Jemena Gas Networks (NSW) - Access Arrangement Information - Appendix 15.3

Standalone and avoidable costs

26 August 2009

Table of Contents

1 Executive summary

1.1 Background

Under the National Gas Rules (**NGR**), tariffs for distribution pipelines need to satisfy Rule 94(3) which requires expected revenue for each tariff class lie between economically efficient bounds, specifically:

- For each tariff class, the revenue expected to be recovered should lie on or between:
  - an upper bound representing the stand alone cost of providing the reference service to customers who belong to that class
  - a lower bound representing the avoidable cost of not providing the reference service to those customers.

The purpose of applying standalone and avoidable cost bounds on expected tariff revenues is to ensure that for each tariff class the distribution business is not pricing outside the bounds defined by economic efficiency.

These bounds, standalone and avoidable costs, are the highest and lowest theoretical prices that a distributor could charge a customer[1] class without imposing costs on other classes. That is, pricing outside these efficient bounds implies cross subsidisation between customer classes if the business is recovering its costs.

For the local network haulage service there are two broad categories of customers: demand and volume. Volume customers are those that consume less than 10 TJ per annum and are divided into country and coastal tariff classes. Demand customers consume more than 10 TJ per annum and there are three types of tariff classes: capacity; capacity first response; and throughput. For the application of standalone and avoidable cost, only the capacity tariff class is considered. This is because the first response tariff class has the same underlying costs as the capacity tariff class; the difference in prices simply reflects the benefit Jemena Gas Networks (NSW) Ltd (**JGN**) receives from an interruptible supply. Since the throughput tariff class does not depend on a customer's region, as do the other services, its standalone and avoidable costs is represented by the range calculated for the capacity service however the expected revenues are added to the relevant region.

[1] This report uses the term 'customer' to refer to 'end users'. This is because NGR rule 94 refers to customers which corresponds to end users as defined in JGN's access arrangement.

1.2 Standalone costs

Standalone cost represents the cost that would be required to replicate or bypass the network. It follows that if customers were charged above standalone costs it would be beneficial for that group of customers to bypass the network or be provided by a new entrant. Therefore, these costs are comprised of the assets and operating costs that would be required to provide services to that tariff class on a dedicated basis (i.e. without sharing costs with other tariff classes).

To estimate the standalone costs for each relevant tariff class JGN has relied on two optimised replacement cost (**ORC**) studies and its own operating costs.
The first ORC study was carried out by Jemena Asset Management (**JAM**) engineers for each non-country demand tariff zone prior to the last access arrangements (**AA**) review. This represents the cost to replace the segment of the network considered without the benefit of scale that is achieved through a combined network.

The second study is the ORC value considered for the entire network by Independent Pricing and Regulatory Tribunal of New South Wales (**IPART**) in 2000 which was considered when setting the initial capital base (**ICB**). JGN has allocated this total network estimate between the volume market tariff classes using a factored index[2] to account for the benefits of scale.

To achieve an annual cost estimate that can be compared to expected revenues the following steps were undertaken:

- calculate the depreciation charge using the standard life for each asset class from the ORC estimated value
- multiply the remaining asset value by the weighted average cost of capital (**WACC**) for a return on capital charge
- summarise the above two components with the estimated operating costs required to provide services to the relevant tariff class.

The meter data service (largely meter reading) is provided by an external contractor. This means that JGN does not have sufficient information to estimate a standalone cost for this service. Therefore, the average ratio of the standalone to avoidable cost estimates determined for haulage services was applied to the avoidable costs to develop a proxy standalone cost of meter data services.

Table 1-1 presents the results for each tariff class. It can be observed that the estimate of standalone costs far exceeds the expected revenue for each tariff class.

[2] A factored index is used in engineering cost estimation models to use historical or known costs and account for scale to obtain an estimate for a similar project with a different size.

Table 1-1: Standalone costs compared to expected revenue ($2009-10, '000)

Tariff Class	Standalone Estimate	Expected Revenue
Haulage: Demand Market Segment		
Sydney 1	39,209	3,839
Sydney 2	44,742	7,009
Sydney 3	47,790	10,453
Sydney 4	44,772	7,047
Sydney 5	36,929	1,943
Newcastle 1	46,610	3,108
Newcastle 2	51,832	2,560
Newcastle 3	33,013	628
c-i-c	c-i-c	c-i-c
Wollongong 2	23,852	767
Country	24,433	3,407
Haulage: Volume Market Segment		
Coast	694,180	376,508
Country	100,978	42,300
Meter Data Service		
Volume	16,001	5,217
Demand	319,948	1,022

1.3 Avoidable costs

Avoidable cost represents the cost that would be avoided if the network business no longer provided services to that group of customers. If the business charges less than avoidable cost to that group of customers it follows that it would be beneficial for it to not provide services to those customers since the costs would be greater than the expected revenues.

Since customer numbers are a significant driver of operating costs an incremental cost per customer was estimated in order to calculate an avoidable cost for each tariff class. This was estimated by dividing an estimate of operating costs that are driven by customer numbers and dividing by the number of customers. Although total operating costs are driven by customers a large proportion is generally fixed from year to year, such as property and management costs, whereas 'direct' operating costs, such as maintenance activities, will increase as customer numbers increase the size of the networks. That is, as each customer is added to the network another meter and service (the connection between the main and the

premise) requires maintenance and after a certain number of customers are added more assets are added to the network which require maintenance.

In addition there are capital costs that are avoided when a tariff class was no longer supplied by the network business. Primarily those are the assets mentioned above, the meter and service. The capital costs associated with these costs (i.e. the return on and return of) is therefore included in the estimate of avoidable cost based on the relevant unit rate of providing a meter and service for each customer in the tariff class.

Since meter reading is provided by an external contractor the avoidable costs of the meter data service are the direct costs plus the communications costs associated with the communications equipment for the demand market. The demand market is also charged for the return on the communications devices.

Table 1-2 presents the results for each tariff class. It can be observed that the expected revenue for each tariff class exceeds the estimate of avoidable costs.

Table 1-2: Avoidable costs compared to expected revenue ($2009-10, '000)

Tariff Class	Avoidable Estimate	Expected Revenue
Haulage: Demand Market Segment		
Sydney 1	326	3,839
Sydney 2	728	7,009
Sydney 3	871	10,453
Sydney 4	360	7,047
Sydney 5	92	1,943
Newcastle 1	243	3,108
Newcastle 2	201	2,560
Newcastle 3	33	628
c-i-c	c-i-c	c-i-c
Wollongong 2	92	767
Country	393	3,407
Haulage: Volume Market Segment		
Coast	244,571	376,508
Country	20,174	42,300
Meter Data Service		
Volume	3,251	5,217
Demand	906	1,022

1.4 Summary

The efficient bounds for each tariff class is presented in Figure 1-1, Figure 1-2, Figure 1-3.

