Jemena Gas Networks (NSW) Ltd

2015-20 Access Arrangement Information

Appendix 1.7

G Swier – Economic considerations for the interpretation of the National Gas Objective

Public

30 June 2014

Jemena

Economic considerations for the interpretation of the National Gas Objective

Expert Report prepared by Geoff Swier for Jemena Gas Networks (NSW) Ltd

23 May 2014

Farrier Swier
Consulting

Level 7, 330 Collins Street, Melbourne
Victoria 3000 Australia

Telephone 613 9612 1900
Facsimile 613 9612 1999
www.farrierswier.com.au

Table of Contents

1. Introduction

1.1 Terms of reference

1. I have been engaged by Jemena Gas Networks (NSW) Ltd (JGN) to prepare an expert report on four questions concerning the interpretation of the National Gas Objective (NGO) for the National Gas Law (NGL).[1]

2. In summary these questions are:

   - What is the meaning of the NGO?
   - How should an economic regulation regime be designed to promote the NGO?
   - Is the building blocks approach likely to contribute to the achievement of the NGO?
   - What are the consequences of material error in the application of the building blocks approach for achieving the NGO, what is the nature of those consequences, and do the risk consequences differ depending on the nature or the direction of the error?

3. The context for this report is that JGN is preparing its revised Access Arrangement proposal (AA proposal) with supporting information for its network, for the consideration of the Australian Energy Regulator (AER). JGN is now in the process of framing its AA proposal within the relevant provisions of the NGL and National Gas Rules (NGR) for submission to the AER by 30 June 2014.

4. A critical element of the NGL is the NGO which is:

> *"to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas."*

5. Under section 28 of the NGL the AER must, in performing or exercising any of its economic regulatory functions or powers, perform or exercise those functions or powers in a manner that will or is likely to contribute to the achievement of the NGO.

6. Further, under recent changes to section 28 of the NGL, in making certain regulatory decisions (including decisions on whether to approve an access arrangement), the AER must:

[1] National Gas (South Australia) Act 2008 version 19 December 2013.

- specify the manner in which the constituent components of the decision relate to each other, and the manner in which that interrelationship has been taken into account in the making of the decision; and
- if there are two or more possible decisions that will or are likely to contribute to the achievement of the NGO, make the decision that the AER is satisfied will or is likely to contribute to the achievement of the NGO to the greatest degree.

7. JGN states that it is seeking to formulate its AA proposal in a way that contributes to achieving the NGO to the greatest degree. To assist in formulating and supporting the proposal, JGN seeks to better understand the implications of the NGO for its AA proposal and its consideration by the AER. In particular, JGN seeks to better understand whether the application, and correct application, of the building blocks framework in the NGR is likely to contribute to the achievement of the NGO, and the consequences of material error in the application of the building blocks approach.

8. The full terms of reference are at Attachment A.

1.2 Qualifications

9. This report has been prepared by Geoff Swier, Director, Farrier Swier Consulting. I have a Masters of Commerce degree in Economics. I have over 20 years' experience in the application of economic regulation to network businesses, having acted as a policy maker, adviser, regulator and consultant to regulators and network businesses across the gas, electricity and other infrastructure sectors in Australia and New Zealand. I have prepared a number of expert economic reports and been a member of dispute resolution panels. My full curriculum vita is at Attachment B.

10. I have been assisted in the preparation of this report by Shaun Dennison. Shaun has a finance and accounting background, and experience in corporate advisory and project management roles focusing on energy sector reform and privatisation. Previously, he was a senior manager with KPMG Corporate Finance. He has a Bachelor of Commerce degree in Finance and Accounting and is a Graduate Member of the Australian Institute of Company Directors.

1.3 Federal Court Practice Note

11. I confirm that I have read, understood and complied with the Federal Court Practice Note on Expert Witnesses in Proceedings in the Federal Court of Australia (CM 7).

1.4 Approach to interpretation

12. The interpretation of the NGO in this expert report is within the context of the economic regulation of JGN's gas distribution pipeline services.[2]

13. This expert report requires interpretation of certain provisions of the NGL and NGR. As required by the NGL, I have adopted a 'purposive' approach[3] - that is, an interpretation that will best achieve the purpose of object of the Law. I also have had regard to 'law extrinsic material' and 'rule extrinsic material'.[4]

[2] The NGL provides a framework for regulation of a range of activities and markets. Economic regulation of gas pipelines is one important aspect. Other markets regulated by the NGL include competitive gas transmission pipelines, wholesale and retail gas markets. I consider that the interpretation of the NGO will have a different focus and emphasis depending on the context.

[3] In the interpretation of a provision of this Law, the interpretation that will best achieve the purpose of object of this Law is to be preferred to any other interpretation. Schedule 2, clause 7 NGL.

[4] Schedule 2, clause 8(3) NGL.

2. Summary

Question1. What is my understanding of the NGO ?

14. As an expert economist I have the following understanding of the NGO:

- The NGO is an economic concept. The terms 'efficient investment in, and efficient use of natural gas services for the long term interest of consumers' have a clear meaning in economic theory and in the practical application of economic regulation.
- The reference to 'efficient investment in, and efficient operation and use of natural gas services,' in the NGO encompass productive, dynamic and allocative economic efficiency, which are outcomes expected in a workably competitive market over the long run.
- Productive (or technical) efficiency means that natural gas services are produced at minimum cost, using the least-cost combination of inputs. Allocative efficiency means that the right amount of the right type of natural gas service is produced and consumed, and resources cannot be reallocated in a manner that results in a higher valued bundle of outputs. Dynamic efficiency means that allocative and productive efficiency continues to be achieved over time.
- The reference to 'efficiency….for the long term interest of consumers' in the NGO means that investment, operation and use of natural gas services are productively, allocative and dynamically efficient in the long term by ensuring that:
  - tariffs, and regulated service standards are set in a manner that avoids the potential harm to consumers from gas pipeline businesses exercising market power and should reflect what would occur in a workably competitive market;
  - investors in regulated gas pipeline businesses are provided with comfort that they will have a reasonable opportunity to recover their past costs, their expected future costs and to earn a reasonable rate of return such that it is commercially attractive for them to undertake appropriate capital investment in long lived, immovable assets; and
  - the rule maker and the regulator are directed to implement economic regulation in a way that creates incentives for gas businesses to invest and operate efficiently and to reveal information on their efficient costs.
- The NGO limits the types of benefit that may be considered to only those that relate directly to the provision and consumption of gas services, and ignores possible external costs and benefits.

- The promotion of the long term interests of consumers with respect to price, quality, safety, reliability (but not security) of supply are relevant considerations in the context of JGN's AA proposal.

Question 2. How should an economic regulation regime be designed to promote the NGO?

15. There are a number of important design issues for any effective economic regulation regime, one of which is the basis on which the regulation of revenues should be determined.

16. Economists, when dealing with any complex infrastructure such as gas distribution with unique characteristics have no way of judging what level of revenue allowance would best promote the NGO without reference to some form of model or framework.

17. In selecting a model for determining regulated revenues and an institutional framework for applying the model that would meet the NGO, I consider that an economist would define three principles that such a model would need to meet:

    - it should limit the service provider's ability to exercise market power so that prices and service outcomes are consistent with what would be observed in a workably competitive market
    - it should establish and maintain a regulatory commitment through time which provides the service provider with a reasonable expectation that it can recover the efficient costs of providing the services (including a rate of return)
    - it should be able to be implemented in a way that creates incentives for gas businesses to invest and operate efficiently and where possible, to reveal information on their efficient costs.

18. The building block approach is the most common framework in Australian regulatory practice for determining regulated revenues or regulated prices for natural monopoly infrastructure. It is capable of being implemented in a way that meets each of these principles.

19. The implementation of an economic regulatory regime means that the choice of model and the institutional framework for how it is applied are closely interrelated.

20. Australia in common with other developed countries, has established a legal framework that includes obligations and constraints on the conduct of the regulator in determining allowed revenues for regulated service providers.

21. In my opinion the following features of the Australian institutional arrangements for applying the building blocks approach to gas distribution

regulation, have been designed to promote consistent and predictable regulatory decision making through time:

- requiring the regulator to take into account the NGO and the Revenue and Pricing Principles (RPPs);
- separation of the functions of review and amendment of the rules from rules application; and
- setting out in the NGRs certain detailed requirements about how each component of the building blocks approach is to be determined.

22. This consistency and predictability should help promote the long term interests of consumers by providing an assurance to service providers that they will have a reasonable opportunity to recover the efficient costs of providing the service (including a rate of return) over time.

Question 3. Is the building blocks approach likely to contribute to the achievement of the NGO?

23. I consider the building blocks approach (specifically, the NGRs that set out the building blocks approach) is likely to contribute to the achievement of the NGO because:

- the long term interests of consumers are promoted by the requirements of the NGR for the AER to review service providers expenditure forecast in the AA proposal, and applying tools and processes to ensure that allowed expenditures are based on the costs that would be incurred by a prudent service provider acting efficiently, and rates of return are commensurate with regulatory and commercial risks involved in the provision of the service
- regulated service providers are provided with the conditions within which they have assurances and incentives to make long term investments to meet the long term needs of consumers
- it provides regulated business with incentives to become more efficient over time.

24. Conceptually, the building blocks approach is a logical basis on which to accurately estimate the total revenue requirement and, in turn, reference tariffs.

25. Detailed analysis of each rule that determines the calculation of the building blocks components shows they promote the NGO. This is discussed in section 5.2.

26. Taking together the analysis of how the building blocks fit together and considering how each building blocks rule individually supports the NGO demonstrates that the building blocks approach (correctly applied) is likely to contribute to the achievement of the NGO.

27. A new aspect for operationalising the NGO in decision-making is government's policy decision that merits review should 'consider all interlinked matters.' I interpret an interlinked matter to mean that there should be a logical and consistent treatment of different constituent elements of a determination, where there are logical economic relationships between them.

Question 4. The outcome for the NGO of material error in the estimation of a building blocks component

28. A material error in the estimation of a building blocks component would arise from an incorrect or mistaken application of a relevant rule setting out how building blocks expenditure component is to be determined.

29. A material error in the estimation of a building blocks component will, logically change the calculation of the total revenue requirement, because of the additive nature of the building blocks calculation.

30. Such a difference in the calculation of the total revenue requirement will have an adverse effect on the achievement of the NGO where this has consequences that, overall, adversely affects the ability of the business to meet any of its standards and obligations or, otherwise harms the long term interest of its consumers.

31. The nature of the harm to the long term interest of its consumers resulting from a material error will depend on the relevant rule and the particular links to economic efficiency and the long term interest of consumers implied in that rule. This is discussed further in section 6.1.2.

32. A test that could be applied to determine whether the outcome of a material error is likely to contribute to the achievement of the NGO would be to identify the specific linkages between the relevant rules and the NGO.

