# Jemena Electricity Networks (Vic) Ltd

## 2016-20 Electricity Distribution Price Review Regulatory Proposal

Attachment 6-10

Geoff Swier - Economic considerations for the interpretation of the National Electricity Objective

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# Economic considerations for the interpretation of the National Electricity Objective

## Expert Report prepared by Geoff Swier for Jemena Electricity Networks (Vic) Ltd

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**Farrier Swier**
Consulting

Level 7, 330 Collins Street, Melbourne
Victoria 3000 Australia

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

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# 1. Introduction

## 1.1 Terms of reference

1. I have been engaged by Jemena Electricity Networks (VIC) Ltd (JEN) to prepare an expert report on four questions concerning the interpretation of the National Electricity Objective (NEO) set out in the National Electricity Law (NEL).[1]

2. In summary these questions are:

   - What is the meaning of the NEO?
   - How should an economic regulation regime be designed to promote the NEO?
   - Is the building blocks approach likely to contribute to the achievement of the NEO?
   - What are the consequences of material error in the application of the building blocks approach for achieving the NEO, 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 JEN is preparing its regulatory proposal for the period 1 January 2016 to 31 December 2020, for consideration of the Australian Energy Regulator (AER). JEN is now in the process of framing its regulatory proposal within the relevant provisions of the NEL and National Electricity Rules[2] (NER) for submission to the AER by 30 April 2015.

4. A critical element of the NEL is the NEO[3] which is:

> *"to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to—*
>
> *(a) price, quality, safety, reliability and security of supply of electricity; and*
>
> *(b) the reliability, safety and security of the national electricity system."*

5. Under section 16(1)(a) of the NEL the AER must, in performing or exercising any of its economic regulatory functions or powers, perform or

[1] National Electricity (South Australia) Act 1996—30.1.2015.

[2] Version 67.

[3] NEL, section 7.

exercise those functions or powers in a manner that will or is likely to contribute to the achievement of the NEO.

6. Further, under recent changes to section 16(1)(c) and (d) of the NEL, in making a reviewable regulatory decision (including decisions on whether to approve a regulatory proposal), 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 two or more possible decisions that will or are likely to contribute to the achievement of the NEO, make the decision that the AER is satisfied will or is likely to contribute to the achievement of the NEO to the greatest degree.

7. JEN states that it is seeking to formulate its regulatory proposal in a way that contributes to achieving the NEO to the greatest degree. To assist in formulating and supporting its regulatory proposal, JEN seeks to better understand the implications of the NEO for its regulatory proposal and its consideration by the AER. In particular, JEN seeks to better understand whether the application, and correct application, of the building blocks framework in the NER is likely to contribute to the achievement of the NEO, 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 electricity, gas and other infrastructure sectors in Australia and New Zealand. I have prepared a number of expert economic reports and have been a member of dispute resolution panels. My full curriculum vitae 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 20 years' experience in economic regulation of network businesses in the energy and water sectors. 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 NEO in this expert report is within the context of the economic regulation of JEN's electricity distribution services.[4]

13. This expert report requires interpretation of certain provisions of the NEL and NER. As required by the NEL, I have adopted a 'purposive' approach[5] - 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'.[6]

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

[5] 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 NEL.

[6] Schedule 2, clause 8 NEL.

# 2. Summary

## Question1. What is my understanding of the NEO?

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

- The NEO is an economic concept. The terms 'efficient investment in, and efficient operation and use of electricity 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 electricity services,' in the NEO encompasses 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 electricity 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 electricity 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 NEO means that investment, operation and use of electricity services are productively, allocatively 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 electricity businesses exercising market power and should reflect what would occur in a workably competitive market;
  - investors in regulated electricity 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 electricity businesses to invest and operate efficiently and to reveal information on their efficient costs.
- The NEO limits the types of benefit that may be considered to only those that relate directly to the provision and consumption of electricity 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 JEN's regulatory proposal.

## Question 2. How should an economic regulation regime be operationalised to promote the NEO?

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 with unique characteristics such as electricity distribution have no way of judging what level of revenue allowance would best promote the NEO 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 NEO, I consider that an economist would define three principles that such a model would need to meet:

    - the model 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
    - the model 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)
    - the model should be able to be implemented in a way that creates incentives for electricity 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 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 electricity

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

- requiring the regulator to take into account the NEO and the Revenue and Pricing Principles[7] (RPPs);
- separation of the functions of review and amendment of the rules from rules application; and
- setting out in the NER 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 NEO?

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

- the long term interests of consumers are promoted by the requirements of the NER for the AER to review service providers' expenditure forecasts in the regulatory 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 a rate of return 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, determine distribution tariffs.

[7] The RRPs are set out in section 7A of the NEL.

25. Detailed analysis of each rule that determines the calculation of the building blocks components shows they promote the NEO. 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 NEO demonstrates that the building blocks approach (correctly applied) is likely to contribute to the achievement of the NEO.