Figure 1-1: Efficient bounds for expected revenues, demand tariffs ($2009-10)

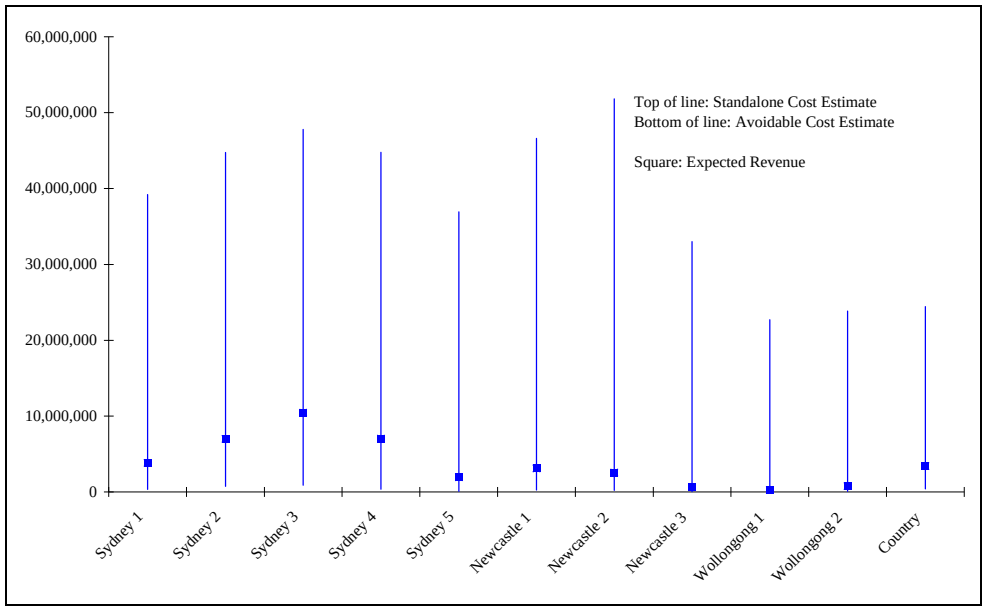


Figure 1-2: Efficient bounds for expected revenues, volume tariffs ($2009-10)

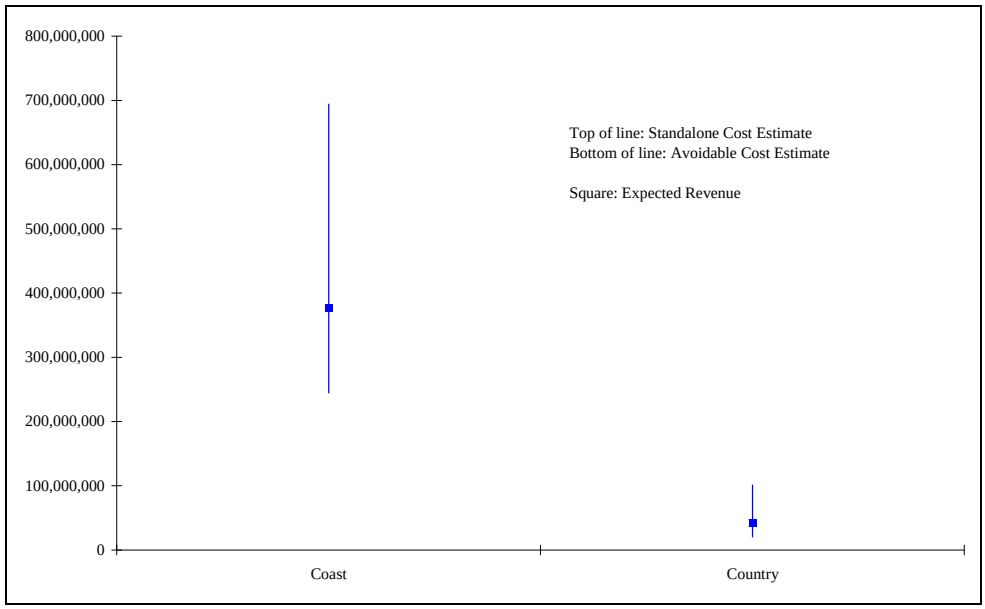


Figure 1-3: Efficient bounds for expected revenues, meter data service ($2009-10)

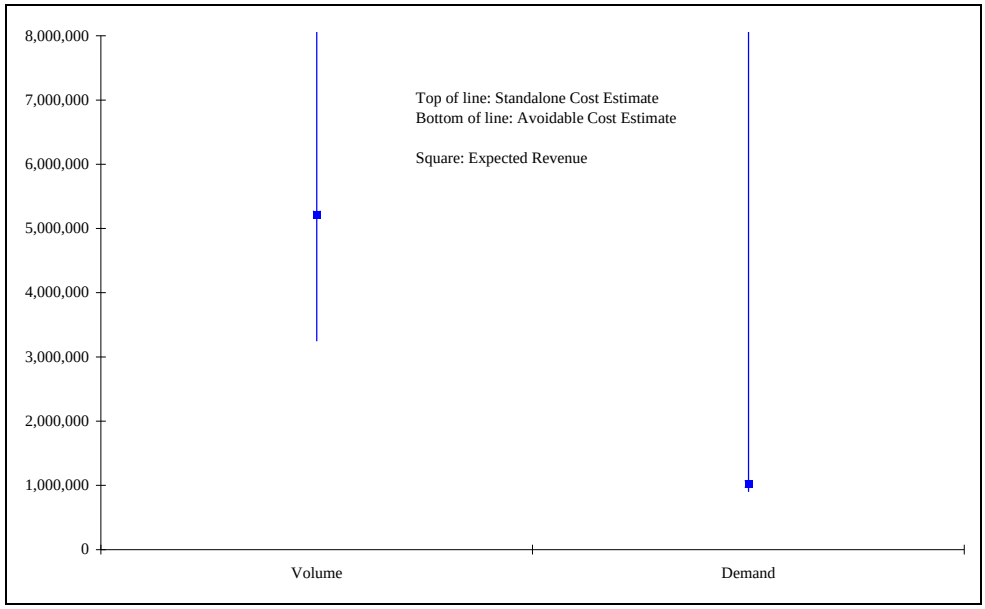


Figure 1-1, Figure 1-2, Figure 1-3 show that JGN's proposed revenues from each tariff class fall within the efficient pricing bounds. JGN's proposed tariffs and tariff classes are therefore compliant with Rule 94(3) of the National Gas Rules (**NGR**).

2 Introduction

This report presents estimates of standalone and avoidable costs for each of JGN's tariff classes. Under the NGR tariffs for distribution pipelines need to satisfy Rule 94(3) which requires expected revenue for each tariff class lie between economically efficient bounds, specifically:

- For each tariff class, the revenue expected to be recovered should lie on or between:
  - An upper bound representing the stand alone cost of providing the reference service to customers who belong to that class; and
  - A lower bound representing the avoidable cost of not providing the reference service to those customers.

This analysis shows that for the first year of the upcoming regulatory period (2010-11) the expected revenue for each tariff class lies between the estimated efficient bounds of standalone and avoidable costs.

The approach JGN has adopted did not rely upon a bottom-up estimation of replication or bypass costs for each tariff class individually. Instead, JGN applied

scaling factors to previous optimised replacement cost studies to determine a standalone form of costing. Whilst this requires the estimates to be used with a degree of caution the conclusions regarding the efficiency of expected revenues remain valid given the history of the network and the conservative assumptions employed.