3. Question 1: The meaning of the NGO

33. The objective of the NGL is:

> *...to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.*[5]

34. This section sets out my answer to Question 1 of the terms of reference (TOR):

> *As an expert economist, do you have a particular understanding of the NGO and, if so, what is your understanding of the NGO?*

3.1 The National Gas Objective

35. The NGO binds all decision makers in the revenue and tariff setting process, including the rule maker - the Australian Energy Markets Commission (AEMC), the regulator - the Australian Energy Regulator (AER) and the review body - the Australian Competition Tribunal (Tribunal).

36. I note that the NGL second reading speech stated that:

> *The long term interests of consumers of gas requires the economic welfare of consumers, over the long term, to be maximised. If gas markets and access to pipeline services are efficient in an economic sense, the long term interests of consumers in respect of price, quality, reliability, safety and security of natural gas services will be maximised.*[6]

37. The Limited Merits Review provisions in the NGL were recently amended.[7] Government policy statements confirm that it is the government's intent that the long term interests of consumers 'should be the sole criterion for determining the preferable decision', both by the primary decision maker (the AER) and by the Tribunal at merits review.

3.2 Revenue and pricing principles

38. As an economist expert in economic regulation I consider that the NGO together with the RPPs provide the overarching framework of the parts of the

[5] Section 23 NGL.

[6] National Gas (South Australia) Bill 2008, second reading speech, the Hon. P. F. Conlon.

[7] The Statutes Amendment (National Electricity and Gas Laws—Limited Merits Review) Bill 2013 amended the National Gas (South Australia) Act 2008.

NGL dealing with economic regulation of gas pipelines.[8] The RPPs provide the next level of detail below the NGO in the hierarchy of the Law and assist in understanding the meaning of the NGO.

39. The RPPs[9] are:

> *(2) A service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs (a) providing reference services; and (b) complying with a regulatory obligation or requirement or making a regulatory payment.*
>
> *(3) A service provider should be provided with effective incentives in order to promote economic efficiency with respect to reference services the service provider provides. The economic efficiency that should be promoted includes– (a) efficient investment in, or in connection with, a pipeline with which the service provider provides reference services; and (b) the efficient provision of pipeline services; and (c) the efficient use of the pipeline.*
>
> *(4) Regard should be had to the capital base with respect to a pipeline adopted (a) in any previous (i) full access arrangement decision; or (ii) decision of a relevant Regulator under section 2 of the Gas Code; (b) in the Rules.*
>
> *(5) A reference tariff should allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service to which that tariff relates.*
>
> *(6) Regard should be had to the economic costs and risks of the potential for under and over investment by a service provider in a pipeline with which the service provider provides pipeline services.*
>
> *(7) Regard should be had to the economic costs and risks of the potential for under and over utilisation of a pipeline with which a service provider provides pipeline services.*
>
> *Note: I have highlighted pertinent aspects to my opinion.*

40. The RPPs are binding on decision makers in the revenue and tariff setting process. The AEMC must in amending the NGR take into account the RPPs[10]; and the AER must take into account the RPPs when approving reference tariffs.[11]

41. In the next section I discuss how each RPP promotes the NGO.

[8] The NGL deals a range of other activities and markets besides economic regulation of gas pipelines.

[9] Section 23 NGL

[10] Section 293 NGL.

[11] Section 28(2)(b) NGL.

3.3 Economic efficiency

42. The NGO includes reference to 'efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers….' This section discusses my understanding of the meaning of economic efficiency in the context of natural gas services.

43. Economic efficiency implies an economic state in which resources are optimally allocated to serve each person in the best way while minimising waste and inefficiency.

44. It is common for economists to distinguish between three different dimensions to economic efficiency:

- Productive (or technical) efficiency
- Allocative efficiency
- Dynamic efficiency.

45. I apply the different dimensions of economic efficiency in section 5 when assessing how the rules that underpin the building blocks approach are likely to contribute to the achievement of the NGO; and in section 6 when assessing the consequences of material error in the application of the building blocks approach.

3.3.1 Productive efficiency

46. Productive (or technical) efficiency means that goods and services are produced at minimum cost using the least-cost combination of inputs.

47. Productive efficiency in the context of regulated infrastructure services includes for example:

- selecting an efficient combination of capital and operating resources
- selecting capital assets that minimise life cycle costs
- implementing capital expenditure projects efficiently
- adopting least cost efficient operating and maintenance processes and techniques.

3.3.2 Allocative efficiency

48. Allocative efficiency means that the right amount of the right type of the good or service is produced and consumed, and resources cannot be reallocated in a manner that results in a higher valued bundle of outputs.

49. Allocative efficiency in producing gas distribution business services includes setting price structures and price levels over time that are 'cost reflective' and

that provide price signals to encourage consumers to use gas efficiently.[12] This is consistent with the 'efficient use' part of the NGO.

50. Allocative efficiency also includes:

- understanding changing market requirements and consumer and stakeholder needs and planning business investment and operations accordingly
- adopting good demand forecasting practices that support efficient network planning expansion to meet demand and avoiding significant over or under investment. [13]

3.3.3 Dynamic efficiency

51. Dynamic efficiency means that allocative and productive efficiency continues to be achieved over time. It concerns adaption to changes in technology, managerial processes, and consumer tastes and encompasses efforts to improve performance and innovate. This is consistent with the long run 'efficient investment in', 'efficient operation of' and 'efficient use of' elements of the NGO.

52. Dynamic efficiency in producing gas distribution business services includes:

- acquiring and managing information that assists in businesses making better decisions
- seeking continuous improvement in all aspects of business investment and operation practices
- management and workforce training and development.

[12] It may be efficient to build pipeline capacity ahead of demand. This leads to questions such as the efficient structure of tariffs over time. For example, it may be efficient to recover pipeline costs by lower tariffs early in the investment cycle, when there is spare capacity and by higher tariffs at a later time when there is not. The 'long term interest of consumers' will therefore be promoted where, amongst other things, tariffs are set so as to promote efficient pipeline utilisation. This interpretation is supported by RPP section 24(7) of the NGL which states that 'regard should be had to the economic costs and risks of the potential for under and over utilisation of a pipeline…'

[13] The 'long term interest of consumers' will be promoted where an optimal balance is struck between under and over investment in a pipeline. Gas pipelines are often characterised by investment 'lumpiness' with investment patterns often exhibiting step changes over time. Under or over investment can occur for a range of reason. For example, if a long term investment planning perspective is adopted then it may be optimal to invest in capacity increments ahead of demand. A decision maker only concerned with the interest of minimising costs for today's consumers could favour investing in small increments to match increase in demand, or defer investment - even if this was sub optimal in the long term (leading to higher costs, or the risk of shortages for future consumers). Other potential causes of over (or under) investment include circumstance where service standards have been set too high (or too low); or the rate of return is set too high (too low). This interpretation is supported by RPP section 24(6) of the NGL which requires that 'regard should be had to the economic costs and risks of the potential for under and over investment in a pipeline'.

3.4 What economic problems does the NGL seek to address?

53. In my option, further guidance on the meaning of the NGO can be gained by asking the question:

> *what are the economic problems the parts of the NGL dealing with economic regulation of gas pipelines are trying to address?*

54. Based on my review of the law extrinsic material and the economic literature, in my opinion there are three overarching problems:

- The potential for exercise of market power by gas pipelines such that price or service standard outcomes are not consistent with what would be expected from a workably competitive market in the long run - which can harm the long term interests of consumers.
- The 'regulatory commitment' problem. If the government does not establish a sustainable ex ante legally binding regulatory commitment for how gas pipelines are to be regulated then this could potentially harm the long term interests of consumers.
- The economic regulation regime established to address the first two problems, if not properly designed or applied, may itself result in avoidable inefficiencies - which would harm the long term interests of consumers.

55. Each of these problems is discussed below. I set out how the resolution of these problems and the relevant RPPs assist in understanding the meaning of the NGO.

3.4.1 The market power problem

56. The cost function for gas distribution pipelines is characterised by declining costs to scale and network characteristics.[14] There are also often significant amenity costs in constructing and maintaining gas pipelines.[15] These features mean it is economically efficient (and socially desirable) to build a single gas distribution pipeline network to serve a particular market. These circumstances give rise to concerns about the potential for the exercise of market power by a commercially[16] motivated gas distribution business.

[14] Network economics refers to business economics that benefit from the network effect. This is when the value of a good or service increases when others buy the same good or service.

[15] For example, the need to bury pipelines underground and consequent need to dig up roads.

[16] Another way in which market power in gas networks can be managed is through government ownership. However, gas distribution in Australia is now privately owned.

57. The extent to which market power is a concern in practice depends on the specific situation including the extent of any countervailing forces that limit the ability of a gas pipeline to exercise market power. Typical countervailing constraints on the exercise of market power include competition in the energy market from other energy sources, the existence of long term contracts with consumers, or the ability of the user to bypass the pipeline.

58. For example, consumers in a market may have access to a range of options for powering their domestic appliances, including electricity (whether sourced through the grid, or from alternative sources such as solar) and gas (reticulated or bottled gas). This means a gas distributor may have incentives to set prices competitively for those parts of the market that are subject to competitive rivalry from other fuel sources; promote the benefits of using natural gas; and maintain or enhance its reputation as a reliable supplier.

59. However, a gas pipeline is likely to have significant market power where (a) it has profit maximising incentives under commercial ownership and (b) where it faces insufficient countervailing competitive constraints on pricing.

60. The incentive and the ability to exercise market power could harm the interest of consumers of natural gas directly and indirectly. The direct harm includes the potential for consumers being charged excessive prices that are materially above the prices that would be expected if the market were workably competitive; being provided with unsatisfactory standards of service; or not being able to access the pipeline or to transport the amount they would like to transport. The indirect harm could be reduced competition in upstream and downstream markets. High gas distribution prices for example may limit opportunities for marginal gas producers to enter the competitive upstream gas production market.

61. Therefore, a second purpose of the NGL and NGR is to determine:

- Whether a gas pipeline has sufficient market power that it should be subject to economic regulation - the 'coverage decision'[17]
- If the gas pipeline is to be covered, to determine the type of economic regulation that best addresses the extent of market power (for example 'full regulation', or 'light regulation'[18])
- And where full regulation applies, how it should be undertaken to protect the interests of consumers from the exercise of market power by the gas pipeline business.

[17] Part 4 NGR.

[18] Part 7, Division 1 NGR.

Conclusion

62. The reference to 'promotion of ....the ... interests of consumers' means, in part, setting reference tariffs in a manner that avoids the harm to consumers from the potential exercise of market power.

3.4.2 The regulatory commitment problem

63. Gas pipeline businesses comprise capital intensive, durable, long lived and immovable assets. A pipeline network with these features is typically the most efficient way to distribute gas to consumers located in cities and towns close to gas supplies.[19] The JGN network is an example of such a gas pipeline business.

