Jemena Gas Networks (NSW) – Access Arrangement Information – Appendix 15.4

Long Run Marginal Cost Report

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1 Executive Summary

1.1 Background

Under the new Gas Rules tariffs for distribution pipelines need to satisfy Rule 94(4) which requires the distribution network service provider to consider long run marginal cost (**LRMC**) in setting tariffs, specifically:

- A tariff, and if it consists of 2 or more charging parameters, each charging parameter for a tariff class:
  - must take into account the long run marginal cost for the reference service or, in the case of a charging parameter, for the element of the service to which the charging parameter relates.

Marginal costs represent the change in costs that arise from a change in demand. The types of costs that are captured are differentiated based on the time horizon that is under consideration, that is, whether it is the 'short run' or 'long run'. In the short run, investments in capacity and overhead is fixed and so marginal cost captures operational inputs such as additional labour, materials and energy. However over the long run all inputs can feasibly be altered such that marginal cost captures the cost of building additional capacity.

Marginal costs are essentially forward looking, since they reflect the expected change in costs that arise from changes in demand. Because they are forward looking invariably the estimates are subjective.

1.2 Application of LRMC

The purpose of requiring tariffs and tariff parameters to be set by taking into account long run marginal costs reflects the economic principle that prices should reflect the underlying costs of providing the service. As consumption increases the capacity of the network requires augmentation to accommodate the additional demand. Therefore in order for consumption decisions to take into account these increased costs current prices need to reflect the expected additional costs arising from additional consumption.

Two factors affect the applicability of this logic to gas network pricing:

- The NGR permit Jemena Gas Networks (**JGN**) to recover its building block cost of services which includes a return on sunk costs and can therefore be expected to exceed LRMC – this point is acknowledged by NRG rule 94(6); and

- JGN's capacity requirements are not driven so much by load peaks as by market expansion (i.e. new customers).

Gas networks are very different from electricity distribution businesses, which are subject to the same Rule. Gas, and in particular in the JGN network, has lower penetration than electricity and faces competition from other fuel sources. In addition climate is a significant determinant of the customer mix and utilisation of the network. These factors affect the application of LRMC to signal the impact of incremental consumption since often in a gas network the objective is to *increase* consumption. Moreover, since the building blocks revenue is greater than LRMC (it is long run average cost) not every tariff class and tariff parameter can be set with reference to LRMC and it would not be appropriate to do so.

For this reason and due to the affects of capital contributions on the LRMC on the demand customer category (see below) JGN estimated the LRMC only for the volume tariff classes since JGN believes these customers are driving incremental demand changes. Although this customer group is largely driving incremental demand it should be noted that JGN does not experience capacity constraints to the extent that electricity networks do. For this reason JGN is not subject to the same incentives to price throughput at LRMC. Therefore, the LRMC estimates are compared to the throughput charges since fixed charges are designed to recover costs on sunk assets.

Demand customers have large loads and are considered on an individual basis when they connect to JGN's network. Consistent with NGR Rule 79(2)(b), these considerations examine the incremental revenues from the customer relative to the incremental costs. Where the expected costs exceed the revenues JGN charges a capital contribution to the connecting user.

The fact that these users pay a contribution for any capacity development costs not covered by JGN's existing charges, JGN's net LRMC can be expected to tend towards its prices for these users.

1.3 Approach

There are two commonly known approaches for estimating LRMC: the Turvey approach; and the average incremental cost (**AIC**) approach. The Turvey approach aims to capture the direct change in expenditure resulting from a change in demand whereas the AIC approach captures the average change in expenditure. For this reason the AIC approach is more readily applied and so for the purposes of this analysis JGN has utilised the AIC approach.

The AIC approach dictates that an optimal least cost capital programme and associated operating costs be forecast to meet additional demand over a medium term (20 to 30 years). JGN has utilised the capacity development component of its capital expenditure programme as it represents investment to accommodate changes in demand. JGN has estimated incremental operating costs using internal activity based cost information. These combined costs are then divided by the change in demand as forecasted by NIEIR to obtain a per unit estimate of LRMC.