The remainder of this report is structured as follows:

- Section 3 provides a general background on standalone and avoidable costs and the tariff classes for which they will apply
- Section 4 sets out the broad approach for estimating standalone and avoidable costs, including a description of the underlying costs that are relied on in the calculation
- Section 5 outlines how the standalone costs are calculated
- Section 6 presents how the avoidable costs are calculated
- Section 7 contains the results.

3 Background

3.1 Definition of standalone and avoidable costs

Standalone cost represents the cost that would be required to replicate or bypass the network. It follows that if customers were charged above standalone costs it would be beneficial for that group of customers to bypass the network or be provided by a new entrant supplier. Therefore, these costs are comprised of the assets and operating costs that would be required to provide services to that tariff class assuming no other customers shared the use of those assets.

In contrast, avoidable cost represents the cost that would be avoided if the network business no longer provided services to that group of customers. If the business charges less than avoidable cost to that group of customers it follows that it would be beneficial for it to not provide services to those customers since the incremental costs would be greater than the expected revenues. To determine what costs should be included in an estimate of avoidable costs the relevant time frame needs to be considered.

Short run avoidable costs represent the costs that the business should be recovering in the short run, i.e. where only variable (operating) costs can vary. This is differentiated from long run avoidable costs where capital costs should be included. Given that tariffs are to be designed 'with regard to long run marginal cost' it follows that the lower bound for efficient tariffs should consider the long run avoidable costs. Albeit that in practice JGN's decisions around pricing and discounting will be more informed by short run avoidable costs.[3]

3.2 Application of standalone and avoidable costs

The purpose of applying standalone and avoidable cost bounds on expected tariff revenues is to ensure that for each tariff class the distribution business is not pricing outside the bounds defined by economic efficiency. These bounds, standalone and avoidable costs, are the highest and lowest theoretical prices that a distributor could charge a customer class without imposing costs on other classes or having the customer pursue alternative forms of supply. That is, pricing outside these efficient bounds implies cross subsidisation between customer classes if the business is recovering its costs.

[3] In economics, the first principle of a profit maximising firm is the 'shut down rule'. It states that output should be positive only if total revenue is equal to, or greater than, total variable costs.. That is, if the business were earning less revenue than its short run marginal costs it would be better off ceasing production and shutting down.

It was noted in a NERA Economic Consulting report for the Ministerial Council on Energy (**MCE**) that the Rule[4] aims to achieve "the economic objectives of ensuring that the revenue expected to be recovered from each tariff class is calibrated so as to discourage inefficient bypass and to avoid customer subsidies".[5] This was also articulated by John Vickers who stated that the standalone cost test has been argued to result in 'subsidy-free' prices because:[6]

- consumers of each product at least cover the extra costs that their consumption causes, so no financial burden is placed on others, and no consumers pay more than they would pay if they broke away and went to an alternative supplier with access to the same technology.

In fact, prior to 1997 there existed a substantial cross-subsidy between the demand and volume market in what was then AGLGN. The regulatory regime that had applied to it immediately prior to the Gas Code (and its precursor the NSW Code) had provided an environment for this to occur. In a 1996 IPART paper AGL was noted to have estimated the value of the cross subsidy to be between $50 and $80 million[7]. In the access arrangement that followed, AGLGN addressed this cross subsidy.

3.3 Reference services and tariff classes

JGN's proposed reference services in for its revised AA are:

- haulage service - a service for transportation of gas by JGN through its network to a single eligible delivery point for the use of a single end user

- meter data service - a service for the provision of meter reading and on-site data and communication equipment to a delivery point.

JGN proposes 26 tariff classes and distinguishes between two different customer categories:

- volume (or small) end users who include residential and small industrial and commercial customers

4 This report was prepared for the review of the electricity distribution rules, however the Rule is similar and so the conclusions remain valid.

5 NERA Economic Consulting, Distribution Pricing Rule Framework, Network Policy Working Group, December 2006

6 Vickers, John (1997), "Regulation, Competition and the Structure of Prices", *Oxford Review of Economic Policy*, 13:1.

7 IPART, Access to the Distribution Network of AGL Gas Companies (NSW) Limited: A Progress Report from the Secretariat, November 1996, pg5.

- demand (or large) end users who are larger commercial and industrial gas consumers.

The distinction between volume and demand customers is based on the likelihood of their consumption being more or less than 10TJ of gas per year.

Within the volume and demand categories there are further tariff classifications based on regions for which a standalone and avoidable cost estimate is calculated.

Meter data service is essentially meter reading and has two types of categories of tariffs: volume and demand. In the volume category there are two tariff classes which relate to whether the meter is to be read quarterly or monthly. Customers that consume greater than 1 TJ per annum are likely to require monthly meter reading. For demand customers there is only one tariff yet this tariff has two components: a meter reading charge and a communications charge.

JGN has not calculated a specific standalone and avoidable cost for the meter data services for reasons outlined below.

3.3.1 Haulage services for demand customers

This customer category has three different types of tariff classes:

- capacity – which is location specific (11 different zones)
- capacity first response – which is also location specific (10 different zones)[8]
- throughput – which is not location specific.

Capacity tariffs are levied based on the customer's maximum demand.

The first response tariffs are discounted capacity tariffs for customers that are able to respond to requests for reductions in demand to avoid network incidents. This discount reflects the benefit of avoided opex in the event of a network incident, as well as the benefit of greater certainty to managed demand to avoid a network incident. These tariff classes have the same underlying costs as the capacity tariffs and so separate standalone and avoidable costs are not calculated for this suite of tariff classes.

Since the throughput tariff is not location specific the standalone and avoidable cost range should be represented by the range that will be calculated for the capacity tariff across the twelve regional zones.

8 The first response tariff is not offered to country customers.

For the capacity (and first response) category there are twelve tariff classes of tariffs. Customers in this category are assigned to their tariff class first based on their region and second (except in the case of country customers) based on cost reflectivity factors. There are four regions that a customer is first assigned to: Sydney; Wollongong; Newcastle; and Country (which is considered anything in NSW outside of the Sydney-Wollongong-Newcastle region defined by the trunk). For non-country customers they are next assigned a zone based on four cost reflectivity factors: relative location to the trunk; relative distance from the primary mains; utilisation of assets by both market segments (i.e. demand and volume customers); and construction costs of mains in the location. There are five zones in Sydney and three zones in each of Newcastle and Wollongong, however currently there are no customers in one of the zones in Wollongong. A standalone and avoidable cost will therefore be derived for eleven demand tariff classes (i.e. all classes that currently contain customers).

3.3.2 Haulage services for volume customers

There are two tariff classes in the volume customer category. One for customers located in the Sydney-Wollongong-Newcastle region defined by the trunk (coastal) and another for all other customers in NSW (country). Therefore two estimates of standalone and avoidable will need to be estimated for this category of tariffs.

3.3.3 Meter data service

The meter data service is essentially meter reading costs. However, JGN currently outsources this service to an external contractor that carries out the meter reading and sends the data to JGN for billing purposes. Therefore the cost to JGN of providing this service to its customers is the contractor cost, which is charged per read, and a portion of overheads to account for contract management. Since JGN does not own equipment nor manage personnel necessary for the provision of meter reading services it is difficult to estimate a standalone cost. That is, include the costs that the contractor would necessarily incur such as software to store data prior to sending to JGN, hand held devices and the vehicles to carry out meter reading and administration and management.