64. Economic literature[20] and practical experience concerning infrastructure with such features suggest that in the absence of any legally entrenched economic regulation framework, public officials concerned with the short term interest of consumers may have rational incentives to make opportunistic decisions to regulate prices so as to benefit current consumers at the expense of investors.[21]

65. Newbery, for example, states:

> *What would be needed to persuade investors to sink their money into an asset that cannot be moved and may not pay for itself for many years? The investors would have to be confident that they had secure title to future returns and that returns would be sufficiently attractive. Durable investment thus requires the rule of law....'*[22]

66. In the literature on economic regulation this is known as the 'problem of regulatory commitment'. In the absence of appropriate regulatory commitments by government it is highly likely there will be inadequate legal protections for investors in long term immovable assets.

67. One way that gas businesses could respond to a lack of regulatory commitment would be to supply consumers using a technology not exposed to opportunistic government pricing decisions. For example, instead of a gas distribution pipeline solution, a gas business could supply consumers with higher cost

[19] Bottled gas is an alternative to piped gas. It is more expensive and less convenient means of distribution for consumers located in towns and cities that are close to gas supplies.

[20] See Newbery's discussion of the problem of regulatory commitment. Pg 27 – 30 *Privatization, Restructuring, and Regulation of Network Utilities*, Professor David M. Newberry, MIT Press, 2002.

[21] The commonly cited example in the literature is a politician whose incentives are to seek short term political support in an election.

[22] Newbery op cit pg. 2.

bottled gas.[23] If a gas pipeline network has already been constructed, a gas business may have incentives to underinvest in the network in order to protect itself from the risk of financial loss resulting from the threat or reality of adverse government pricing decisions. This could result in a decline in the reliability or safety of gas supply. Both situations are likely to harm the long-term interests of consumers.

68. Therefore, in my opinion as an economist expert in economic regulation, the NGL can be viewed as means of creating a legally binding regulatory commitment. Governments have committed to a robust legal framework and independent rule making and regulatory decision making for setting gas distribution revenues and tariffs with the aim of providing legal protections to investors in long lived and immovable assets.

Conclusion

69. An overarching objective of the NGL and NGL taken together with the reference to 'efficiency….for the long term interest of consumers' in the NGO means (in part) that investors in regulated gas pipeline businesses should be provided with comfort that they will have a reasonable opportunity to recover their past costs, their expected future costs and to earn a reasonable rate of return such that it is commercially attractive for them to undertake appropriate capital investment in long lived, immovable assets. If investors are not provided with sufficient comfort to undertake investment, then the resulting underinvestment will lead to inefficiency.

70. This interpretation is supported by the following RPPs:

- Section 24(2) of the NGL which requires that economic regulation decisions should provide a service provider with a *reasonable opportunity to recover at least the efficient costs* the service provider incurs
- Section 24(4) of the NGL which requires that economic regulation decisions have *regard to the capital base* from the prior period
- Section 24(5) of the NGL which requires that a reference tariff should allow for a *return commensurate with the regulatory and commercial risks* involved in providing the service.

[23] A business based on bottle gas may be competitive and not require regulation, and the business could be more easily moved elsewhere.

3.4.3 The inefficient economic regulation problem

71. The third significant problem the NGL seeks to address is the potential for inefficiencies associated with the application of economic regulation itself.

72. It is well known in the economic regulation literature for example that a pure 'cost of service' form of regulation approach can lead to inefficiencies (such as 'gold plating'[24]) and not create the normal incentives for dynamic efficiency in the long run expected in a workably competitive market.

73. Secondly, the regulator faces the so called 'information asymmetry'[25] problem – that is, it may be difficult for the regulator to know what efficient costs should be.

74. The development of incentive based regulation techniques[26] over the past 30 years or so aim to create incentives for businesses to invest and operate more efficiently, and to 'reveal' their efficient costs, and replicate to an extent what occurs in a workably competitive market.

75. Recent amendments to the NGL have also afforded the AER more extensive information gathering powers than had been available to prior state and territory economic regulators of energy networks.

Conclusion

76. The reference to 'efficient investment and operation… for the long term interest of consumers' in the NGO taken together with RPP 24 (3)[27] means (in part) that economic regulation should be implemented in a way that create incentives for dynamic efficiency in the way a gas businesses invests and operates; and to promote efficiency by revealing information on efficient costs as occurs in a workably competitive market.

---

[24] Also known as the 'Averch–Johnson' effect. Averch and Johnson showed, that if the regulator sets the regulatory rate of return above the firm's true cost of capital, the regulated firm has an incentive to choose too much capital relative to labour. This observation sparked off a large empirical and theoretical literature exploring Averch–Johnson' effect *Behaviour of the Firm under Regulatory Constraint*, Harvey Averch and Leland L. Johnson, American Economic Review, 52(5), December 1962, 1062-1069.

[25] In the early 1980s, Baron and Myerson were the first to propose that the regulatory problem could be viewed as an asymmetric information problem. *Regulating a Monopolist with Unknown Costs*', David P. Baron and Roger B. Myerson, Econometrica, 50(4), July 1982, 911-930.

[26] *Incentive Regulation in Theory and Practice: Electricity Distribution and Transmission Networks*, Paul Joskow, August 2007. Unpublished paper, summarised in *The Fifty Most Important papers in the Economics of Regulation*, Darryl Biggar, Working Paper No. 3, May 2011, ACCC/AER Working Paper Series.

[27] RPP 24(3) of the NGL states that 'a service provider should be provided with effective incentives in order to promote economic efficiency'.

3.5 With respect to price, quality, safety, reliability and security of supply of natural gas

77. My interpretation of this component of the NGO is that it limits the types of benefits (or harm) that may be considered to only those that relate directly to the provision and consumption of gas services, and ignores possible external costs and benefits.[28]

78. The promotion of the long term interest of consumers with respect to price, quality, safety, reliability are relevant in the context of JGN's AA proposal. I understand that security of supply is not relevant.[29]

[28] As an example, if the worth of a new gas transmission project was being considered, it would mean ignoring potential effects on amenity values or the existence values of national parks.

[29] Security of supply concerns ensuring there are secure supplies of gas available which is not part of JGN's reference services.

4. Question 2: How should an economic regulation regime be designed to promote the NGO?

79. This section sets out my answer to Question 2:

> *How should an economic regulation regime be designed to promote the NGO - that is, what features should the economic regulation regime have so that decisions about JGN's proposed revenues will promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas?*

4.1 Design of an economic regulation regime that promotes the NGO

4.1.1 Initial design issues

80. Initial design issues for any effective economic regulation regime are:

1. The definition of the service(s) to be regulated
2. The form(s) of regulation that should apply to regulated services
3. Where the form of regulation involves regulating prices, the basis on which this should be determined.

81. For completeness I briefly comment on the first two design issues below. The third issue is a key issue raised by the TOR and is discussed in the remainder of this section.

Definition of service(s) to be regulated

82. One of the first steps in designing any economic regulation regime is to define the services provided by a gas distribution business. The different services provided by a gas distribution business can have different market characteristics: some services may not need regulation; and where regulation is justified there may by different forms of regulation that might be applied. I note that the decision on the definition of the services is outside the TOR scope and is therefore not discussed further.

Form of regulation

83. Once the services that should be subject to regulation have been identified, then a decision is required on the most appropriate form of regulation to be

applied to that service (or group of services). Examples of a form of regulation include:

- 'light regulation', for example establishing an information disclosure regime; or
- regulation of maximum regulated revenues
- price cap.

84. I understand that the decision on the form of regulation is also outside the TOR scope and is therefore not discussed further.

4.1.2 A model is required to determine the total revenue requirement and reference tariffs

85. Once a decision has been made that the long term interests of consumers of particular natural gas service(s) would be best served by regulation of total revenues then a decision needs to be made about how to approach this task.

86. It is generally not the case that a particular regulated infrastructure business is easily comparable to other similar businesses such that meaningful efficient market based revenue or pricing benchmarks can be readily observed. If such information were available, then this could be a simple way to determine the appropriate level of regulated revenues.

87. For gas distribution networks in Australia there is no readily available independent market information that could inform the setting of regulated revenues in a way that could meet the objective. Each gas distribution pipeline businesses comprises a unique range of assets and operational functions. These unique features include the age profile and condition of the assets; the density and topography of the network; and demand characteristics. This means that the task of setting the 'right' revenue / price needs to take account of the specific characteristics of each gas distribution network.

88. When dealing with complex infrastructure with unique characteristics, economists have no way of judging what an appropriate revenue allowance would be to best meet the objective without reference to some form of model or framework.

89. Therefore, two further design issues for an economic regulatory framework are:

- selecting an appropriate model for determining the total revenue requirement and, in turn, reference tariffs
- designing the institutional framework for applying that model.

90. I note that while it can be helpful to consider these design issues separately, that the practical implementation of an economic regulation regime means these are closely interrelated decisions.

4.1.3 Principles for selecting a model and an institutional framework for regulating revenues that promote the NGO

91. In selecting a model for determining regulated revenues and an institutional framework for applying the model that would promote the NGO, I consider that an economist would look to a framework which addresses each of the issues identified previously in section 3.

92. For the reasons discussed in section 3, I consider that the model for determining the service provider's revenue requirement (as well as the institutional framework for applying the model) must be selected and implemented according to three principles.

93. First it must limit the service provider's ability to exercise market power so that price and service outcomes are consistent with what would be observed in a workably competitive market. If this principle is not met then prices paid by consumers could be excessive, service standards could be lower than demanded by consumers and/or utilisation of the pipeline may be sub-optimal - either outcome would harm the long term interests of consumers.

94. Second it must establish and maintain a regulatory commitment, which at any point in time provides the service provider with a reasonable expectation that in future it can recover its efficient costs (including a rate of return) for regulated services. If this principle is not met then a regulated business may not undertake needed investment - which would harm the long term interests of consumers.

95. Third it must be capable of being implemented in a way that limits as far as possible the inefficiencies that economic regulation itself can potentially create. For example, the model should seek to create incentives for economic efficiency, and encourage if possible the service provider to reveal information on efficient costs.

96. The next section describes how the building blocks approach meets each of these principles. Section 4.3 discusses the institutional arrangements that support implementation of the building blocks approach consistent with these design principles.

4.2 The building blocks approach meets the principles for selecting a model for regulating revenues that promotes the NGO

97. The building blocks approach is the most common framework in Australian regulatory practice for determining regulated revenues or prices for most natural monopoly infrastructure.

