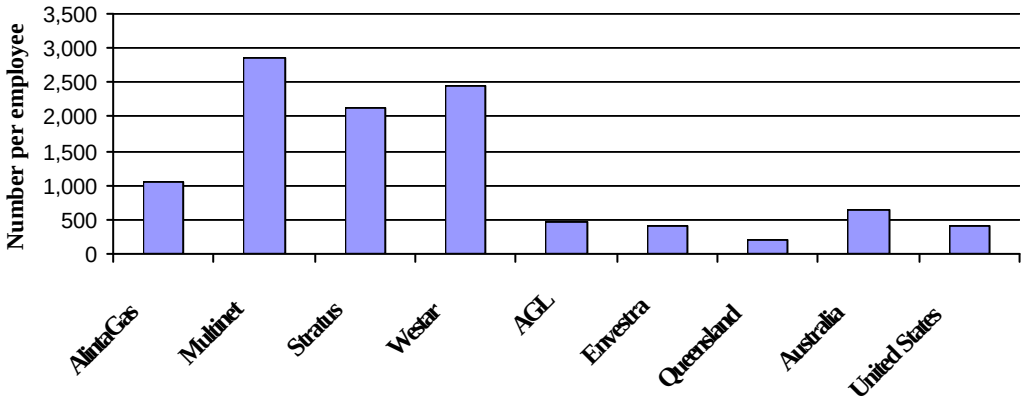


Only the Victorian gas distributors, which have outsourced their maintenance operations (and a number of other functions) have lower numbers of employees per 1000 kilometres of mains. Prior to their outsourcing of maintenance, the Victorian distributors had over 60 employees per 1000 kilometres of mains.

7.5 Number of delivery points per employee

As is shown in Figure 7.5, *AlintaGas* compares favourably against other gas distributors on the basis of number of *delivery points* per employee.

Figure 7.5
Number of delivery points per employee



The number of *delivery points* per employee is influenced by the extent of outsourcing, and by environmental factors driving the use of gas. Both of these factors contribute to the superior performance of the Victorian gas distributors. *AlintaGas* nevertheless compares favourably against other Australian gas distributors, and against gas distributors in the United States.