Jemena Gas Networks (NSW) Ltd

2015-20 Access Arrangement Information

Appendix 13.1

Rule considerations in setting network tariffs

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TABLE OF CONTENTS

List of tables

GLOSSARY

AAI	Access Arrangement Information
AIC	Average Incremental Cost
capex	Capital Expenditure
LRMC	Long run marginal costs
NGR	National Gas Rules
O&M	Operational and Maintenance
opex	Operating Expenditure
TSS	Tariff Structures Statements
UAG	Unaccounted for Gas

1. INTRODUCTION

1. Chapter 13 of the 2015-20 Access Arrangement Information (**AAI**) outlines how JGN's tariffs are efficient and reflect its different customer bases. Rules 94(3) and 94(4) of the National Gas Rules (**NGR**) require JGN undertake tests on our tariffs (refer Box 1–1). The values estimated include:

   - stand-alone and avoidable costs for each tariff class (provided below)
   - long-run marginal costs (**LRMC**) for each tariff class and tariff parameter (provided in chapter 13 of the 2015-20 AAI).

2. This appendix is set out as follows:

   - *section 2*—provides the stand-alone cost, avoidable cost and expected revenue estimates for each tariff class, noting that expected revenue for each tariff class falls within these efficiency bounds
   - *section 3*—describes the logic for applying the pricing principles including stand-alone cost, avoidable cost and why we take account of LRMC
   - *section 4*—describes JGN's approach to estimate stand-alone cost, avoidable cost and LRMC for each tariff class
   - *section 5*—itemises JGN's prudent discounts.

3. JGN's approach is consistent with other gas and electricity network businesses.

4. JGN also considers a set of pricing objectives in setting its network tariffs and the feedback of our customers. JGN details these in our tariff structures statements (**TSS**) at appendix 1.8 to the 2015-20 AAI.

Box 1–1 National Gas Rules relevant to setting tariffs 94(3) and 94(4)

94(3) 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.

94(4) 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;
- must be determined having regard to:
  - transaction costs associated with the tariff or each charging parameter; and
  - whether customers belonging to the relevant tariff class are able or likely to respond to price signals.

94(5) If, however, as a result of the operation of sub-rule (4), the service provider may not recover the expected revenue, the tariffs must be adjusted to ensure recovery of expected revenue with minimum distortion to efficient patterns of consumption.

2. STAND-ALONE AND AVOIDABLE COST ESTIMATES

5. Rule 94(3) requires that the expected revenue recovered for each tariff class should lie on or between the stand-alone cost of providing the reference service and the avoidable cost of not providing the reference service.

6. JGN's stand-alone and avoidable cost estimates for each tariff class are contained in Table 2–1. This demonstrates that the expected revenue for each tariff class sits between the two efficiency measures.

Table 2–1: Efficient bounds for expected revenues ($nominal, $000)

	Avoidable Cost	Revenue	Stand-alone cost	Compliance check
VI-Coastal	$58,843	$476,099	$1,678,979	Compliant
VI-Country	$9,428	$57,192	$360,989	Compliant
VB-Coastal	$27	$606	$319,813	Compliant
VB-Country	$1	$21	$128,516	Compliant
VRT-03	$7	$203	$167,223	Compliant
VRT-04	$66	$299	$167,177	Compliant
VRT-06	$0	$0	$125,258	Compliant
VRT-10	$0	$0	$125,258	Compliant
DC-1	$443	$3,379	$326,243	Compliant
DC-2	$858	$5,982	$342,066	Compliant
DC-3	$1,241	$10,879	$355,684	Compliant
DC-4	$507	$4,931	$335,794	Compliant
DC-5	$0	$0	$327,533	Compliant
DC-6	$406	$2,371	$288,825	Compliant
DC-7	$278	$2,396	$289,027	Compliant
DC-8	c-i-c	c-i-c	c-i-c	Compliant
DC-9	$0	$0	$277,287	Compliant
DC-10	$138	$828	$281,822	Compliant
DC-11	$0	$0	$277,148	Compliant
DC- Country	$537	$3,664	$328,425	Compliant
DT	$18	$3,297	$125,276	Compliant
DMT-1	c-i-c	c-i-c	c-i-c	Compliant
DMT-2	c-i-c	c-i-c	c-i-c	Compliant
DMT-3	c-i-c	c-i-c	c-i-c	Compliant
DMT-4	$0	$0	$125,258	Compliant
DMT-5	$0	$0	$125,258	Compliant
DCFR-6	c-i-c	c-i-c	c-i-c	Compliant

	Avoidable Cost	Revenue	Stand-alone cost	Compliance check
DMTFR-3	c-i-c	c-i-c	c-i-c	Compliant

(1) Costs are annualised stand-alone and avoidable costs.

Source: JGN cost of services model

3. THE EFFICIENCY MEASURES

3.1.1 STAND-ALONE AND AVOIDABLE COSTS

7. Rule 94(3) requires that for each tariff class, the expected revenue 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 tariff class
   - a lower bound representing the avoidable cost of not providing the reference service to those customers.