Assuming that the contractor is pricing to recover these costs across all its customers the standalone costs of providing meter reading to JGN alone would presumably be higher, since JGN is not the sole customer of the contractor. Moreover, the avoidable costs of the meter data service to JGN is the contractor price per read of the meter, i.e. all costs included in the meter data service apart from some allocated overhead.

Given JGN does not have access to the contractor's capital cost base to determine the stand alone cost directly, JGN has adopted a proxy method. This method relies upon the avoidable cost to standalone costs relativities JGN has identified for its gas haulage reference tariff classes.

Therefore, although it is not possible to calculate a standalone cost for the meter data service it is reasonable to assume that the expected revenue from this service would fall between the efficient bounds of standalone and avoidable costs. This is because JGN is able to demonstrate that the meter data service revenues are above its avoidable costs and because JGN faces an incentive to revisit its outsourcing arrangement if these were providing costs that approached standalone costs.

Despite this consideration JGN has applied the average distances between expected revenues and standalone and avoidable costs estimated for the haulage service to present a range for this service. JGN's expected revenues fall comfortably within this range.

4 Approach

4.1 Description of approach – standalone costs

In producing a standalone cost estimate for each tariff class JGN has taken the following broad steps:

- collate direct and indirect operating costs
- obtain asset value costs and associated parameters (e.g. the weighted average cost of capital (**WACC**), standard lives for depreciation, etc)
- identify relevant allocators (i.e. customer numbers, volumes, etc)
- allocate suitable costs to each tariff class as appropriate.

Each of these steps is discussed in further detail below.

Allocations of the kind required by this exercise are necessary somewhat subjective. It may be possible to conduct a bottom-up engineering estimation of each tariff classes to ascertain a more robust estimate of bypass or replication costs. However, the cost associated with such an exercise is unlikely to be warranted by benefits of doing so.

JGN considers that a reasonable estimate is available by relying on ORC estimates that were undertaken when JGN's initial regulatory asset base (**RAB**) was determined by IPART. Although this means that the current customer numbers, facilities, network configuration, unit rates and any design advances will not specifically be taken into account, JGN considers it is the best available proxy for the circumstances. Moreover, this is more than adequate for the estimation of these costs given the significant margin of error that JGN can afford whilst still meeting the rule requirement (see Figure 7-1 and Figure 7-2). That is, a more detailed

engineering analysis is likely to increase the standalone cost estimate relative to JGN's adopted approach, and thereby further support JGN's compliance.

Since the meter data service (meter reading) is provided by an external contractor, which means that JGN does not have sufficient information to estimate a standalone cost for this service. Therefore, the average ratio of the standalone to avoidable cost estimates for each market segment was applied to the avoidable costs.

4.1.1 Operating costs

There are two types of operating costs: internal (controllable) and external (uncontrollable). Internal operating costs consist of Jemena corporate overheads (indirect costs), operating and maintenance costs, business management (commercial) costs and marketing costs. External operating costs consist of unaccounted for gas (**UAG**) procurement, government levies and carbon taxes.

Direct costs include those costs incurred by the asset services provider, JAM. In order to obtain escalated activity based costs from the JAM fee it is necessary to reallocate the escalated total feed into relevant categories based on the raw proportions. This is because costs have been forecast using constant dollar terms and are amalgamated and broken into input cost categories for escalation purposes (i.e. labour and materials).

Two broad cost activities included in the direct costs are asset services (cost code WBS 500 series) and asset management services (cost code WBS 200 series). The asset services cost collectors broadly reflect 'field' activities, i.e. operations and maintenance, whilst the asset management cost collectors broadly reflect 'desk' activities, i.e. planning and development. Some of these codes are also collected based on the region that they are incurred. This primarily relates to the asset services costs. Despite this level of disaggregation there is no separate collection, apart from some specific activities, that differentiates between the two broad markets: demand and volume.

JGN indirect costs, or corporate overheads, are Jemena enterprise support functions. These include costs such as regulatory affairs, legal, management, board, etc.

4.1.2 Capital costs

Capital costs include both return of (depreciation) and return on assets. In order to estimate an annual charge that includes both the return on and return of an asset value is required. The sections below outline the sources for asset value estimates and describe how JGN has converted these into an annual charge.

Sources of asset values

There are two sources used for asset values an ORC study carried out for the coastal demand market by JAM engineers and the Independent Pricing and Regulatory Tribunal (IPART) final decision (2000). The JAM ORC study was carried out in 2003 to inform the cost reflectivity factors that are used to assign demand customers to a zone based on their postcode. The IPART ORC value was considered by IPART in determining a value for the ICB.

Optimised replacement cost study for coastal demand market

JGN has relied upon an ORC study to inform the standalone cost for the demand tariff classes relating to Sydney, Newcastle and Wollongong and to inform the estimates for the country demand tariff class and the volume market.

JAM conducted an ORC study for the demand market (excluding country customers) prior to the last Access Arrangement (**AA**) review. This ORC study sought to estimate the current cost of replacing an asset if it were built today. Thus, the 'optimisation' allows for the asset to be designed such that the current configuration or other historical factors can be ignored if not required for the estimation (e.g. assets required for another customer class). The purpose of the study was to inform JGN of its bypass risk for demand customers and thereby allow it to price with regard to this efficient pricing bound.

The study relied upon sophisticated engineering techniques which broadly reflect the following steps:

- identify each customer by postcode
- remove the segments of the network not required to service those customers
- reduce the pipe size to reflect the capacity required to service those customers
- use a standard unit rate for the pipe diameter and length to produce a cost
- run the 'synergy' model to produce flow requirement at each customer site
- allocate pipe cost by size based on proportion of flow requirement for each customer
- use diversified Maximum Hourly Quantity (**MHQ)** to allocate facility costs between customers
- amalgamate costs by asset class to each postcode and assign to local network zone.

Although this study was completed after the ORC study for the ICB was carried out there have still been network developments that will not be captured in this estimate. Also, these estimates do not include allocations of the trunk or non-system assets and so JGN has also added estimates of a portion of these costs.

Optimised replacement cost study for initial capital base

JGN has relied upon the ORC study from the initial IPART ICB publications to inform its standalone cost for volume customers.

In 2000 IPART released its final decision regarding AGLGN's AA, including the value of the ICB.[9] Various methods of valuing the assets of AGLGN were considered, including an ORC valuation. Although the ORC valuation was not used to set the ICB (nor the DORC) the ORC that was considered in coming to the ICB decision was published. In addition to the total value being published it was allocated between the Sydney, Newcastle, Wollongong and Country regions and a further allocation was published for some assets between the demand (formally contract) and volume (formally tariff) market segments.

Scaling asset values using factored indexes

Since the ORC estimates (from both JAM and IPART) were not conducted for each tariff class individually a degree of scaling is necessary to obtain reasonable estimates for the value that would apply for each class individually. Notably, since there is a standalone network estimate and standalone estimates of the coastal demand tariff classes these together need to be utilised to interpolate the values appropriate for the volume classes (coastal and country) and the country demand market.