1.4 Results

The LRMC estimate for the volume tariff classes ranges from $27/GJ to $33/GJ ($2009-10) when the total costs are divided by the change in demand over the observed period. When JGN observes the annual changes in incremental costs and demand the LRMC during the forecast access arrangement period ranges from $13/GJ to $30/GJ ($2009-10) with an average of $19/GJ ($2009-10). Extending the forecast period resulted in an average LRMC of $32/GJ ($2009-10). These compare to JGN's proposed volume haulage throughput tariff block 1 prices[1] of approximately $13/GJ ($2009-10).

Although JGN does not currently experience significant capacity constraints to warrant stronger price signalling this range demonstrates that JGN's prices are within the estimated range when the annual changes are observed. This means that tariffs are currently approximating the near term capital costs of additional capacity. Importantly the tariffs are at the bottom of the range such that should capacity constraints arise an increase in throughput prices would be consistent with JGN's estimated LRMC. When the LRMC is estimated over the entire period the range is higher than current throughput tariffs however this is consistent with the view that JGN's prices are currently designed to encourage consumption which is consistent with JGN's marketing strategy.

Consistent with NGR rule 94(6) JGN has sought to recover the residual of its costs in a manner that least distorts demand. This has involved JGN retaining standing charges for each customer.

[1] JGN has a further 5 blocks which have declining prices, and recover a further share of JGN's allowed costs.

2 Introduction

This report presents estimates of LRMC for a number of JGN tariff classes. It also sets out how long run marginal cost is considered in setting tariffs and tariff parameters.

Under the new Gas Rules tariffs for distribution pipelines need to satisfy Rule 94(4) which requires the distribution network service provider to consider long run marginal costs in setting tariffs, specifically:

- A tariff, and if it consists of 2 or more charging parameters, each charging parameter for a tariff class:
  - must take into account the long run marginal cost for the reference service or, in the case of a charging parameter, for the element of the service to which the charging parameter relates.

Gas networks are very different from electricity distribution businesses, which are also subject to this Rule. For one reason gas, and in particular in the JGN network, has lower penetration and faces competition from other fuel sources. In addition climate is a significant determinant of the customer mix and utilisation of the network. These factors affect the application of LRMC to signal the impact of incremental consumption since often in a gas network the objective is to *increase* consumption. Moreover, since the building blocks revenue is greater than LRMC (it is long run average cost) not every tariff class and tariff parameter can be set with reference to LRMC and it would not be appropriate to do so.

For these reasons LRMC was estimated for the throughput charges for the volume market tariff classes only and the results are consistent with current charging parameters and pricing strategy. This is because demand customers have large loads and are considered on an individual basis when they connect to JGN's network. Consistent with NGR Rule 79(2)(b), these considerations examine the incremental revenues from the customer relative to the incremental costs. Where the expected costs exceed the revenues JGN charges a capital contribution to the connecting user. The fact that these users pay a contribution for any capacity development costs not covered by JGN's existing charges, JGN's net LRMC can be expected to tend towards its prices for these users.

This report is structured as follows:

- Section 3 provides a general background on LRMC and the tariff classes for which it will apply;

- Section 4 presents two methods for calculating LRMC and sets out the network capital investment programme from which capital cost estimates will be derived;

- Section 5 describes the application of the stated approach; and

- Section 6 contains the results of the analysis.

3 Background

3.1 Definition of Long Run Marginal Costs

Marginal costs represent the change in costs that arise from a change in demand. The types of costs that are captured are differentiated based on the time horizon that is under consideration, that is, whether it is the 'short run' or 'long run'. In the short run, investments in capacity and overhead are fixed and so marginal cost captures operational inputs such as additional labour, materials and gas. However over the long run all inputs can feasibly be altered such that marginal cost captures the cost of building additional capacity.

Marginal costs are essentially forward looking, since they reflect the expected change in costs that arise from changes in demand. Estimating marginal costs is a subjective exercise since they are forward looking and based on expectations. Therefore, where appropriate the estimates presented in this analysis will include ranges.

3.2 Application of Long Run Marginal Costs

The purpose of requiring tariffs and tariff parameters to be set by taking into account long run marginal costs reflects the economic principle that prices should reflect the underlying costs of providing the service. As consumption increases the capacity of the network requires augmentation to accommodate the additional demand. Therefore in order for consumption decisions to take into account these increased costs current prices need to reflect the expected additional costs arising from additional consumption.