98. Section 76 of the NGR requires application of the building blocks approach for determining regulated gas pipeline AA revisions:

> *Total revenue is to be determined for each regulatory year of the access arrangement period using the building block approach…*

99. I consider that the building blocks approach as it is implemented through the NGL and NGR reflects each of the principles discussed in the previous section:

- It establishes rules and transparent regulatory review processes that limit the ability of regulated business to exercise market power. It can be applied in a systematic way such that the information, analysis and discretions applied by the regulator are transparent and service providers and consumers can understand the basis of each constituent decision.
- It supports a regulatory commitment by governments which provides an assurance to regulated business that they will have a reasonable opportunity to recover their efficient costs of providing the relevant service, including a rate of return.
- It can be implemented in such a way that it can help promotes economic efficiency.

100. My reasoning for this assessment is explained in detail in section 5.

4.2.1 Other approaches for determining regulated revenues

101. It is worth noting that variations on the building blocks approach are used in other jurisdictions internationally.

102. Many states in the United States use a 'cost of service' (or 'rate of return' regulation) approach. The cost of service model reflects the first two of the design principles discussed above. However, as discussed previously in section 3.4.3 pure 'cost of service' regulation is considered not to provide incentives for dynamic economic efficiency.

103. A few state regulatory authorities in the United States and Canada have used the total factor productivity (TFP) methodology to inform setting the rate of change for gas distribution allowed revenues over the regulatory period.[30] This approach seeks to provide stronger incentives for dynamic efficiency and potentially reduce the cost of regulation, by reducing the linkage between costs

[30] Ontario: TFP is considered in rate setting for all distribution companies. TFP was used for rate setting for San Diego Gas and Electric and Southern California Edison from mid-1990s until 2000-01 crisis. Massachusetts: TFP has informed rate design as part of Settlement Agreement with Nstar. Source Overseas Experience with TFP in Energy Network Regulation; AEMC Framework and Issues Paper, Public Forum, 11 February 2009, Denis Lawrence, Economic Insights

and prices. However, it may provide weaker assurances to investors about the ability to recover efficient costs over time and it may not be as effective in constraining the exercise of market power. This approach has been considered in Australia but has not been adopted.[31]

4.3 The institutional framework for applying the building blocks approach

104. As noted previously the implementation of an economic regulatory regime means that the choice of model and the institutional framework for how it is applied are closely interrelated decisions.

105. Most developed countries, including Australia, have established legal frameworks that define the institutional arrangements, including the obligations and constraints on the conduct of the regulator for determining allowed revenues for regulated energy businesses.

106. As discussed by Newbery a common goal of these legal frameworks is to create credible regulatory commitment so as to provide reasonable assurances to investors that the economic regulation model will be applied in a consistent manner over time. The approach adopted to the design of institutional arrangements varies, for example in relation to the level of prescription in law and regulation, the extent of discretions provided to the regulator and the role of the courts and legal precedent.[32]

107. In Australia the institutional arrangements have been designed to not only require the use of the building blocks approach (as discussed above) but also to:

[31] On 22 December 2011 the AEMC published its final determination in relation to a proposed rule change to allow the use of total factor productivity (TFP) methodology as an alternative economic regulation methodology to be applied by the Australian Energy Regulator (AER), in approving or amending price or revenue determinations for distribution network service providers. The Commission determined not to make the rule proposed as it considered that the market conditions necessary for its effective implementation are not yet in place. AEMC, Rule Determination. National Electricity Amendment (Total Factor Productivity for Distribution Network Regulation) Rule 2011

[32] Newbery's survey of international practice in economic regulation shows that that regulatory institutions vary between countries "....according to their institutional endowment which include the legislative, executive and judicial institutions, norms of behaviour, administrative capacity and the degree of social consensus within their society." For example, the United States has a different tradition and approach to economic regulation of monopoly utilities than does the United Kingdom. "In the United States the regulatory compact is sustained by the separation of the judiciary and from the legislature and the executive, by the Constitution and by a well developed body of administrative procedures that specify how regulatory agencies must behave. In contrast the United Kingdom Parliament is sovereign and can override previous legislation. The courts are however independent and well able to uphold contracts therefore the main body of the regulation is included in the license granted to the utilities. pg 55- 57 Privatization, Restructuring, and Regulation of Network Utilities, Professor David M. Newberry, MIT Press, 2002.

- require that the regulator take into account the NGO and the RPPs (see section 4.3.1 below)
- separate the ongoing review and amendment of the rules from the application of the rules[33]
- set out in the rules certain detailed requirements about how each component of the Building Blocks approach is to be applied (see section 5 below).

108. In my opinion each of these features of Australia's institutional arrangements for gas distribution regulation have been designed to promote consistent and predictable regulatory decision making through time. They therefore help promote the long term interests of consumers by providing assurances to service providers that they will have a reasonable opportunity to recover their efficient costs (including a rate of return) through time.

4.3.1 How the AER must make economic regulation decisions

109. This section outlines the institutional arrangements for how the AER must make economic regulation decisions.

110. The AER as the primary decision maker on an AA proposal must either accept or amend a service provider's AA proposal.[34] The AER may also make its own AA, if it refuses to approve an AA proposal.

111. In practice the AER must make numerous individual decisions including:

- interpreting the relevant NGR requirements
- developing and consulting on guidelines to assist gas pipeline businesses to prepare their AA proposals and other supporting information
- analysing information put forward by the service provider, the AER staff and consultants, and other stakeholders
- exercising its discretions in interpreting relevant rules under the NGL requirement to choose the preferable decision.

112. Section 28 of the NGL sets out certain requirements the AER must follow in making decisions and exercising its discretions on an AA proposal including:

- The AER must exercise power to contribute to the achievement of the NGO

[33] The AEMC reviews and amends the rules and the AER applies the rules, for example in making gas distribution access arrangement determinations

[34] Part 8, Division 8 NGR.

- The AER must consider interlinked matters
- The AER must take into account the RPPs.

113. Each requirement is discussed below.

AER must exercise power to contribute to the achievement of the NGO

114. The AER must make decisions in a manner that 'will or is likely to contribute to the achievement of the NGO'.[35]

115. Where there are two or more possible designated reviewable regulatory decisions that will, or are likely to, contribute to the achievement of the NGO, the NGL requires that AER must make a decision 'that the AER is satisfied will or is likely to contribute to the achievement of the NGO **to the greatest degree** and specify reasons'.[36]

AER must consider interlinked matters

116. The AER must specify the manner in which the constituent components of the decision relate to each other and the manner in which that interrelationship has been taken into account in the making of the decision.[37] This is discussed further in section 5.3 below.

AER must take into account the revenue and pricing principles

117. The AER must take into account the RPPs when 'exercising a discretion in approving or making those parts of an access arrangement relating to a reference tariff'.[38]

[35] Section 28(1)(a) NGL.

[36] Section 28(1)(b)(iii) NGL.

[37] Section 28(1)(ii) NGL.

[38] Section 28(2) NGL.

5. Question 3: Does the building blocks approach contribute to the achievement of the NGO?

118. This section sets out my answer to Question 3:

> *Pursuant to the NGR, the total revenue a service provider is permitted to earn from reference services in each regulatory year of an access arrangement period is determined as the sum of the following building blocks:*
>
> *A return on the projected capital base;*
>
> *B depreciation on the projected capital base for the year;*
>
> *C the estimated cost of corporate income tax for the year for the year;*
>
> *D increments and decrements for the year resulting from the operation of an incentive mechanism to encourage gains in efficiency for the year; and*
>
> *E a forecast of operating expenditure.*
>
> *In your view, is such an approach (correctly applied) likely to contribute to the achievement of the NGO?*

5.1 Building blocks approach

5.1.1 Overview of the building blocks approach

119. The building blocks approach is summarised in Figure 1.

120. The building blocks approach is used to determine the total revenue requirement on an ex ante basis, typically for a five year period.

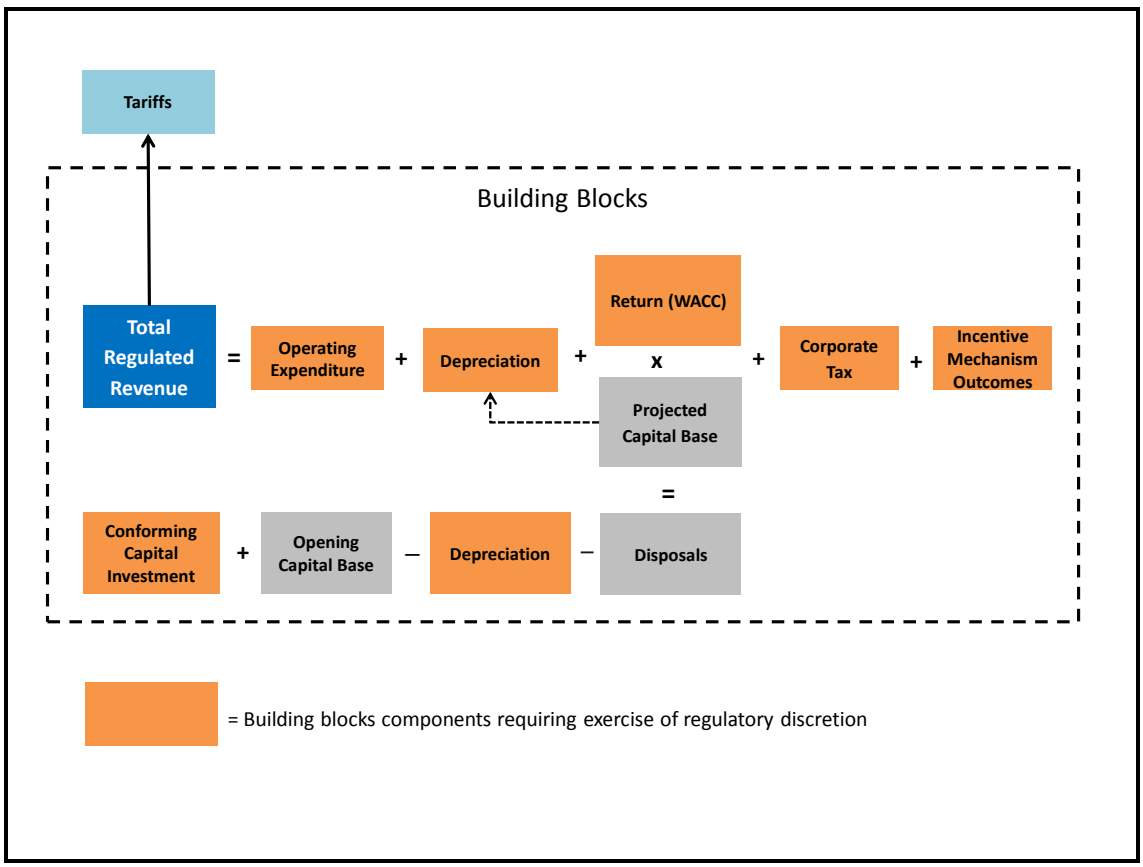
121. The total regulated revenue requirement for each year of an Access Arrangement (AA) period is calculated by adding together five categories of forecast costs as shown in Figure 1. The projected capital base for each year is calculated by a roll forward model which adds conforming actual and forecast capital expenditure to the opening capital base, and subtracts depreciation and disposals over the current regulatory period.