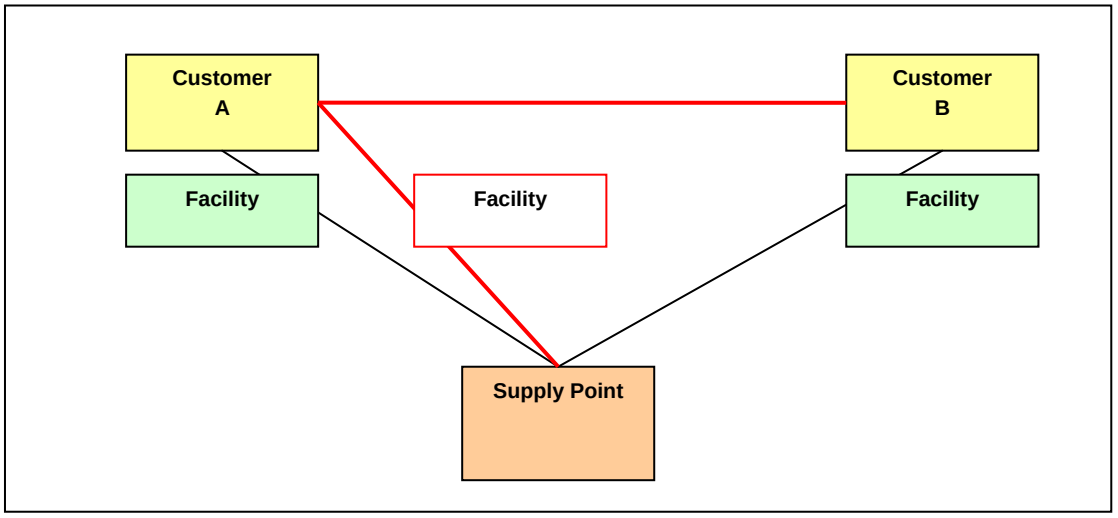
A factored index is used in engineering cost estimation models to use historical or known costs and account for scale to obtain an estimate for a similar project with a different size. In this case, JGN has utilised a scaling factor to account for the significant scale economies in gas network assets when estimating separate components of the whole. That is, since gas networks exhibit significant economies of scale in the capital costs the standalone estimates of components would be expected to sum to more than the combined total.

For example, suppose there are two customers located 1 km apart and they are both 10 km from a supply point (i.e. a transmission pipeline). The cost for the network service provider to supply gas to the one customer will be the cost of constructing a 10 km main, associated facilities and the customer's connection (including a meter). This would also be required for the business to connect the other customer, on a standalone basis. However, if both are connected using shared infrastructure once the facilities and 10 km main is in place, only an

[9] IPART, Final Decision: Access Arrangement for AGL Gas Networks Limited, Natural Gas Systems in NSW, July 2000.

additional 1 km of main and the connection infrastructure is required. Figure 4-1 illustrates this example, where the 'red' indicates the shared asset scenario.

Figure 4-1: Standalone v shared assets between two customers



These scale benefits arise not only when more customers are connected to the same infrastructure but also, significantly, when larger capacity infrastructure is laid such that more throughput can be sold. This is because the additional cost of a wider pipe at the time of installation is relatively low compared to the cost of digging a trench and installing any size pipe.[10] This leads to a large volume requirement to justify the considerable investment that characterises gas network businesses. This can either be met with large commercial and industrial loads or a relatively dense residential market with high average consumption.

Converting asset values to annual capital charges

To convert the asset values into an annual capital charge the following steps are undertaken:

- index the estimates by asset class into current year dollar terms (forecast 2010-11 was utilised)
- divide each asset class by the standard life to obtain a straight-line depreciation charge (see **Appendix A** for standard lives used)
- subtract the depreciation charge from the total asset value
- multiply the remaining asset value by the WACC.

[10] It is also significantly lower than the cost of retrofitting a large pipe within the network.

4.1.3 Allocators

In order to allocate certain costs (including overheads) some parameters have been collected to use as weights. These include:

- forecast customer numbers
- forecast volumes by customer class
- forecast MDQ for demand customers.

The source for these parameters is the NIEIR demand forecast for the 2010-11 financial year allocated into relevant classes and segments consistent with the approach undertaken for tariff modelling purposes.

The specific allocation of costs is described in section 4.

4.2 Description of approach – avoidable costs

In producing an avoidable cost estimate for each tariff class JGN has taken the following broad steps:

- collate direct operating costs
- estimate an approximate incremental cost per customer
- multiply incremental cost per customer estimate by forecast customer numbers for each tariff class
- calculate avoidable capital costs per customer for each tariff class and multiply by forecast customer numbers
- sum the operating and capital components for each tariff class.

Each of these steps will be discussed in further detail below.

Since meter reading is provided by an external contractor the avoidable costs of the meter data service are the direct costs incurred. For the volume market this is solely a proportion of the WBS 510 costs. For the demand market this is a proportion of the WBS 510 costs plus the communications costs (costs levied by Telstra) associated with the communications equipment for the demand market. The allocation of WBS 510 (routine meter reading) is based on customer numbers. The customer is also charged for the provision of the communications devices and so the capital costs associated with these assets is also included.

4.2.1 Operating costs

Using the 'direct' operating costs described above an incremental cost per customer is calculated. This essentially is an average cost however as many of the 'fixed' components of operating costs are excluded (i.e. management, government levies, ESFs) it is expected that this will approximate a true incremental cost. This incremental cost per customer is then multiplied by the forecast number of customers in each tariff class for an estimate of the avoidable opex.

Utilising this estimate across each tariff class however adds another level of averaging since operating costs per customer are likely to differ between tariff classes. However these differences would not be expected to be material compared to the differences that would arise in capital costs.

4.2.2 Capital costs

The capital component for avoidable costs is estimated in a similar manner to the standalone costs however the source for primary asset values is forecast unit rates instead of historic ORC studies. This is because whilst standalone costs aim to capture what the current cost of replicating or bypassing the network avoidable costs depicts the future costs of not providing services to that group of customers.

That said, the avoidable assets associated with no longer providing services to a tariff class relate primarily to:

- the meter for each customer in the tariff class
- the service connection (pipe between the main in the street and the customer's premise) for each customer in the tariff class
- any main extension required for additional connections in the tariff class, net of any contribution made by the customer towards those dedicated extension costs.

It is clear that for each additional customer a service and meter is required however in many cases there may be no additional main cost or it will be negligible due to contributions, therefore any mains costs will be excluded from the estimate.

To estimate these costs the forecast unit rates for various meters and services will be utilised.

5 Standalone cost estimation

5.1 Volume market

The volume market is comprised of all customers that consume less than 10TJ of natural gas per annum. This includes all residences and small and medium sized businesses. As described above, there are two tariff classes in this market: coastal and country. Customers in the coastal market are located within the 7 trunk zones of the Sydney-Wollongong-Newcastle network. Customers in the country are located on networks connected from laterals off the Moomba to Sydney Pipeline (**MSP**). These include Bowral, Bathurst, Moss Vale, Goulbourn, Griffith, etc.