Two factors affect the applicability of this logic to gas network pricing:

- the NGR permit JGN to recover its building block cost of services which includes a return on sunk costs and can therefore be expected to exceed LRMC – this point is acknowledged by NRG rule 94(6)

- JGN's capacity requirements are not driven so much by load peaks as by market expansion (i.e. new customers).

Gas networks are very different from electricity distribution businesses, which are subject to the same Rule. In recent years electricity networks have struggled to maintain sufficient capacity to accommodate peak summer demand arising from air conditioner load. In this case, the application of LRMC for peak period pricing has an important signalling effect regarding the high cost of building network capacity for use during the peak period with low utilisation during the remainder of the year. Although gas does experience peaks (in Canberra the ratio between the peak and off-peak is very high) it is not to the degree experienced in electricity.

Moreover gas network businesses also operate in a different environment. For one reason gas, and in particular in the JGN network, has lower penetration and faces competition from other fuel sources. JGN is also not a franchise monopolist which means that potentially any provider could build alongside JGN's infrastructure. In addition climate is a significant determinant of the customer mix and utilisation of the network since gas is a heating source. These factors affect the application of LRMC to signal the impact of incremental consumption since often in a gas network the objective is to *increase* consumption. Furthermore, since the building blocks revenue is greater than LRMC (it is long run average cost including return on sunk costs) not every tariff class and tariff parameter can be set with reference to LRMC and it would not be appropriate to do so. This principle is envisaged by NGR rule 94(6).

Since LRMC attempts to capture the change in costs in response to a change in demand only haulage services are considered. Therefore the meter data service (meter reading) is excluded as changes in these costs are driven by customer numbers. In addition, not all components of the haulage tariffs are priced with respect to demand and can essentially be viewed as recovering historic costs (such as the return on assets) therefore only those components which relate to additional consumption will be considered for comparison with the LRMC estimates. Essentially these are the throughput components. The section below provides the necessary background on the different tariff classes and the charging components.

3.3 Tariff Classifications

The table below sets out the various tariff classifications with the associated components. It also indicates whether a LRMC estimate has been calculated for the component and a brief explanation. These are further discussed below in the context of each market segment.

Figure 3-1: Summary of Tariff Classes and Components for LRMC Estimation

Service	Tariff Class	Component	Parameter	LRMC Estimate	Explanation
Volume Haulage Service	***Coastal***	Throughput	6 blocks	Yes	Relates directly to demand.
		Standing	-	n.a.	Cost recovery of fixed costs.
		Provision of metering equipment	2 sizes	n.a.	Historical cost recovery for fixed asset costs
	Country	Throughput	6 blocks	Yes	Relates directly to demand.
		Standing	-	n.a.	Cost recovery of fixed costs.
		Provision of metering equipment	2 sizes	n.a.	Historical cost recovery for fixed asset costs
Demand Haulage Service	***Coastal***	Capacity	5 blocks	n.a	Not driving incremental demand and customer capital contributions address incremental capital costs where these are generated, thereby causing JGNs prices and its LRMC for this segment to converge.
		Provision of metering charge	5 sizes	n.a	Historical cost recovery for fixed asset cost
	Country	Capacity	Distance rate with 5 blocks	n.a	Not driving incremental demand.
			Pressure reduction rate with 5 blocks	n.a	Not driving incremental demand.
		Provision of metering charge	5 sizes	n.a	Historical cost recovery for fixed asset costs
	Throughput	Throughput	3 blocks	n.a	Not driving incremental demand.
		Provision of metering charge	5 options based on meter size	n.a	Historical cost recovery for fixed asset costs

Service	Tariff Class	Component	Parameter	LRMC Estimate	Explanation
Meter Data Service	***Volume***	Quarterly meter reading cycle	One annual charge per delivery station	n.a	Operating cost recovery based on the external contract to provide these services. This price represents JGNs SRMC. JGN does not have access to the service provider's capital costs to estimate LRMC for this charging parameter.
		Monthly meter reading cycle			
	Demand	Daily data meter reading	One annual charge per delivery station	n.a	Operating cost recovery based on the external contract to provide these services
		Provision of on site data and communications equipment charge		n.a	Historical cost recovery for asset

For haulage services there are two classifications of tariff classes:

- ***demand*** customers consume more than 10TJ per annum
- ***volume*** customers consume less than 10TJ per annum.