122. Total revenue requirements are used to determine the base year tariffs for the first year of the regulatory period and, depending on the form of price control, converted into an annual CPI – X formula for each subsequent year to escalate the base year tariffs. Not shown in Figure 1 are demand forecasts, which are an important driver in determining some elements of conforming capital and operating expenditure, and in setting tariffs.

123. Under incentive regulation, the actual expenditures incurred within each building blocks component are not expected to reflect the expenditure allowances in the AER's determination, although the AER does expect businesses to explain why differences arise. Businesses are expected to adjust to changing circumstances (such as changes in demand), reprioritise expenditures as appropriate or to reduce expenditure if efficiencies can be achieved over the AA period.

124. The establishment of the total revenue (in JGN's case) for five years in advance provides an incentive for the businesses to invest and operate efficiently. Subject to the operation of any incentive mechanism the business is able to retain the benefit of any efficiencies achieved, or are penalised if their costs are higher than the estimate of efficient costs used to calculate the revenue requirement. This feature promotes the long term interests of consumers by creating incentives for efficiency over time (dynamic efficiency).

Figure 1 Building blocks approach



Note: This diagram summarises the key features of the building blocks approach and does not show all the interrelationships (see section 5.3.)

5.1.2 Assessment of the building blocks approach

125. As discussed in section 4, the building blocks approach is capable of being implemented in a way that it can meet each of principles for designing an economic regulatory regime that can promote the NGO. It also has the advantage that it is based on well understood concepts, and is a well-accepted approach.

126. Except for the incentive mechanism outcomes (which is unique to utility economic regulation) the building blocks approach draws on standard cost accounting and corporate finance concepts used by many types of businesses.

127. An approach to setting revenues and tariffs based on adding together blocks of costs (operating expenditure, depreciation, return on capital and corporate tax) and rolling forward the asset base is familiar and logical approach to determining target revenues and prices for any person with accounting and financial qualifications.

128. The building blocks approach is well accepted, having been used in Australia for at least twenty years, and variants of it are widely used for utility economic regulation in other jurisdictions, in particular the United Kingdom for monopoly energy networks[39] and wholesale water and waste water businesses.[40] It is widely accepted[41] that the building blocks approach is a conceptually logical basis on which to determine regulated total revenue requirements, which are then used to determine tariffs.

5.2 Assessment of rules that determine each building block component

129. This section

1. identifies and discusses the rules that determine each building block component; and
2. discusses from an economic perspective how each rule (or group of rules) is directed at

[39] See for example OFGEM 'Regulating Energy Networks for the Future: RPI-X@20 . History of Energy Network Regulation', 27 February 2009. pg 9 onwards describes the building blocks approach adopted for electricity and gas networks.

[40] See 'Ofwat's final methodology: now for implementation' Oxera August 2013.

[41] See for example, the Productivity Commission: 'The building block approach generally works well and is a suitable model for the regulation of electricity networks. although the success of (recent) changes will depend on appropriate implementation and regulatory guidelines.' Chapter 5, Productivity Commission, Electricity Network Regulatory Frameworks Inquiry report. 26 June 2013.

i) promoting particular behaviours by a gas business which are in the long-term interest of consumers, and

ii) providing assurances to consumers that regulatory decisions are in their long term interests.

5.2.1 The projected capital base

130. The rules that determine the projected capital base are outlined below. As shown in Figure1, the projected capital base is used to calculate:

- A - return on the projected capital base; and
- B - depreciation on the projected capital base.

NGR rule 77: Opening capital base

131. This rule includes dealing with how the initial opening capital base is determined when a pipeline first becomes a covered pipeline. The assessment of this provision as to how it supports achievement of the NGO is complex. As a practical matter it is not relevant to the operating circumstances of JGN (or probably to any gas distribution pipelines) as the initial opening capital base has already been determined for these pipelines.

132. The rules for determining the opening capital base in each period thereafter essentially sets out the procedures for 'rolling forward' of the asset base described above.

NGR rule 78: Projected capital base

133. This rule states the procedures for rolling forward the projected asset base for the forthcoming AA period.

NGR rule 79: Conforming capital expenditure

134. This rule requires capital expenditure to be:

> *such as would be incurred by a prudent service provider acting efficiently, in accordance with good industry practice, to achieve the lowest sustainable cost of providing services*
>
> and may be justifiable on at least one of these grounds:
>
> - *the overall economic value of the expenditure is positive; or*
> - *the present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capital expenditure; or*
> - *the capital expenditure is necessary: (i) to maintain and improve the safety of services; or (ii) to maintain the integrity of services; or (iii) to comply with a*

> *regulatory obligation or requirement; (iv) to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred.*

135. NGR rule 77, combined with rule 79(1)(a), emphasises that it is only capital expenditure that is productively efficient that will promote the objective.

136. The concept of 'prudency' recognises there are benefits from providing regulated businesses with certainty that, where they undertake investment on a prudent basis - which takes into account the circumstances that existed at the time the decision to undertake the investment was made - they should have some certainty around the recovery of such investments even if, assessed in hindsight, the investment may not be considered necessarily efficient.

137. NGR rule 79 recognises that 'efficient investment and operation and use of' is to be assessed in terms of what it delivers to consumers with respect to price, quality, safety and reliability. NGR rule 79 is concerned with more than the very lowest possible price for consumers. It is concerned with efficiently meeting safety and other regulatory requirements. This rule also acknowledges that there are certain things a service provider may have little or no control over, in particular, externally determined standards set out in regulatory obligations and requirements. This recognises that efficient investment includes the efficient costs associated with meeting such requirements.

138. The ground for capital expenditure being justified because 'the overall economic value of the expenditure is positive' reflects the allocative efficiency aspect of economic efficiency. (That is, resources allocated as a result of applying this part of rule 79 would increase the value of outputs).

How these rules promote the long-term interest of consumers

139. Collectively NGR rules 77, 78 and 79 mean that any actual capital expenditure previously held to be conforming is not re-visited at the commencement of each regulatory period. This provides some assurance to investors in regulated business that the capital base will not be subsequently expropriated by the regulator. This helps provide incentives to investors to make ongoing investment in long-lived assets.

140. Together these are the principal rules that set out the way in which the capital base is determined for each year and rolled forward. These rules (and certain other rules outlined below) interact with the rules for return on capital and depreciation to determine the building block components.

141. NGR rules 77,78 and 79 contribute to achieving the NGO by:

- Enabling investments to proceed where
  - the overall economic value of the expenditure is positive

- the present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capital expenditure; or
- the capital expenditure is necessary: (i) to maintain and improve the safety of services; or (ii) to maintain the integrity of services; or (iii) to comply with a regulatory obligation or requirement; (iv) to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred.

- providing an assurance to investors in a regulated business that efficient capital expenditures will be able to be recovered over the economic life of the assets. This encourages businesses to continue undertaking investments in the long term interest of consumers (allocative efficiency); and
- benefiting consumers by providing and assurance capital expenditure forecasts are subject to regulatory scrutiny (productive efficiency)

NGR rule 80: AER's power to make advance determination with regard to future capital expenditure

142. This rule recognises that efficient investment is promoted where service providers have greater certainty as to the recovery of their investments.

NGR rule 85: Capital redundancy

143. This rule provides that an AA proposal may include a mechanism that deals with assets that cease to contribute in any way to the delivery of pipeline services and enables them to be removed from the capital base. It also provides that an AA proposal may include a mechanism for sharing costs associated with a decline in demand for pipeline services between the service provider and consumers. Before requiring or approving a mechanism, the AER must take into account the uncertainty that such a mechanism would cause and the effect that uncertainty would have on the service provider and consumers.

How this rule promotes the long-term interest of consumers

144. This rule contributes to the achievement of the NGO by providing some assurance to regulated businesses on the treatment of redundant capital, which encourages investment in the long term interest of consumers (allocative efficiency).

5.2.2 Return on the projected capital base

145. The rate of return is multiplied by the projected capital base in each year to determine building blocks component A - return on the capital base.

NGR rule 87: Rate of return

146. This rule requires that the allowed rate of return be set so that it is:

> *commensurate with the efficient financing costs of a benchmark entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.*

How this rule promotes the long-term interest of consumers

147. The rate of return rule contributes to achieving the NGO by:

- providing an assurance to investors that they will be able to earn an appropriate risk adjusted rate of return which encourages ongoing investment, in the long term interest of consumers (allocative and dynamic efficiency); and
- protecting consumers from excessive rates of return that could be achieved through exercise of market power (allocative efficiency).

5.2.3 Depreciation

148. Building blocks component B is depreciation on the capital base. Depreciation is deducted from the opening capital base.

149. **NGR rules 88, 89 and 90** sets out: how depreciation schedules are used; the criteria for determining depreciation schedules; and calculation of depreciation for rolling forward the capital base from one access arrangement period to the next. These rules set out the basis on which depreciation is calculated for different classes of the pipeline assets constituting the capital base.

How these rules promote the long-term interest of consumers

150. The depreciation rules contribute to achieving the NGO by:

- providing an assurance to investors in a regulated business that investment will be able to be recovered over the economic life of the assets. This encourages ongoing investments to be made, in the long term interest of consumers (allocative efficiency); and
- benefiting consumers by:
  - assuring consumers that capital expenditure will only be recovered once (allocative efficiency)
  - spreading the recovery of capital expenditure equitably across current and future generations of consumers (allocative and dynamic efficiency).

5.2.4 Estimated cost of corporate income tax for the year

151. Building blocks component C is the estimated cost of corporate income tax for the year.

NGR rule 87A: Estimated cost of corporate income tax

152. Investors must pay corporate income tax each year from pre-tax earnings. NGR rule 87A sets out a formula to calculate an 'estimation of corporate income tax payable by a benchmark efficient entity'.

153. The formula calculates the estimated cost of corporate income tax by reducing taxable income to allow for the value of gamma (the assumed value of imputation credits). I understand that the intention of this rule is that shareholders are assumed to get some of the allowed rate of return back via imputation credits. Therefore, to avoid double counting the rules ensure that an appropriate estimate of the value of imputation credits is made and removed from the corporate tax building block.

How this rule promote the long-term interest of consumers

154. The corporate income tax rule contributes to achieving the NGO by:

- providing an assurance to investors that in future regulatory periods they will be able to recover corporate income tax costs, which encourages ongoing investments to be made in the long term interest of consumers; (allocative efficiency); and
- benefiting consumers by:
  - ensuring that consumers are not subject to double counting in the estimate of the rate of return by recognising the value of imputation credits received in the hands of shareholders, consistent with the policy intent of the Australian imputation credit system (productive efficiency)
  - assuring consumers that only a reasonable estimate of corporate income tax costs will be recovered (productive efficiency)
  - encouraging efficient management of corporate tax by setting the allowance based on a benchmark entity (rather than for example reimbursement of actual corporate income tax) (dynamic efficiency).