To estimate the asset values associated with these two tariff classes the following steps are undertaken:

- a factor of 60 per cent is used to convert the ORC estimates for the demand market (excluding meters and services, which are assumed to represent the entire 'contract meter' and 'secondary service' assets) and subtracted from the relevant asset class in the total ORC estimate
- subtract a portion of the demand (formally contract) allocation from the trunk for each region as follows:
  - Sydney: 50 per cent of the Wilton to Newcastle allocation plus 50 per cent of the Wilton to Wollongong allocation
  - Newcastle: 50 per cent of the Wilton to Newcastle allocation
  - Wollongong: 50 per cent of the Wilton to Wollongong allocation
- subtract the demand (formally contract) allocation for country POTS from the TRS asset class
- the remaining ORC asset values is the estimated 'volume standalone cost' and is then split as follows:
  - coastal: sum totals for each asset class for Sydney, Wollongong and Newcastle and increase by factor (i.e. 60 per cent)
  - country: sum totals for each asset class for Country and increase by factor (i.e. 60 per cent).

It should also be noted that this estimate does not include non-system assets.

This asset value is then converted to an annual charge as described in Converting asset values to annual capital charges on page 18 of this document.

Since only some opex is broken into regions and minimal opex is observable by market segment these costs require a degree a weighting. Table 5-1 sets out the direct operating costs that are utilised for the calculation.

Table 5-1: Direct operating cost inclusions for volume market standalone cost

WBS Code	Description	Allocation methodology/justification
200	Participate in the development of external standards/codes/regulations. Develop and maintain internal standards/policies/procedures for assets.	All for each of Coast/Country tariff classes.
201	Manage relationship with Technical Regulators. Identify compliance requirements, establish frameworks, develop SAOPs and oversee audits, ensure reports to authorisations and licences.	All for each of Coast/Country tariff classes.
202	Develop and manage the delivery of the Asset Strategic Plans, including Asset Management Plan, Maintenance Plan, Capacity Development Plan, SIB capex Plan, Operational guidelines and capex/opex forecasts.	All for each of Coast/Country tariff classes.
203	Provide design specifications for infrastructure growth and modifications (e.g. design briefs, construction documentation, costing, support of delivery). Oversee and support the delivery from an asset management perspective (e.g. approve changes and variations).	All for each of Coast/Country tariff classes.
204	Monitor and validate the technical performance of assets. Manage risks for assets. Formulate and initiate projects for corrective actions.	All for each of Coast/Country tariff classes.
205	Provide technical advice and solutions for marketing of services from existing assets - e.g. request for new or additional gas transportation.	All for each of Coast/Country tariff classes.
206	Establish and manage network maps, pipeline alignment sheets and engineering records.	Regionalised – split into Coast/country
207	Administrative functions including establishment of easements, land and survey inquiries excluding pipeline surveillance.	All for each of Coast/Country tariff classes.
208	It covers developing & executive marketing strategy, perform market analysis& research, managing incentive payment scheme & establishing & maintaining customer relationship (residential new home, line of main, existing customer).	All for each of Coast/Country tariff classes.
209	It covers developing & executive marketing strategy, perform market analysis& research, managing incentive payment scheme & establishing & maintaining customer relationship (business sales).	All for each of Coast/Country tariff classes.

WBS Code	Description	Allocation methodology/justification
	Process customer enquiries and complaints.	Regionalised – split into Coast/country
216	Covers establishing customers accounts, processing collected readings and generating bills.	All for each of Coast/Country tariff classes.
217	Retailer administration - process request for service from retailers for new connections, disconnections, reconnections, special reads, customer churn. Excluding turn-on/turn-off.	Exclude because these are attributable to ancillary fees.
220	Accounting support	All for each of Coast/Country tariff classes.
223	Associated with any research and development projects. It covers activities namely research projects to enhance the competitiveness of natural gas and equipment testing for other 3rd parties clients.	All for each of Coast/Country tariff classes.
224	Commercial services transportation this is the commercial framework for access and negotiation.	All for each of Coast/Country tariff classes.
297	Front line worker support including raising & processing purchase orders, credit cards and administration	All for each of Coast/Country tariff classes.
298	Front line worker supervision	All for each of Coast/Country tariff classes.
500	SCADA Service (control centre)	All for each of Coast/Country tariff classes.
501	Monitor and control (control centre)	All for each of Coast/Country tariff classes.
502	SCADA planned maintenance	All for each of Coast/Country tariff classes.
503	SCADA corrective maintenance	All for each of Coast/Country tariff classes.
504	Fault response (response centre)	All for each of Coast/Country tariff classes.
505	Corrective R&M audit	Regionalised – split into Coast/country
506	Residential appliance audit	Regionalised – split into Coast/country
507	Non-residential appliance audit	Regionalised – split into Coast/country
512	Calibration and maintenance of meters (part of meter provision)	Regionalised, allocated between demand and volume using customer numbers

WBS Code	Description	Allocation methodology/justification
513	Disconnections/reconnections, meter accuracy investigations and repairs	Exclude because these are attributable to ancillary fees.
519	Planned maintenance >1050	Regionalised – split into Coast/country
519	Planned maintenance >1050, trunk	Coast only
520	Corrective R&M maintenance facilities >1050	Regionalised – split into Coast/country
520	Corrective R&M maintenance facilities >1050, trunk	Coast only
521	Corrective R&M pipes >1050	Regionalised – split into Coast/country
521	Corrective R&M pipes >1050, trunk	Coast only
522	Planned maintenance <1050	Regionalised – split into Coast and Country
523	Corrective R&M pipes <1050	Regionalised – split into Coast and Country
524	Corrective R&M pipes <1050	Regionalised – split into Coast and Country
525	Planned maintenance =1050	Regionalised – split into Coast and Country
526	Corrective maintenance facilities =1050	Regionalised – split into Coast and Country
527	Corrective R&M pipes =1050	Regionalised – split into Coast and Country
528	Urgent response	Regionalised – split into Coast and Country
529	Planned Easement Patrol	Regionalised – split into Coast and Country
529	Planned Easement Patrol, trunk	All to coast
530	Corrective Easement Patrol	Regionalised – split into Coast and Country
530	Corrective Easement Patrol, trunk	All to coast
531	Planned Cathodic Protection	Regionalised – split into Coast and Country

WBS Code	Description	Allocation methodology/justification
531	Planned Cathodic Protection, trunk	All to coast
532	Corrective Cathodic Protection	Regionalised – split into Coast and Country
532	Corrective Cathodic Protection, trunk	All to coast
533	Planned Leakage Surveillance	Regionalised – split into Coast and Country
597	Admin/client support for front line work	All for each of Coast and Country
597	Admin/client support for front line work, trunk	Coast only
598	Supervision in work delivery	All for each of Coast and Country
598	Supervision in work delivery, trunk	Coast only

Note: 1050 refers to the operating pressure of the facility or pipe. Greater than 1050 refers to the Trunk and Primary, equal to 1050 captures the secondary network and less than 1050 refers to the medium and low pressure network.

In addition, there are indirect and overhead costs that are incurred in the course of providing services to volume customers. These include the overheads of both JAM (the asset management provider) and JGN, as well as the corporate overheads of Jemena which relevant to JGN. Furthermore, costs such as government levies, UAG and marketing also need to be allocated. These cost categories and the method for allocating to the volume market is provided in the table below.