8. The purpose of applying stand-alone 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.

9. Stand-alone costs for each tariff class are the costs of providing a distribution network to supply only that tariff class. This is an upper bound because the network business supplying only one tariff class would not achieve the same economies of scale of supplying multiple tariff classes. Avoidable costs for each tariff class are the costs a network business would avoid were the tariff class to no longer exist. This only includes costs related to dedicated assets and operations and is therefore generally a relatively low value.

10. These stand-alone and avoidable cost bounds are the highest and lowest theoretical prices that a distributor could charge a customer class without inefficiently imposing costs on that customer class or other customer classes. That is, pricing outside these efficient bounds implies inefficient levels of cross subsidisation between customer classes if the business is recovering its costs.

3.1.2 LONG-RUN MARGINAL COST

11. Rule 94(4) requires the distribution network service provider to take into account LRMC in setting tariffs.

12. The purpose of taking LRMC into account when setting tariffs and tariff parameters reflects the economic principle that prices should reflect the underlying costs of providing the service. As consumption increases the capacity of the network, augmentation is required to accommodate the additional demand. Therefore in order for consumption decisions to take into account these increased costs, current prices should reflect the expected additional costs arising from additional consumption.

13. Prices set on the basis of marginal costs provide a signalling function to ensure customers make efficient consumption decisions at the margin. However, the NGR permits a distribution business to recover its building block cost of services, which includes a return on sunk costs and prices can therefore be expected to exceed LRMC—this point is acknowledged by rule 94(5).

14. LRMC differs from an estimate of short-run marginal costs as it assumes that all inputs can feasibly be altered so as to capture the cost of building additional capacity.

4. ESTIMATING THE EFFICIENCY MEASURES

4.1 STAND-ALONE AND AVOIDABLE COSTS

15. To estimate the stand-alone and avoidable cost for each tariff class, JGN has, where possible, linked each asset to one or more tariff classes. The linkage depends on an engineering assessment of whether that tariff class would require the asset in a stand-alone network that served only that tariff class.

16. JGN allocates each individual asset type to tariff classes in three steps:

- identify asset classes for each tariff class
- where possible, map dedicated and shared assets to tariff classes
- where mapping has not proven possible, estimate the asset data (optimised kilometre of pipeline assets, optimised diameter of pipeline assets and number of optimised non-pipeline assets) by tariff class.[1]

17. Asset classes for each tariff class are determined based on an assessment of the physical use of the network. Customers in the lowest consumption tariff classes (i.e. the individually and boundary metered volume tariff classes) utilise almost all of the asset classes. By comparison, larger consumption or demand customers use fewer asset classes as they might generally only need to be connected to higher capacity components of the network. For example, customers in demand tariff classes are typically connected to higher capacity assets such as the trunk, primary and secondary mains and not to lower capacity assets such as medium and low pressure mains.

18. All asset classes (and the asset types associated with each asset class) fall into two broad categories:

- *dedicated assets*—assets that serve only one particular end customer, such as demand and volume meters and services. Dedicated assets associated with each customer (and their associated tariff classes) are directly allocated to that tariff class
- *shared assets*—assets that are utilised by more than one customer. The assets can be shared by customers within the same tariff class and also with customers in different tariff classes.

19. By establishing this split, JGN is also able to estimate the avoidable cost for each tariff class as the value of the dedicated assets established above.

4.1.1 STAND-ALONE COSTS

20. The stand-alone cost for each tariff class comprises both capital expenditure (**capex**) and operating expenditure (**opex**) as follows:

- Capex costs include the costs of building a gas distribution network that only supplies customers within that tariff class to the required standard, availability and quantity. This hypothetical network would be smaller (i.e. dedicated) than JGN's existing shared network, and the annualised replacement cost of this hypothetical network, together with the annualised replacement cost of the dedicated assets, forms the capex component of the stand-alone cost

[1] The estimation process avoids the need to allocate dedicated and shared assets to tariff classes in recognition of the limited granularity of asset data. It also avoids the need to perform asset scaling (optimisation) as optimised data can be entered straight into the model.

- Opex costs include the annual costs of maintaining and operating the assets required to supply gas to customers within that tariff class. This includes targeted aspects of the shared network and the dedicated assets for the tariff class.
- For each tariff class, JGN calculates the stand-alone cost as follows in Box 3–1

Box 3–1 Stand-alone cost calculation

SC = DA + SA + OA + NA

Where

- SC is the stand-alone cost
- DA is the annualised dedicated asset cost
- SA is the annualised shared asset costs
- NA is the annualised non-system asset costs
- OA is the annual operation and maintenance and other opex associated with the assets

4.1.2 AVOIDABLE COSTS

21. The avoidable cost for each tariff class comprises both capex and opex as follows:

- capex includes the replacement value of dedicated connection assets such as meters and services
- opex includes the costs associated with operating and maintaining the dedicated connection assets.