5.2.5 Incentive mechanism to encourage gains in efficiency

155. Building block component D consists of any increments and decrements for the year resulting from the operation of an incentive mechanism.

NGR rule 98 - Incentive mechanisms

156. This rule states that an 'access arrangement may include (and the AER may require it to include) one or more incentive mechanisms to encourage efficiency in the provision of services by the service provider.' An incentive mechanism may provide for carrying over increments for efficiency gains and decrements for losses of efficiency from one access arrangement period to the next.

How this rule promote the long-term interest of consumers

157. The incentive mechanism rule contributes to achieving the NGO by providing options to encourage improvements in efficiency over time for the long term interest of consumers (productive and dynamic efficiency).

5.2.6 Forecast of operating expenditure

158. Building blocks component E is the forecast of operating expenditure.

NGR rule 91: Criteria governing operating expenditure.

159. This provides regulated service providers with an allowance for operating expenditure component of the building blocks:

> *Operating expenditure must be such would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.*

How this rule promotes the long-term interest of consumers

160. The operating expenditure rule contributes to achieving the NGO by:

- providing an assurance to the regulated business that efficient operating cost incurred through the regulatory period will be able to be recovered, and therefore:
  - enables the business to meet externally imposed regulatory requirements such as safety regulation (productive efficiency)
  - encourages efficient operation and maintenance of the gas network for the long term interest of consumers (allocative and productive efficiency)
- benefiting consumers by:
  - recognising that 'accepted good industry practice' is likely to change and potentially improve over time (dynamic efficiency)
  - encouraging ongoing provision of reliable services (allocative efficiency)
  - assuring consumers that operating expenditure are subject to regulatory scrutiny (productive efficiency).

5.3 Interlinked matters

161. A new aspect for operationalising the NGO in decision-making is government's policy decision that merits review should 'consider all interlinked matters'.

162. The Standing Council on Energy and Resources (SCER) in its Regulatory Impact Statement decision on Limited Merits Review stated that:

> *the review process is much more narrowly focused than was the original policy intention. The original intention, as set out in ....section 258 of the NGL, was to allow the regulator to raise issues that could impact on the matter before the Tribunal. In practice, this has not occurred.*

163. Reflecting this concern the NGL amendments impose specific requirements on the Tribunal to consider and explain how interlinked matters have been taken into account.

164. The SCER final decision is not particularly clear as to exactly what an interlinked matter is.

165. The common English meaning of 'Interlinked' is to 'link two or more things to one another, one thing with something else'. Therefore, I interpret an interlinked matter to mean that there should be a logical and consistent treatment of different constituent elements of a determination, where there are logical economic relationships between them.

166. The following sets out examples of interlinked matters where one parameter or component of the building blocks cost forecast may be interlinked through a logical economic relationship with another.

- **Capital Asset Pricing Model (CAPM)**. Consistency issues often arise in the estimation of the expected return on equity using the CAPM. The AER[42] noted the following specific examples of consistency issues which it took into account in a 2008 review of the WACC parameters:
  - the assumed utilisation of imputation credits (gamma) affects the estimate of the Market Risk Premium (MRP)
  - the gearing ratio adopted affects the credit rating and the equity beta
  - the term of the risk free rate affects the term of the debt risk premium and the estimate of the MRP.
- **Capital and operating expenditure trade-offs**. Capital expenditures may be economically justified by substituting for operating expenditure. Alternatively replacement capital expenditures can sometimes be deferred by accepting higher operating and maintenance costs. The assessment of capital and operating expenditure should consider such trade-offs.
- **Forecast capital expenditure and forecast depreciation**. Depreciation is a function of the asset base in a given year, new capital investment added that year and the applicable asset lives. Changes in forecast capital expenditure have consequential effects on forecast depreciation.

[42] Pg 51 *Explanatory Statement: Electricity transmission and distribution network service providers Review of the weighted average cost of capital (WACC) parameters*, AER December 2008.

- **Changes in demand forecasts**. These can affect expenditure forecasts, the setting of tariffs and the weighted average price path (X factor).
- **Cost of service impacts on tax:** Any cost of service change will affect the tax building block.
- **The management of risk**: through expenditure on risk mitigations, self-insurance, and external insurance.

6. Question 4: Consequences of material error

167. This section sets out my opinion on Question 4:

> *If there is a material error in the application of the building block approach (ie an error in the estimation of a building blocks component):*
>
> *(a) is the outcome likely to contribute to the achievement of the NGO?*
>
> *(b) what is the nature or type of consequences that may arise in such circumstances?*
>
> *(c) are these consequences, or the risks associated with such consequences, likely to be different depending on the nature or direction of the error?*

168. I have addressed each part of the question separately below.

6.1 Material error in application of the building blocks and the NGO

169. This section answers question 4(a):

> *If there is a material error in the application of the building block approach (i.e. an error in the estimation of a building blocks component) ... is the outcome (of the error) likely to contribute to the achievement of the NGO?*

6.1.1 Limitation

170. There may be legal interpretation questions that arise in answering this question. This answer is not a legal analysis but based on my understanding of the NGR as a regulatory practitioner and economist.

6.1.2 Analysis of material error

171. A material error in the estimation of a building blocks component would arise from an incorrect or mistaken application of a relevant rule[43] setting out how the building blocks expenditure components are to be determined (the 'building block rules'). I understand that it is also possible that an error could

[43] As discussed above, Part 9 of the NGR deals with the implementation of the building blocks approach.

arise if the AER does not take into account the RPPs which results in a materially different decision from one made taking account of the RPPs.[44]

172. Based on my practical experience in economic regulation, I consider that the incorrect or mistaken application of a relevant rule will depend on the particular context of the rule, the type of analytical technique(s) that are accepted as used to estimate the building block component, whether the analytical techniques have accepted bounds for identifying error, and the weight of evidence about the proper application of that technique.

173. A material error in the estimation of a building blocks component will, logically change the calculation of the total revenue requirement, because of the additive nature of the building blocks calculation.

174. Such a difference in the calculation of the total revenue requirement will have an adverse effect on the achievement of the NGO where this has consequences that, overall, adversely affects the ability of the business to meet any of its standards and obligations or, otherwise harms the long term interest of its consumers.

175. The nature of the harm to the long term interest of its consumers resulting from a material error will depend on the relevant rule and the particular links to economic efficiency and the long term interest of consumers implied in that rule.

176. My assessment of each of the building block rules (see section 5.2) demonstrates that the way in which each rule contributes to the NGO is capable of being clearly identified.

177. The following table outlines examples of possible effects on the achievement of the NGO of a material error in the calculation of a building blocks component that reduces total regulated revenue.

Material error in building blocks component....	Correct application of the rule means that....	Effect of material error on long term interest of consumers
Rules for Projected capital base (NGR rules 77, 78 and 79)	...the overall economic value of the proposed expenditure is in fact positive	Allocative efficiency is reduced
	... the expected incremental revenue to be generated as a result of the proposed expenditure does in fact exceed the present value of the capital expenditure	Allocative efficiency is reduced

[44] Section 28(2) NGR:- 'The AER must take into account the revenue and pricing principles when exercising a discretion in approving or making those parts of an access arrangement relating to a reference tariff.'

Material error in building blocks component....	Correct application of the rule means that....	Effect of material error on long term interest of consumers
	...the proposed capital expenditure is in fact necessary to maintain and improve the safety of services	Safety obligation not met
	.... the proposed capital expenditure is in fact necessary to maintain the integrity of services	Reliability standards or regulatory obligation not met
	.... the proposed capital expenditure is in fact necessary to comply with a regulatory obligation or requirement	Regulatory obligation not able to be met
	.... the proposed capital expenditure is in fact necessary to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred.	Allocative efficiency is reduced - demand not able to be met.
	...there is not an adequate assurance to the investor that efficient capital expenditures will be able to be recovered over the economic life of the assets	Allocative efficiency reduced due to potential for lack of investment
Rule for return on the projected capital base (NGR rule 87)	...there is not an adequate assurance to investors that they will be able to earn an appropriate risk adjusted rate of return	Allocative efficiency deuced - ongoing investment is discouraged
Rule for estimated cost of corporate income tax for the year (NGR rule 87A)	... there is not an adequate assurance to investors that in future regulatory periods they will be able to recover corporate income tax costs	Allocative efficiency reduced - discourages ongoing investments
Rule for operating expenditure (NGR rule 91)	... the business may need reduce or cease undertaking operational activities that are in fact necessary	Allocative efficiency reduced due to inability to meet service standards required by customers, or inability to meet safety of other regulatory obligation

178. A test that could be applied to determine whether the outcome of a material error is likely to contribute to the achievement of the NGO would be to identify the specific linkages between the relevant rules and the NGO, along the lines discussed in the table above.

6.2 Nature and types of consequences that might arise

179. This section answers question 4(b):

> *If there is a material error in the application of the building block approach set out above what is the nature or type of consequences that may arise in such circumstances?*

180. The nature or type of consequences of a material error will vary according to the circumstances and it is not possible to make any general observation. This section illustrates the nature and type of consequences by way of examples.

6.2.1 Inability to recover at least efficient costs

Example 1: A regulated business within the regulatory period is not provided the opportunity to recover at least the efficient costs it incurs in providing regulated services

181. This occurs where there is a material error in the application of the building blocks approach in a final AA determination which results in a regulated business not being provided the opportunity within an AA period to recover at least its efficient costs it incurs in providing regulated services within the regulatory period.

182. For example, in relation to gamma assume that:

- the correct value of imputation credits is 0.25, but the regulator sets a value of 0.5 for this regulatory period, and
- all other building blocks are set by the regulator at an efficient level.

183. The consequences of this error for the businesses in this scenario would be that its actual benchmark cost of corporate income tax (after adjusting for imputation credits) would be materially higher than had been allowed for by the regulator.

184. As discussed, under the ex-ante building blocks approach businesses are free to spend the total revenue allowance as they see fit, and are expected to reprioritise expenditures as needed.

185. It could manage the effects of this error by either:

- seeking to maintain its target rate of return and reduce its costs at the expense of the least important outcomes, or
- reduce its rate of return to less than the return expected by shareholders.

186. The first option can be illustrated in more detail by analysis undertaken by JGN. I understand that if JGN were to reduce its costs it would not reduce expenditure on works and activities driven by perceived safety risks or concerns - as 'safety is non-negotiable.' Rather, JGN would either defer or abandon plans for expenditure that it says would otherwise be efficient to undertake currently, including expenditure to maintain network reliability or extend service to new consumers. I understand that reduced network reliability would result in longer response times to incidents, and increased and more disruptive gas leaks.

187. If reliability related expenditure was reduced, then potentially this may result in an increase to prices in the longer-term, as there may be a need for 'catch-up' expenditure in future periods. In addition, this catch up expenditure may be more costly overall - allowing significant swings in expenditures is typically less efficient than undertaking expenditure smoothly over time.