Table 5-2: Indirect operating cost inclusions for volume market standalone costs

Cost category	Description	Allocation methodology/justification
Commercial and business management staff	Manages the commercial performance of business, including setting commercial and market policies, managing and evaluating network expansion or review growth opportunities, etc.	All for each segment.
ESF	Allocation of Jemena corporate overheads to JGN. Includes legal, board management, rent, etc.	Allocated between the volume market based on forecast customer numbers, given the size of the total volume market compared to the demand market.
UAG	Procurement costs of UAG. UAG driven by a number of factors, including receipt and delivery meter accuracy bounds, throughput, leakage, etc.	Allocated between volume and demand market using rounded allocation figure from tariff variation (85% volume, 15% demand) and then allocated between tariff classes based on customer numbers.
Marketing	Strategy, mass market campaign and targeted incentives.	All for each segment.
Government Levies	Mains tax	Allocated based on forecast volume for each tariff class as a share of total volume projected.
Other Directs	Legal fees, commissions, costs associated with owned and leased properties, fees, etc.	All for each segment.

Given that Table 5-2 sets out the costs that will be included, Table 5-3 shows the costs that will be excluded. Note that where costs were only partly included the remainder will be excluded but it is not replicated in the table following as it shows only the entire categories that are excluded.

Table 5-3: Direct operating cost exclusions for volume market standalone costs

WBS Code	Comment
210	Marketing for contract market
212	Commercial support and administration in relation to existing contract customers
213	Commercial support and administration of new contract customers
214	Negotiation for new contract customers or increased supply in relation to minor design aspects
219	Network claims – there was no cost reported in 2008, all costs associated with claims against non-AGL property
221	Development and calculation of network tariffs – there was no cost reported in 2008.
222	Regulatory affairs – there was no cost reported in 2008, these costs are included in the corporate ESF allocation.
510	Routine meter reading – this is part of the meter data service.
511	Special meter reading – this is excluded because it is recovered through ancillary fees.

Note that a significant amount of the total opex is allocated to the volume tariff classes. This is because customer numbers are a major driver of opex.

5.2 Demand customers

The demand market is comprised of customers that consume more than 10TJ per annum. As stated above, these customers are located throughout the state and classified based on their region. The asset requirements to provide services to each zone of the coastal region were estimated in an earlier ORC study and so JGN has utilised these estimates. However, a separate estimate was not carried out for the country region, so JGN has utilised the estimate for Sydney zone 1 since it has a similar number of customers and booked, peak demand (MDQ).[11]

In addition to the estimates contained in the ORC study JGN has added a portion of the trunk. JGN has allocated the ORC estimate for the trunk from

[11] It should be noted that although there are a similar number of customers in Sydney 1 and Country, the customers in Sydney 1 are far more densely located than in the Country. However, any additions to reflect the higher asset costs associated with a more spread out customer base will serve to increase the standalone cost, which is already significantly higher than expected revenues.

the IPART decision between the relevant 9 zones (the trunk is not utilised for delivery to the country customers nor the customer in Wollongong 1) based on forecast booked MDQ. Since this method simply allocates the ORC value it will underestimate the standalone cost of providing a 'trunk' service to these customer classes, and thereby provide a conservative standalone cost estimate.

Operating costs for the demand market are assumed to be broadly similar to those required for the volume market given the degree of economies of scale inherent in supporting and operating a network business. Therefore, there are only minor differences between the costs outlined in Table 1-1 and Table 1-2 to those that would be required for each regional zone of the demand market. These are set out in Table 5-4.

However, given the low number of customers present in each zone and minimal factors for which to differentiate customers in individual zones from their region operating costs are estimated for the broad region only (i.e. Sydney, Wollongong, Newcastle and country not the individual sub-regions within these). Therefore, the only costs that will differ within regions will be the asset value estimates for each zone, except for UAG since customer numbers is utilised to allocate this cost.

Table 5-4: Direct operating cost variations for demand market standalone costs

WBS Code	Include/Exclude	Comment
208	Exclude	Marketing for residential volume market
209	Exclude	Marketing for business volume market
210	Include	Marketing for demand market
212	Include	Commercial support and administration in relation to existing contract customers
213	Include	Commercial support and administration of new contract customers
214	Include	Negotiation for new contract customers or increased supply in relation to minor design aspects
506	Exclude	Residential appliance audit.
ESF	Include	Allocated proportion to each zone based on the total demand market compared to the total market (based on customer numbers).

Note the only, differences from the volume market are to include the specified activities for the demand market and exclude those specified for the volume market, apart from a different allocation methodology for the ESFs.

6 Avoidable cost estimation

To estimate the avoidable costs an operating incremental cost per customer was utilised for the operating cost component, which was estimated as described in section 4.1.1.

For the capital component of avoidable cost, JGN used unit rates for meters and service lines which yields an asset value for which a depreciation and return on capital charge can be estimated. For the depreciation calculation the standard life was halved to proxy the 'remaining life' since avoidable costs are to represent the costs that would be avoided now if the group of customers no longer require services. For the demand market segment the unit rate for a high pressure service and 'contract' meter was utilised. For the volume market segment the 'new estate' service and meter[12] was employed for the majority of the market. Since approximately 3 per cent of volume customers will be 'large', that is require a larger capacity meter, these customers were allocated an 'I&C' service and meter.

Table 6-1 presents a summary of this approach to estimate the capital component per customer.

Table 6-1: Summary of avoidable capital cost per customer ($2009-10)

	Formula	Volume - small	Volume – I&C	Demand
Unit Rates				
Service	A	1,179	3,975	41,264
Meter	B	145	3,026	19,937
Depreciation				
Services	C=A/(50*.5)	47	159	1,651
Meters	D=B/(20*.5)	6	121	797
Return on Assets				
Services	E=(A-C)*WACC	113	382	3,967
Meters	F=(B-D)*WACC	14	291	1,917
Total Capital	**C(D)+E(F)**	**180**	**953**	**8,331**

[12] The difference between using a 'new estate' and 'E-G' service is $513 and the difference for meters is $4, however if a medium density/high rise meter is used the difference is $346.

In Table 6-1 the capital cost per customer will then be added to the estimated opex incremental cost per customer and multiplied by the number of customers in the tariff class.

7 Results summary

Table 7-1 presents the standalone and avoidable estimates for each tariff class.

Table 7-1: Estimated Standalone and Avoidable Costs ($2009-10, '000)

Tariff Class	Standalone	Avoidable	Expected Revenue
Haulage: Demand Market Segment			
Sydney 1	39,209	326	3,839
Sydney 2	44,742	728	7,009
Sydney 3	47,790	871	10,453
Sydney 4	44,772	360	7,047
Sydney 5	36,929	92	1,943
Newcastle 1	46,610	243	3,108
Newcastle 2	51,832	201	2,560
Newcastle 3	33,013	33	628
c-i-c	c-i-c	c-i-c	c-i-c
Wollongong 2	23,852	92	767
Country	24,433	393	3,407
Haulage: Volume Market Segment			
Coast	694,180	244,571	376,508
Country	100,978	20,174	42,300
Meter Data Service			
Volume	16,001	3,251	5,217
Demand	319,948	906	1,022

Figure 7-1, Figure 7-2 and Figure 7-3 shows that for each tariff class the expected revenues fall comfortably between the estimated efficient bounds. This range is illustrated in the figures below, by market segment.