These classifications are also utilised to determine the ***meter data service*** tariff classes. Each will be discussed below.

3.3.1 Haulage Services

All haulage tariff classes have declining block structures for either the throughput or capacity components. A declining block structure means that for each additional block (or 'tranche') of gas or capacity consumed the price declines, meaning that the higher the block consumed the lower the average cost per unit. In electricity the opposite is true – there are *inclining* block structures.

Since penetration is low and gas is a discretionary fuel with competing sources, JGN has an incentive to encourage consumption to increase utilisation of the network which will lower the average price faced by all customers over time. As shown below, the residential market has the peakiest load as a tariff class since they are most responsive to changes in weather which affects heating demand. This means that as parts of the network are built to accommodate these peaks, midsize customers are encouraged to increase their consumption to improve capacity utilisation, rather than the capacity be utilised only during the winter peaks. In addition, since it is the peak that drives capacity investment these small customers driving it are the ones most requiring a signal to change the profile of their consumption. That is, the small customers which consume in the first block only will pay the highest per unit charge and the greatest collective contribution towards recovery of JGN's LRMC.

Demand haulage service

The demand customer segment includes customers that consume more than 10 TJ per annum. The total cost of service for these customers is comprised of two components:

- the capacity or throughput rate. The throughput rate is charged based on the GJ consumed and has three blocks of consumption whereas the capacity rate is based on chargeable demand and has five blocks of consumption between regions as follows:
    - for country customers it consists of a rate per km for the distance between the customer site and receipt point and a pressure reduction rate charged per GJ of chargeable demand

- for non-country customers it consists of a rate per GJ of chargeable demand

- provision of metering equipment, which is based on the size of meter required.

This segment of the market has a relatively flat load profile[2] throughout the year since most customers will use gas for industrial or manufacturing processes. However, some commercial customers such as hospitals will increase their load in the winter for heating purposes. Nevertheless since commercial customers are smaller compared to the total market segment on average this market segment will not have a high load factor.[3] In addition, since these customers are charged based on their capacity any changes in their load are conveyed to JGN and assessed using the capital contributions framework. Therefore steps up in demand are readily managed by JGN outside of the pricing arrangements for which JGN is seeking to align its LRMC.

Volume haulage service

The volume customer segment includes customers that consume less than 10 TJ per annum. The total cost of service for these customers is comprised of three components:

- the throughput rate which is charged based on the GJ consumed and has six blocks of consumption

- standing charge which is a fixed charge per annum

- provision of metering equipment, which is based on the size of meter provided.

The volume market segment is divided into two tariff classes: coastal and country. Coastal customers are located in the Sydney-Wollongong-Newcastle region, defined by the trunk, and country customers are located across the remainder of NSW.

The volume customer segment tends to have a higher load factor than the demand customer segment. This is due to the fact that this customer segment contains all residential customers which are primarily affected by weather conditions. In addition, small commercial businesses which will be affected by weather for heating load are also contained in this customer segment. Moreover since volume customers are smaller when they connect only their individual impact is assessed which on average will not result in network augmentation whereas larger, demand

[2] Load profile refers to the pattern of consumption.

[3] Load factor describes the relationship between maximum and minimum demand.

customers have known impacts at the time of connection. This means that over time as more volume customers connect the customer segment as a whole causes impacts on the network which need to be addressed through investment in capacity.

3.3.2 Meter Data Services

The meter data service (meter reading) has two tariff classes, one for each of the market segments (volume and demand). Each tariff class pays the following charges:

- *volume* customers pay one of two annual charges which is based on the frequency of meter reading. Larger customers require monthly reading (commercial and industrial) and small customers (residential and small businesses) require quarterly reading

- *demand* customers pay two charges. One relates to the meter reading charge and the other for the provision of communications equipment which facilitates daily meter reading.

4 Approach to Estimating LRMC

4.1 Theoretical Approaches

There are two commonly known approaches for estimating LRMC: the Turvey approach; and the average incremental cost approach. Each of these is discussed below.

4.1.1 Turvey approach

This approach was developed by Ralph Turvey in the context of estimating LRMC for water supply. It involves considering how a least cost capital programme varies for an increment or decrement in demand. The steps required to estimate it can be summarised as follows:

- forecast demand over a medium period (20-30 yrs)

- consider existing capacity to meet the forecast demand

- develop a least cost capital programme to meet the demand not met by existing capital

- increase or decrease forecast demand that is not met by existing capacity by a small but permanent amount and recalculate the least cost capital programme

- calculate the present value (**PV**) of the change in the least cost capital programme divided by the PV of the revised demand forecast compared to the initial demand forecast.