188. Under the second option the business may compromise its ability to attract necessary capital in future for future investment. In practice this may mean either deterioration in the business' credit rating and/or a diminution of equity-holders' perception of the business.

189. In addition, if the error is seen by gas network equity holders or utility investors generally as a systematic error (rather than a specific or one-off error only applying to the company) then the impacts on the ability to attract capital may be spread across the industry.

Example 2 A regulated businesses on an ongoing basis is not provided the opportunity to recover at least the efficient costs it incurs in providing regulated services

190. The effects of an error also depend on whether the error is expected to be repeated in future regulatory periods. This scenario is likely to have more serious consequences, than a one off error that is not expected to be repeated.

191. For example, say if the error discussed above in relation to imputation credits was expected to be repeated in each future regulatory period it will permanently reduce the investors' expected rate of return. The same types of choices as to how to respond as discussed in Example 1 would be open to the business but the ongoing impacts would be likely to be more serious as they would extend into each regulatory period for the foreseeable future.

192. This type of error, if it was shown to be material, would be likely to harm the future credibility of the regulatory regime with potential adverse impacts on investors investment intentions.

6.2.2 Expenditures not adequately reviewed

Example 3: Investment and operating expenditure proposals contain imprudent or inefficient expenditure and are not adequately reviewed by the AER leading to prices being set unnecessarily high

193. If a regulated businesses' capital and operating expenditure proposals are not subject to adequate review by the AER then one consequence could be actual rates of return being in excess of what is required to attract financing with returns including an element of monopoly rent. Another consequence could be that the business undertakes the imprudent or inefficient expenditure resulting in inefficient expenditure.

6.2.3 Lack of incentives

Example 4: Regulated business are not provided with incentives for improving efficiency over time

194. Assume a regulated business is not provided with adequate incentives for improving efficiency over time.

195. The consequences of doing so could include the business not undertaking expenditure on longer term efficiency related expenditures, such as replacement and upgrading of IT systems, staff development and training, or investing in new systems and processes. The business may be able to attract financing and meet its service standards and regulatory obligations but the consequences may be a lack of efficiency improvement in the longer term.

6.3 Are risk consequences likely to be different depending on the nature or direction of the error

196. This section addresses question 4 (c):

> *If there is a material error in the application of the building blocks approach set out above....are the consequences, or the risks associated with such consequences, likely to be different depending on the nature or direction of the error?*

197. The short answer is yes, the consequences, or the risks associated with such consequences, will often differ depending on the nature or direction of the error. Section 6.3.1 discusses historical examples of the nature of the consequences of major regulatory errors. Sections 6.3.2 and 6.3.3 discuss examples of the asymmetry of risk consequences of under investment and lack of maintenance expenditure respectively.

6.3.1 Historical examples of major regulatory errors

198. A review of historical examples from the economic regulation literature is useful in illustrating the real world consequences of where government authorities have made major errors in not providing adequate assurances to investors that they will be able to recover their efficient costs. These examples are outlined below.

199. None of these examples are specifically connected to the application of the building blocks approach, and they are probably extreme in the context of Australian experience with economic regulation.

200. But they are a useful reminder of the relevant point that material error in the application of economic regulation – which does not provide investors with a reasonable assurance that they will be able to recover their efficient costs (as

provided for in RPP section (24 (2) and in NGR rule 79) - can have very damaging consequences for the long term interest of consumers:

- In Britain in the 1870s, the Tramway Act allowed municipalities to purchase the tram companies at written down cost at the end of twenty one year franchises. Trams that should have been electrified in the 1890's were near the end of their franchise. However, because the Tramway Act had no mechanism to accommodate the advent of electrification, no private company was willing to incur the considerable cost required. The outcome was the improvements for consumers and the community resulting from electrification were delayed until after the trams were taken over by municipalities.[45]
- The British National Telephone Company refused to invest in improvements in the telephone system unless it was provided compensation guarantees for this investment after 1908 as it neared the end of its franchise in 1911.[46]
- The Jamaican government in 1962 informed the Jamaica Telephone Co that it wished to renegotiate the terms of its licence upon its expiry in 1966. The company responded by stopping all investments.[47]
- In Bolivia the municipality of La Paz started negotiations in 1984 over the renewal of the licence for private electricity company which was due to expire in 1984. Due to lack of certainty on the outcome of the negotiations the company suspended all investment activity after 1984. The license was still not satisfactorily renewed by 1991.[48]

6.3.2 Asymmetry of risks consequences of under investment

201. One commonly discussed example is the asymmetry of risk consequences for over and under investment.

202. RPP section 24(6) of the NGL requires that regard should be had to the economic costs and risks of the potential for under and over investment in a pipeline.

203. The Expert Panel noted that:

[45] J. S. Foreman-Peck and R. Millward, Public and private ownership of British industry, 1820–1990. (Oxford: Clarendon Press, 1994)

[46] Foreman-Peck and R. Millward op cit.

[47] Pablo T Spiller, Institutions and Regulatory Commitment in Utilities' Privatization in Industrial and Corporate Change 1993 pp 387-450

[48] Pablo Spiller op.cit.

> *There tends to be a general view in energy regulation that risks are asymmetric, and that the adverse consequences of under-investment and over-use of assets (which may lead to security of supply problems) are greater than those of over-investment and under-use).*[49]

204. In the case of JGN's gas distribution pipeline, I understand that the cost to consumers resulting from systematic under-investment could include new consumers in currently unserved areas not being provided with the option of gas supply.[50] The opportunity costs to consumers of not being supplied with gas and instead relying on another energy source, such as electricity, are capable of being estimated (albeit with some difficulty) and compared to the savings from lower prices that might result.

205. Typically the direct consequential costs to consumers, and indirect costs of an event resulting from poor security of supply, are much higher for consumers already taking supply from a gas network because they already have invested in gas appliances and can only switch (say to electricity) at very high cost.

206. An indication of the magnitude of the asymmetric risk consequences of failure in security of supply is provided by the shut-down of the Longford gas plant in October 1999. This incident was estimated to have caused economic loss to industry of around A$1.3 billion[51], a figure that in my understanding was far in excess of the costs of mitigating the risk that led to the incident.

6.3.3 Asymmetry of risks consequences of lack of maintenance

207. There can also be asymmetry of risks consequences in maintenance. Consumers often value adequate reliability highly, with this valuation exceeding the incremental cost of providing reliability.

208. For example, an inquiry into electricity distribution reliability outcomes in the UK[52] that was undertaken by the Trade and Industry Committee of the UK House of Commons found that:

> *... we are less happy about the continued regulatory pressure on operational expenditure. While there may still be efficiencies to be gained by the companies, we fear that the DNOs may have to make real cuts in the amount and quality of maintenance of their networks if such pressure continues. We recognise that*

[49] Pg 38 Expert Panel Review of Limited Merits Review, Stage One report 29 June 2012.

[50] JGN's AA proposal, April 2014.

[51] Cited in Challenges and Opportunities Facing Public Utilities: Report for Discussion. International Labour Organisation, 2003

[52] House of Commons Trade and Industry Committee, *The Electricity Distribution Networks: Lessons from the storms of October 2002 and Future investment in the networks*, First Report of Session 2004–05.

> *consumers are unhappy about recent increases in electricity bills, which stemmed from rises in generating costs; but we are aware that, in several recent major incidents, power cuts were caused either directly or in a contributory way by maintenance problems. We believe that consumers would be willing to pay a little extra to reduce the incidence of such power cuts.*

Appendix A – Terms of Reference

Partner Luke Woodward
Contact Geoff Petersen
T +61 2 9263 4388
gpetersen@gtlaw.com.au
Our ref LXW:GCP:1019305

GILBERT + TOBIN
LAWYERS

Sydney
2 Park Street Sydney NSW 2000 Australia
GPO Box 3810 Sydney NSW 2001
T +61 2 9263 4000 F +61 2 9263 4111
www.gtlaw.com.au

21 May 2014

By email

Mr Geoff Swier
Farrier Swier Consulting
Level 7, 330 Collins Street Melbourne VIC 3000
Email geoff.swier@farrierswier.com.au

Confidential and privileged

Dear Mr Swier

Jemena Gas Networks (NSW) Ltd access arrangement review - expert report

1 Background

We act for Jemena Gas Networks (NSW) Ltd (**JGN**) in relation to the upcoming review of the Access Arrangement for its New South Wales gas distribution network.

JGN is the major gas distribution service provider in NSW. JGN owns more than 25,000 kilometres of natural gas distribution system, delivering approximately 100 petajoules of natural gas per annum to over 1.2 million homes, businesses and large industrial consumers across NSW.

JGN is preparing its revised Access Arrangement proposal (**AA proposal**) with supporting information for its network, for the consideration of the Australian Energy Regulator (**AER**). The AA proposal relates to the Access Arrangement period 1 July 2015 to 30 June 2020 (July to June financial years).

JGN is now in the process of framing its AA proposal within the relevant provisions of the National Gas Law (**NGL**) and National Gas Rules (**NGR**) for submission to the AER by 30 June 2014.

A critical element of the NGL is the National Gas Objective (**NGO**), which is:

> *"to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas."*

Under the NGL (section 28), the AER must, in performing or exercising any of its economic regulatory functions or powers, perform or exercise those functions or powers in a manner that will or is likely to contribute to the achievement of the NGO.

Further, under recent changes to section 28 of the NGL, in making certain regulatory decisions (including decisions on whether to approve an access arrangement), the AER must:

- specify the manner in which the constituent components of the decision relate to each other, and the manner in which that interrelationship has been taken into account in the making of the decision; and

- if there are 2 or more possible decisions that will or are likely to contribute to the achievement of the NGO, make the decision that the AER is satisfied will or is likely to contribute to the achievement of the NGO to the greatest degree.

In this context, JGN is seeking to formulate its AA proposal in a way that contributes to the NGO to the greatest degree. In formulating its AA proposal, JGN has considered and continues assess how its actions can best support the long term interests of its customers, and has tested and continues to test with those customers whether its proposal will meet customers' interests (and expectations), as to both the short and longer–term implications of the proposal.

To assist in formulating and supporting that proposal, JGN seeks your opinion, as a suitably qualified independent expert (**Expert**), in relation to the implications of the NGO for its AA proposal and its consideration by the AER. In particular, JGN seeks to better understand whether and if so how the application, and correct application, of the building blocks framework in the NGR is likely to contribute to the achievement of the NGO, and the consequences of material error in the application of the building blocks approach.

2 Scope of Work

The Expert will provide an opinion report that answers the following questions:

1 As an expert economist, do you have a particular understanding of the NGO and, if so, what is your understanding of the NGO?