22. For each tariff class, the JGN calculates the avoidable cost as follows in Box 3–2.

Box 3–2 Avoidable cost calculation

AC = DA + OD

Where

- AC is the avoidable cost
- DA is the annualised dedicated asset cost
- OD is the annual operation and maintenance cost associated with dedicated assets

4.2 LONG-RUN MARGINAL COST

4.2.1 HIGH LEVEL APPROACH

23. To ensure a robust approach to calculation LRMC, JGN considered both the Turvey approach and the average incremental cost (**AIC**). The Turvey approach aims to capture the direct change in expenditure resulting from multiple scenarios of changes in demand whereas the AIC approach captures the average change in expenditure. For this reason the AIC approach is more readily applied.

24. JGN has therefore used the AIC approach in order to estimate the LRMC for each tariff and each tariff parameter. In opting for an AIC approach, JGN has considered the approved approaches of other gas distributors for which an AIC approach is common.

25. The AIC approach examines a forecast demand profile and the portion of demand that is beyond the current supply capacity. A cost minimising quantity of capex and opex necessary to supply the incremental demand is then calculated. The present value (**PV**) of the total expenditure necessary to supply the incremental demand is then divided by the present value of the additional demand, to provide an estimate of the LRMC on a dollars per unit (of demand) basis. This formula can be expressed as:

LRMC = PV(expected costs of the optimal network)/PV(additional demand supplied)

Where:

- *expected costs of the optimal network* is the forecast annual growth-related capex in shared network assets required to meet additional demand over the forecast period plus the forecast annual growth-related opex required to operate and maintain the shared network assets required to meet additional demand over the forecast period.
- *additional demand supplied* is the change in gas demand (in gigajoules) over the forecast period.

26. Given growth in customer demand drives expenditure on shared network assets, only forecast capex and opex relating to forecast growth of the shared network is included in the LRMC estimate. No forecast expenditure related to connection assets are included as these are dedicated to specific customers and driven purely by customer numbers and not demand.

27. JGN adopted a forecast period of 13 years. This reduces the susceptibility of the model to long-range forecasts with associated reduced levels of reliability.

4.2.2 STEPS FOR CALCULATING LRMC FOR TARIFF CLASSES AND PARAMETERS

28. In accordance with rule 94(4), JGN is required to calculate LRMC for each tariff and charging parameter (where there are two or more charging parameters).

29. JGN calculated the LRMC for each tariff class using the following steps:

1. The annual customer numbers for the tariff class, as forecast by JGN, are used to determine the annual change in customer numbers for the tariff class
2. The annual change in customer numbers for the tariff class are used to determine the annual change in demand by multiplying the annual change in customer number by the average peak demand (in gigajoule (**GJ**) per customer)
3. The PV of the annual change in demand for the tariff is determined using the annual change in demand and current and forecast WACC values
4. Annual future growth capex is allocated to each tariff class and each asset class based on the engineering assessment allocations
5. The PV of the annual future growth capex is determined using the annual future growth capex and a forecast WACC value
6. The annual operational and maintenance (**O&M**) cost is estimated by determining the per-GJ O&M cost based on historical data and determine the incremental O&M cost each year based on the per-GJ O&M cost multiplied by the number of new customers multiplied by the annual GJ per customer.

7. An allocation of the Unaccounted for Gas (**UAG**) cost is also included the in estimated O&M cost based on the Average Energy Cost per GJ multiplied by the number of new customers multiplied by the annual GJ per customer multiplied by 0.45% (for demand tariff classes) or 5.44% (for volume tariff classes)[2]

8. The PV of the annual O&M costs associated with the future growth capex for the tariff is determined using the annual O&M costs associated with the future growth capex and the forecast WACC value for the upcoming AA

9. JGN calculates the AIC for the tariff class by dividing the PV of the growth related capex and opex by the PV of the annual change in capacity for the tariff.

30. JGN's charging parameters for the volume tariff classes include a 'dollar per annum', 'dollar per GJ' and 'dollar per GJ of chargeable demand'. For the purposes of calculating the LRMC for each charging parameter, JGN applied the following principles:

- The fixed charge component should recover the cost of dedicated assets and fixed operational costs (i.e. costs that do not vary depending on consumption or demand).
- The variable charge components should recover the cost of shared assets and variable operational costs (i.e. costs that in some way vary depending on consumption or demand).
- To calculate its tariff parameter LRMC values, JGN the followed similar steps to the tariff classes above but needed to tailor these steps for each charging parameter.

31. The LRMC estimates resulting from this process are provided in chapter 13 of JGN's 2015-20 AAI.

[2] Refer AAI appendix 7.5 for derivation of the forecast UAG.

5. PRUDENT DISCOUNTS

32. JGN has three prudent discount arrangements in place. Consistent with rule 96(2), the provision of these prudent discounts goes towards improving the efficiency of the network and leads to tariffs lower than they would have otherwise have been without the discounts. The discounted revenue from these users contributes to reference services revenue. Without this revenue, other sites would be subject to higher reference tariffs.

33. Table 5–1 details JGN's prudent discounts.

Table 5–1: c-i-c

Name	Details	Justification	Negotiated revenue ($2014)	Estimate of avoidable cost
c-i-c	c-i-c	c-i-c	c-i-c	c-i-c
c-i-c	c-i-c	c-i-c	c-i-c	c-i-c
c-i-c	c-i-c	c-i-c	c-i-c	c-i-c