Figure 7-1: Efficient bounds for expected revenues, demand tariffs ($2009-10)

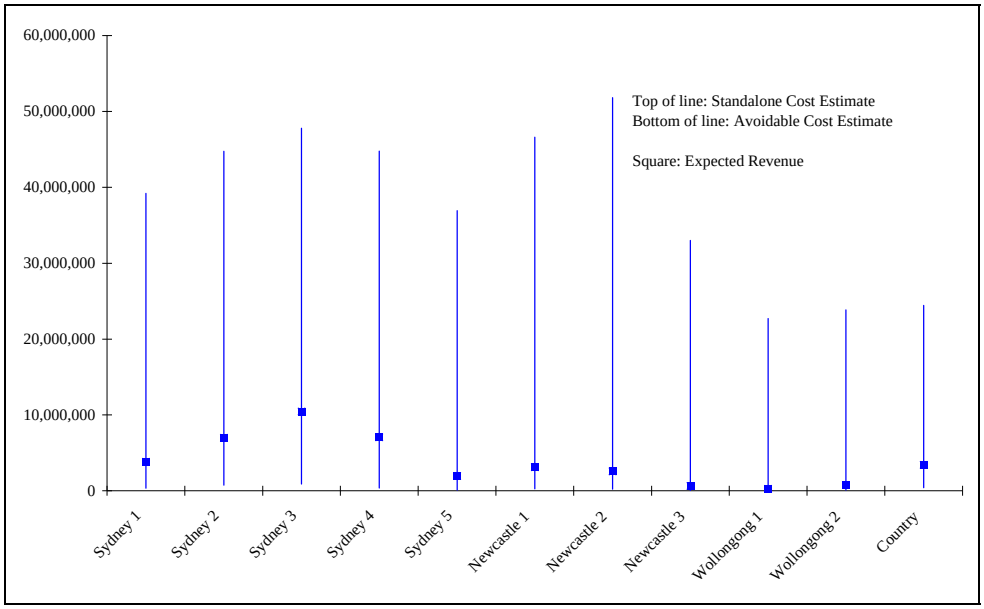


Figure 7-2: Efficient bounds for expected revenues, volume tariffs ($2009-10)

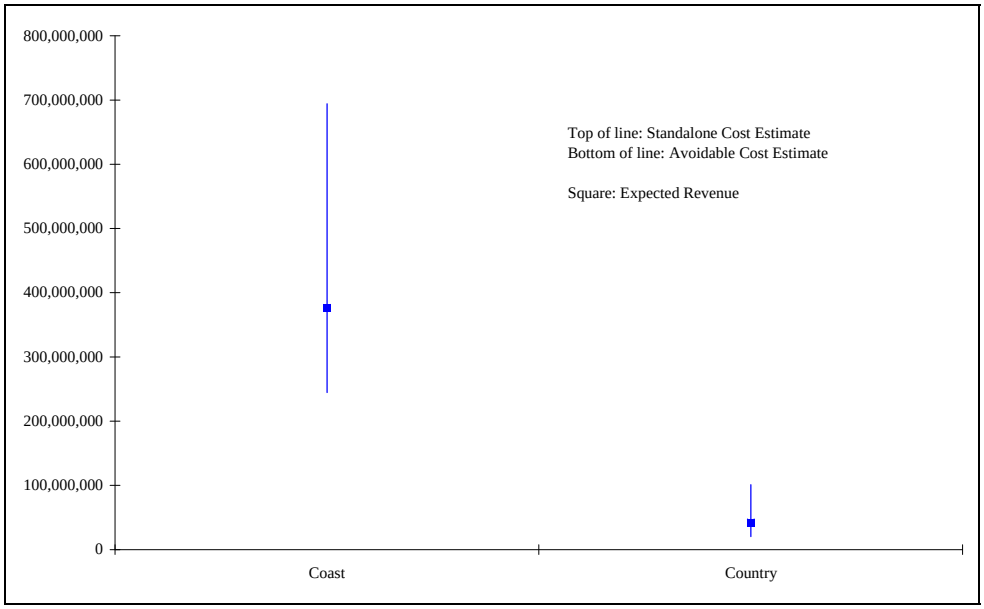
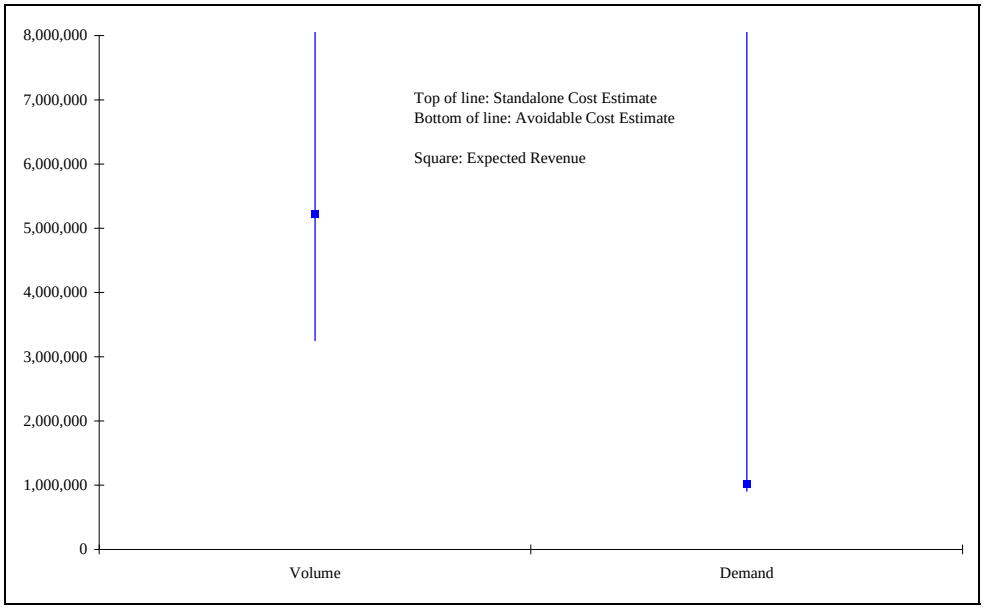


Figure 7-3: Efficient bounds for expected revenues, meter data service ($2009-10)



Appendix A: Standard lives used for depreciation

Table A.1 sets out the standard lives used for depreciation charges calculated as part of the capital charge.

Table A.1: Standard lives used for depreciation

Asset Category	Standard Life
Trunk main	80
Primary main	80
Secondary main	80
Medium pressure network	50
Secondary services	50
Medium/low pressure services	50
ALB valves	50
TRS/POTS	50
PRS	50
Primary valves	50
SRS	50
Demand meters*	20
Volume meters – I&C*	20
Volume meters – residential*	20

Note: the standard life for all meters contained in the 2000 IPART decision was 15 years however the life now employed is 20.