These steps are also carried out for the operating costs associated with the least cost capital programme.

4.1.2 Average incremental cost approach

The AIC approach is a less complicated methodology for calculating LRMC compared to the Turvey approach. The capital component is estimated by undertaking the following steps:

- forecast demand over a medium to long term (20-30yrs)
- consider existing supply capacity and assess its scope to supply demand over the same period
- develop a least cost programme of capital projects that equates capacity with demand over the same period.

This approach can be expressed by the following formula:

$$LRMCC = \frac{PV(\text{growth capital program})}{PV(\text{additional demand})}$$

Since the LRMC also includes operating costs the steps need to be carried out considering operating costs and how they change when demand changes, which can be summarised by the following formula:

$$LRMOC = \frac{PV(\text{marginal operating cost})}{PV(\text{additional demand})}$$

For the purposes of this analysis JGN has utilised the AIC approach. This requires estimates of a capital programme. JGN's network capital expenditure programme is comprised of three major elements, some which are not relevant for the purposes of estimating the impact of additional demand. This is discussed in the section below.

4.2 Categories of Network Capital Investment

There are three categories of network investment at JGN: market expansion; capacity development; and stay-in-business. The first two are driven by growth whereas stay in business is essentially reliability driven. These are each discussed in further detail below.

4.2.1 Market Expansion

Market expansion capital expenditure accommodates routine growth in the network. This is essentially comprised of connections and mains extensions required to facilitate customers connecting to the network. Therefore expenditure for this component of capital expenditure is driven by new customer numbers.

There are three asset types which are installed under this category:

- mains – the pipes in the road
- services – facilitates the connection between the main in the road and the customer's premise
- meters – enables usage measurement.

The size, type and cost to install the above assets relates to the type of customer that is being connected.

Customer types are divided into five categories:

- *electricity to gas (**E to G**)*, or existing dwellings in an established area connect an existing house (or sometimes where a new house is built in its place) that previously did not have gas
- *new estates* connect a house that is being constructed as part of a suburban development whereby the gas mains are laid in conjunction with other services such as electricity, water and communications
- *medium density/high rise* connects multiple dwellings to the gas network
- *industrial and commercial (**I&C**)* provides a larger connection to facilitate a larger load associated with an I&C customer
- *I&C demand* (formally contract) provides a high pressure connection to a demand customer.

Before a customer is connected to the network an assessment is undertaken regarding the future revenue expectations to enable cost recovery of the connection assets and any network augmentation requirements (eg, mains extension). The cost recovery assessment considers:

- the connection assets required (eg, service, meter)
- forecast load

- the period over which the customer will take supply, or in the case of a demand customer the contract term
- the price
- the extent to which any network augmentation is required to facilitate the connection and/or the forecast load, which is assessed using network pressure simulation modelling for large customers.

Any revenue shortfall is charged to the customer as a capital contribution.

4.2.2 Stay-in-Business

Stay-in-business includes improvement, renewal and replacement of aging network assets. This component of the capital programme is driven by the age and reliability requirements of the assets.

4.2.3 Capacity development

Capacity development relates to the expansion of network capacity to accommodate growth. For each class of assets (mains and facilities), the requirements to develop capacity in the network are based on the following types of analysis:

- network pressures close to or below the requirements for reliable supply. This is identified through annual pressure gauging processes and continuous monitoring via telemetry/SCADA
- load forecasts/projections including load movements and customer usage patterns. The capacity is also developed to ensure supply reliability is maintained, and customer contractual obligations are met
- computer modelling and network analyses. Network analysis is used to determine the technical solutions for augmenting the capacity with consideration to the overall efficient development of the network. Modelling of the network incorporates a 1 in 10 winter peak factor[4]
- risk assessments on supply reliability. The timing of the capacity development projects are planned when the risk of loss of supply is expected to become unacceptable and require mitigation.

Therefore, this component of capital expenditure is primarily driven by changes in gas use, whether that is increased consumption or changes in consumption patterns.