2 How should an economic regulation regime be designed to promote the NGO – that is, what features should the economic regulation regime have so that decisions about JGN's proposed revenues will:

> *promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas?*

3 Pursuant to the NGR, the total revenue a service provider is permitted to earn from reference services in each regulatory year of an access arrangement period is determined as the sum of the following building blocks (**building blocks framework**):

(a) a return on the projected capital base for the year

(b) depreciation on the projected capital base for the year

(c) the estimated cost of corporate income tax for the year

(d) increments and decrements for the year resulting from the operation of an incentive mechanism to encourage gains in efficiency; and

(e) a forecast of operating expenditure.

In your view, is the application of the building blocks framework likely or not to contribute to the achievement of the NGO and, if so, how?

4 If there is a material error in the application of the building blocks framework (i.e. an error in estimation of a component of the building blocks):

GILBERT TOBIN
LAWYERS

(a) is the outcome likely or not to contribute to the achievement of the NGO?

(b) what is the nature or type of consequences that may arise in such circumstances?

(c) are these consequences, or the risks associated with such consequences, likely to be different depending on the nature, magnitude or direction of the error?

3 Deliverables

At the completion of his review the Expert will provide an independent expert report which:

- is of a professional standard capable of being published during JGN's Access Arrangement revision review process;
- is prepared in accordance with the Federal Court Practice Note on Expert Witnesses in Proceedings in the Federal Court of Australia (CM 7) set out in Attachment 1, and includes an acknowledgement that the Expert has read the guidelines;
- contains a section summarising the Expert's experience and qualifications, and attaches the Expert's curriculum vitae (preferably in a schedule or annexure);
- identifies any person and their qualifications, who assists the Expert in preparing the report or in carrying out any research or test for the purposes of the report;
- summarises JGN's instructions, as set out in these terms of reference, and as otherwise communicated during the course of the Expert's engagement;
- identifies all materials which have been referred to or relied on in preparing the report; and
- (without limiting the points above) carefully sets out the facts that the Expert has assumed in developing the report, as well as identifying any other assumptions made, and the basis for those assumptions.

The Expert's report will include the findings for each of the four parts defined in the scope of works (Section 2).

4 Timetable

The Expert will deliver the final report to us by 23 May 2014.

5 Terms of engagement

The terms on which the Expert will be engaged to provide the requested advice shall be as provided in accordance with the Consultancy Agreement between Jemena and Farrier Swier Consulting dated 14 June 2013.

Unless we collectively agree otherwise, the Expert's approach to this engagement will be as set out in the letter from Farrier Swier Consulting dated 7 April 2014

We will make contact in due course to provide you with a purchase order number for this engagement. The purchase order number should be included on any invoices for fees rendered in performing this work.

GILBERT + TOBIN
LAWYERS

Please contact us if you have any questions in relation to this engagement.

Yours sincerely

Luke Woodward
Partner
T +61 2 9263 4014
lwoodward@gtlaw.com.au

Geoff Petersen
Lawyer
T +61 2 9263 4388
gpetersen@gtlaw.com.au

Appendix B – Geoff Swier Curriculum Vitae

Geoff Swier – Curriculum Vitae

Geoff Swier is an economist with extensive practical experience of regulation, operation and reform, and of the gas, electricity, water and transport industries. He has 20 years' experience in the application of economic regulation to network businesses, having acted as a policy maker, adviser, regulator and consultant to regulators and network businesses across the gas, electricity and other infrastructure sectors in Australia and New Zealand. He has acted as an expert in dispute resolution, advisory panels and arbitrations.

Currently he is a director of Farrier Swier Consulting (FSC) and independent non-executive director of Trustpower (NZ). Previous roles include: member of the Australian Energy Regulator (2005-08), director of VENCorp (1999-2001), Victorian representative on the National Grid Management Council (1995); policy director for a board established by the New Zealand government to oversee the reform of the New Zealand public hospital system (1992-93), and economic adviser to the New Zealand Minister of State Owned Enterprises (1990) and New Zealand Minster of Finance (1984-87).

Since forming Farrier Swier Consulting in 1999, Geoff's experience and expertise has included:

- appearing as an expert witness and membership of dispute resolution panels in energy sector legal proceedings
- designing, implementing and advising on regulatory regimes and market development
- applying the principles of regulation, government accountability and corporate governance to policy development
- reforming international energy markets through World Bank and Asian Development Bank projects in Indonesia, China, and South Africa.

Qualifications

Masters of Commerce Degree in Economics, University of Auckland 1981.

Experience as Expert Witness

- Prepared an expert report for the Financial Investors Group for submission to a review on the limited merits review regime being undertaken by the Standing Council on Energy and Resources. (2012)

- Prepared an expert report for the Energy Networks Association assessing rule changes proposed by the Australian Energy Regulator in relation to regulatory process and practices for energy network regulation. (2012)
- Independent expert report for Jemena Gas Networks (NSW) on the regulatory treatment of operating expenditure by the AER (2010)
- Independent expert report for Jemena Gas Networks (NSW) on the appropriate classification of the NSW gas networks. (2009).
- Expert witness in arbitration of a dispute under a power purchase agreement. Matters covered in the witness statement included an explanation of how market prices are determined in the electricity market, and a summary of generation investment and market issues that affect the electricity market. (2000)
- Assisted in the preparation of an expert witness statement in an arbitration of a dispute under a Long term Gas Supply Agreement. Matters covered included the effect of the implementation of the national electricity market on future gas prices. (1997).

Expert Panels, Dispute Resolution

- Member, Dispute Resolution Panel (DRP scheduling errors, renewable energy certificate claim (Electricity Rules, December 2012)
- Sole DRP Member, determination of claim for recovery from participant compensation fund for a scheduling error affecting dispatch of Mintaro Gas Turbine Station (Electricity Rules 2010)
- Chair, expert panel established to advise the AEMC on an application for compensation by Synergen under the National Electricity Rules (2010)
- DRP Member - TruEnergy vs. Vencorp and others (Victorian National Gas Market, 2009)
- DRP Member - Powercor vs. Vencorp re. Wemen (National Electricity Market 2009, settled)
- Member AEMC advisory panel for establishment of first compensation guidelines, February, 2009
- Member three person expert panel providing advice to the Ministerial Council of Energy on definitional matters for the National Gas Law (2005); Client Commonwealth Treasury
- Member of three person expert panel providing advice to the Ministerial Council of Energy on definitional matters for the National Electricity Law (2005); Client Commonwealth Treasury

Selected relevant consultancy experience

Energy Network price submissions

- Adviser and member of SP AusNet Steering Committee: 2016 Electricity Distribution Price Review Price (2014 – ongoing)
- Adviser and member of Ausgrid EDPR Steering Committee: 2014 Electricity Distribution Price Review Price (2013)
- Adviser and member of SP AusNet Steering Committee: 2014 Gas Access Arrangement Review (2011- 2012)
- Adviser and member of SP AusNet Steering Committee: 2010 Electricity Distribution Price Review (2009-2010)
- Adviser and member of TXU Networks Steering Committee: 2005 network price determination (2004)
- Adviser to Integral Energy in relation to preparation of its submission for the 2004 network price determination (2002-03)

Economic Regulation

- Advisor to the New Zealand Commerce Commission on the development of Input Methodologies for capital and operating expenditure forecast information in proposals by a regulated supplier for a customised price-quality path (2009)
- Advice to National Transport Commission on application of economic regulation concepts to road pricing reform (2006)
- Provided advice to the Independent Pricing and Regulatory Tribunal (IPART) on its Investigation into Water and Wastewater Service Provision in the Greater Sydney Region (2005).
- Preparation of revised Electricity Transmission Rules (Part F) for the New Zealand Electricity Market. Developed detailed drafted Transmission rules based on policy framework developed by the Ministry of Economic Development managed consultation with stakeholders and prepared final rules (2003)
- Prepared study for the Australian Utility Regulators Forum on comparing Indexed Approaches with Building Blocks (2002)
- Economic and regulatory advice to Sydney Water (2003)

Industry Reform

- Key adviser in Victorian and Australian national electricity and gas reform (1994-1999)
- Review of Indonesia Power Sector Reform Strategy, (Client: Asian Development Bank, (2009).
- Prepared a report for the Victoria Competition and Efficiency Commission to review relevant experience and the state of play and thinking on promoting greater competition and urban water markets as input to the Commissions Inquiry into Reform of the Metropolitan Retail Water Sector (2007)
- Advice to Water Corporation (Western Australia) on options for industry structure and enhancing private sector participation and competition. (2006)
- Advice to the Independent Pricing and Regulatory Tribunal (IPART) on its investigation into the structure of the greater metropolitan Sydney water industry. (2005)
- Appointed to an expert panel (Energy System Review Committee - Singapore) to provide advice to the Minister of Energy on energy security and reliability of the Singapore gas and electricity systems following a major incident at a gas receiving facility (2004)
- Member of team undertaking major review of the New Zealand Gas Market for NZ Ministry of Economic Development. (2003)
- Technical assistance study to the Peoples Republic of China for the establishment of the State Electricity Regulatory Commission. Asian Development Bank (2003)

Prizes/Awards

- International Fellow of the Kings Fund, a charitable organisation based in London, which provides management and organisational development advice to the health sector in the United Kingdom and elsewhere
- Caughey Scholarship, Kings College, Auckland NZ

Employment History

1982 - May 1983	Policy Officer, Forecasting and Planning Division, Ministry of Energy (NZ)
May 1983 - June 1984	Economist, Labour Party Parliamentary Research Unit (NZ)
June 1984 - October 1987	Economic Advisor, Office of the Minister of Finance (NZ)

October 1987 - 1988	Associate Director, Investment Banking, DFC New Zealand (NZ)
1988 - 1989	Senior Management Consultant, Ernst & Young, Energy Sector Consulting Group (NZ)
1990	Adviser, Office of State Owned Enterprises (NZ)
1991	Economic and Financial Consulting (NZ) • Trans Power (Commercial and pricing issues connected with separation from ECNZ; Governance and ownership issues, Wholesale Market Development) • Airways Corporation • Australia Post
1992 - August 1993	Health Reforms. Director (Economic and Financial Policy), National Interim Provider Board (NZ)
September 1993 to June 1999	Department of Treasury and Finance, (Victoria) Deputy Project Leader, Electricity Supply Industry Reform Unit (1994 – June 1996) Deputy Project Leader, Energy Projects Division (July 1996- June 1999) Victorian representative, National Grid Management Council Government observer • Board of Directors, Victorian Power Exchange, • Board of Directors, Victorian Energy Networks Corporation • Citipower • Ecogen
July 1999 – present	Director and owner, Farrier Swier Consulting Pty Ltd
1999 to 2001	Director, Victorian Energy Networks Corporation
July 2005 – June 2008 January 2007	Part Time Member, Australian Energy Regulator, Associate Commissioner of the Australian Competition and Consumer Commission
January 2008 - present	Director, Trustpower (NZ), chair audit committee