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[4] A 1 in 10 winter peak factor measures the occurrence of a peak winter once in ten years.

4.3 Consequences for Long Run Marginal Capital Cost Estimates

To estimate long run marginal capital cost (**LRMCC**) it will be necessary to utilise existing capital expenditure programmes. However, given the above discussion it is clear that since market expansion is driven by customer numbers and stay-in-business is driven by the age of assets, capacity development is the best component to capture the cost impact of changes in incremental demand. Next, it is necessary to discern which tariff classes influence changes in capacity development investments.

Currently demand customers (those consuming more than 10 TJ pa) consume approximately two thirds of the total volume sold in the JGN network. Although volume drives the initial network investment to ensure cost recovery, subsequent investments in capacity are driven by peak demand growth. That is, since services are sold on either a throughput or maximum demand basis, a higher expected volume has a greater probability of ensuring cost recovery of the initial investment.

Peak demand is the maximum consumption drawn from the network. It can be measured on an hourly, daily or annual basis. Peak demand is important for network capacity planning since a network needs to accommodate the maximum volume that can be expected to be required at any given time, otherwise demand management measurements will need to be utilised, such as curtailment or voluntary reduction.

Demand customers contribute less to peak demand compared to its significant position regarding total consumption. This is because these customers generally consume gas to fuel industrial and commercial processes, and so are not affected by weather. Since gas is a heating fuel, weather is a significant factor influencing residential use. Therefore, it is clear that since industrial customers will generally consume the same amount throughout the year, subject to their business operations, residential customers will consume more in the winter when the demand for heat is highest.

As such, during the summer (when there is no heating demand) demand customers make up approximately 70 to 80 per cent of the daily peak demand. During the winter, however, when the annual peak will occur, the volume market will only make up between 45 and 50 per cent of the peak demand. Therefore the future capital requirements of the network are driven largely by the volume market.

5 Application of the AIC Approach

The LRMC estimate has two components, operating (long run marginal operating costs (**LRMOC**)) and capital costs (LRMCC) which are added together for the LRMC estimate. The information sources and method for calculating a unit cost is set out in the following sections. First, however, a discussion of the growth forecast is necessary.

5.1 Growth

Demand over the access arrangement (**AA**) period was forecast by National Institute of Economic and Industry Research (**NIEIR**). JGN transformed the NIEIR customer number forecast into a billings forecast by taking the average between the customers forecast at the beginning and end of each year. This is because the likely number of customers that will pay fixed charges will be somewhere between the number of customers present at the beginning and end of the year, which is represented by the average. Since volumes relate to how much is sold over the entire year this conversion is not necessary. JGN also allocated the NIEIR volume market forecast between the coastal and country customers using the historic average split. For the period following 2014-15 to 2024-25 the average growth rate from the NIEIR forecast over the AA period was applied.

Although the NIEIR forecast is utilised, it does not directly correspond to the forecasting required for capacity development purposes. This is because the NIEIR forecast is done on a 'whole of market' basis whereas for capacity development purposes growth forecasts are necessarily carried out at the suburb level. However, it can be expected that on average the suburb level forecast will sum to the whole of market forecast. In addition, since JGN is estimating LRMC for the purposes of an entire tariff class, a level of averaging is reasonable.

This points to a very necessary departure from the exact application of the AIC theoretical approach, since some of the capacity development forecast is not in response to the NIEIR forecast. Invariably some of the forecast capital will be incurred at the beginning of the period to address growth that has occurred over the current (2005-06 to 2009-10) AA period and so the programme does not entirely address 'new' growth (i.e. it is affected by a backlog of growth from the current AA period. Moreover capacity development will not be forecast to solely supply the near to medium term growth. That is, since most network assets have lives from 50 to 80 years and the relative costs associated with building larger assets are low (due to significant economies of scale) the horizon over which the asset will reach capacity may well be higher than the horizon over which demand is forecast for the purposes of this analysis.

5.2 Capital Costs

To calculate an estimate of LRMCC the following steps were undertaken:

- obtain the capacity development component of the capital programme by project over the forthcoming AA period and the total spend over the following fifteen years

- allocate each project to either the coastal or country region based on the project title, which contains the suburb and general upgrade required
- sum the total spend by region to calculate the proportion of the total to allocate to the escalated total capacity development
- divide the regional capital cost over the period by the change in demand over the period for the corresponding region.

JGN has also endeavoured to examine the change in capital costs per unit of incremental demand over each year and compare the average to the estimate which results from the above approach.

In any analytical assessment it is important to rely on data that will represent a 'typical' scenario in order to draw meaningful conclusions. The capacity development programme is not typical for the first two years of the access arrangement for two reasons:

- a couple of significant projects that were to occur during the current access arrangement were delayed into the forecast access arrangement period
- a couple of significant projects that were to occur towards the end of the forecast access arrangement period have been brought forward.

Project delays have occurred because smaller capital projects have been undertaken in order to prolong significant investment until absolutely necessary. For example, when demand is high and gas is being drawn quickly from the network the pressure drops. When the pressure drops below certain operating pressures the regulators which maintain pressure for downstream infrastructure are compromised. By replacing the regulators with 'low differential' ones it enables the regulator to operate with lower pressures which maintains the downstream capacity. However, if demand continues to increase dropping the pressure below that which the 'low differential' regulator can operate more significant solutions to increase capacity is necessary, such as looping or extending the network.

Projects that need to be brought forward occur when the growth is increasing faster than expected and the temporary solutions (such as installing 'low differential' pressure regulators) are not sufficient to maintain safe operating pressures. Therefore, for the purposes of this analysis the first two years of the forecast access arrangement period are excluded.

5.2.1 Operating Costs

To calculate an estimate of LRMOC, JGN undertook the following steps:

- estimate average incremental operating cost for new capital per customer:

- forecast 'direct' operating costs for 2010-11 are from JGN's standalone and avoidable costs analysis

- operating costs that would be associated with activities for new facilities and mains (eg, routine and corrective maintenance) are summed

- direct opex that would be associated with new capital is divided by the forecast number of customers for the corresponding year

- multiply the incremental operating cost per customer by the forecast incremental customer numbers

- divide the product of the incremental operating cost per customer and forecast incremental customer numbers by the incremental demand for the corresponding year to obtain a cost per GJ.

An average incremental opex per customer is utilised as it is expected that this will best approximate the additional opex. The reason for this is that economies of scale exist in delivering operating activities. This means that the larger the business becomes, the closer it is to the point where average costs will intersect with marginal costs.

6 Results and Application

Under the Rules a distribution network services provider is required to take account of LRMC when setting tariffs and tariff parameters. JGN has shown above through examination of its tariff classes and tariff components that the LRMC compliance assessment should not apply to each component (as supported by rule 94(6)). This is because JGN recovers long run average costs through the building blocks revenue and so some tariff components are designed to recover historic sunk costs.

JGN has also shown that growth in the volume market segment is driving requirements for investment in capacity. This is because changes in capacity in the demand market are assessed using the capital contributions framework whereas only the initial connection is assessed for a volume customer. Given the smaller load of a volume customer the initial impact on the network is low to negligible however over time as more customers are connected the requirement for network augmentation arises.

Therefore JGN estimated the LRMC for the throughput charge for the volume customer tariff classes. JGN relied on forecasts for the capacity development capital programme, Jemena Asset Management's (JAM) direct operating and maintenance costs and the NIEIR forecast. This resulted in an estimate of $27/GJ to $33/GJ ($2009-10) over the period 2012-13 to 2029-30. When JGN utilised the annualised approach the LRMC during the forecast access arrangement period (excluding the first two years) ranges from $13/GJ to $30/GJ ($2009-10) with an average of $19/GJ ($2009-10). Extending the forecast period to 2029-30 resulted in an average LRMC of $32/GJ ($2009-10). These compare to JGN's proposed volume haulage throughput tariff block 1 prices of approximately $13/GJ ($2009-10).

Although JGN does not currently experience significant capacity constraints to warrant stronger price signalling, this range demonstrates that JGN's prices are within the estimated range when the annualised approach is utilised. This means that tariffs are currently approximating the near term capital costs of additional capacity. Importantly the tariffs are at the bottom of the range such that should capacity constraints arise an increase in throughput prices would be consistent with JGN's estimated LRMC. When the LRMC is estimated over the entire period the range is higher than current throughput tariffs however this is consistent with the view that JGN's prices are currently designed to encourage consumption which is consistent with JGN's marketing strategy and the desire to improve utilisation and thereby lower average prices over time.