27. The AER is required by the NEL to consider the interrelationships between constituent components of its decision and explain how it has taken these into account. [8] A new aspect for operationalising the NEO in decision-making is that the Tribunal in merits review is required to consider how the constituent components of a reviewable regulatory decision interrelate with each other and with the matters raised as a ground for review.[9] The purpose of this provision is to ensure that in merits review, logical economic relationships between different constituent elements of a determination are identified and considered to ensure consistent treatment of common parameters or factors. This promotes the NEO in merits review decisions by reducing the scope for errors arising from inconsistent parameters or factors used to determine related constituent elements of a determination.

## Question 4. The outcome for the NEO 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 NEO where this has consequences that, overall, adversely affect 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 resulting from a material error to the long term interest of its consumers will depend on the relevant rule and the particular

[8] Section 16(1)(c) of the NEL.

[9] Section 71P 2(b) of the NEL.

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 NEO would be to identify the specific linkages between the relevant rules and the NEO.

# 3. Question 1: The meaning of the NEO

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

> *What do you consider the national electricity objective to mean?*

## 3.1 The National Electricity Objective

34. The objective of the NEL is:

> *"to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to—*
>
> *(a) price, quality, safety, reliability and security of supply of electricity; and*
>
> *(b) the reliability, safety and security of the national electricity system."*[10]

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

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

> *The long term interests of consumers of electricity requires the economic welfare of consumers, over the long term, to be maximised. If electricity markets and access to services are efficient in an economic sense, the long term interests of consumers in respect of price, quality, reliability, safety and security of electricity services will be maximised.*[11]

37. The Limited Merits Review provisions in the NEL were recently amended.[12] 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.

[10] Section 7 NEL.

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

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

## 3.2 Revenue and pricing principles

38. As an economist expert in economic regulation I consider that the NEO together with the RPPs provide the overarching framework of the parts of the NEL dealing with economic regulation of electricity.[13] The RPPs provide the next level of detail below the NEO in the hierarchy of the Law and assist in understanding the meaning of the NEO.

39. The RPPs[14] are:

> *(2) A service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs (a) providing direct control network services; and (b) complying with a regulatory obligation or requirement or making a regulatory payment.*
>
> *(3) A regulated network service provider should be provided with effective incentives in order to promote economic efficiency with respect to direct control network services the operator provides. The economic efficiency that should be promoted includes— (a) efficient investment in a distribution system or transmission system with which the operator provides direct control network services; and (b) the efficient provision of electricity network services; and (c) the efficient use of the distribution system or transmission system with which the operator provides direct control network services.*
>
> *(4) Regard should be had to the regulatory asset base with respect to a distribution system or transmission system adopted (a) in any previous (i) as the case requires, distribution determination or transmission determination; or (ii) determination or decision under the National Electricity Code or jurisdictional electricity legislation regulating the revenue earned, or prices charged, by a person providing services by means of that distribution system or transmission system; or (b) in the Rules.*
>
> *(5) A price or charge for the provision of a direct control network service should allow for a return commensurate with the regulatory and commercial risks involved in providing the direct control network service to which that price or charge relates.*
>
> *(6) Regard should be had to the economic costs and risks of the potential for under and over investment by a regulated network provider in, as the case requires, a distribution system or transmission system with which the operator provides direct control network services.*
>
> *(7) Regard should be had to the economic costs and risks of the potential for under and over utilisation of a distribution system or transmission system with*

[13] The NEL deals a range of other activities and markets besides economic regulation of electricity.

[14] Section 7A NEL

> *which a regulated network service provider provides direct control network services.*
>
> *Note: Aspects that are pertinent to this opinion are underlined.*

40. The RPPs are binding on decision makers in the revenue and tariff setting process. The AEMC must in amending the NER take into account the RPPs;[15] and the AER must take into account the RPPs when approving prices or charges for an electricity network service.[16]

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

## 3.3 Economic efficiency

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

43. In principle, 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. In practice it is often difficult to determine whether resources are allocated in a *perfectly* optimal way for reasons such as incomplete information and bounded rationality.[17] However the optimal allocation of resources implied by economic efficiency remains a useful guide to interpreting the NEO but will often imply a range of outcomes that can be assessed as economically efficient rather than a single outcome.

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

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

46. 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 NEO; and in section 6 when assessing

[15] Section 88B NEL.

[16] Section 16(2)(a)(ii) NEL.

[17] Bounded rationality is the idea that when individuals make decisions, their rationality is limited by the information they have, the cognitive limitations of their minds, and the time available to make the decision.

the consequences of material error in the application of the building blocks approach.

### 3.3.1 Productive efficiency

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

48. 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 operating and maintenance processes and techniques.

### 3.3.2 Allocative efficiency

49. 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.

50. Allocative efficiency in producing electricity 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 electricity efficiently.[18] This is consistent with the 'efficient use' part of the NEO.

51. Allocative efficiency also includes:

- understanding changing market requirements and consumer and stakeholder needs and planning business investment and operations accordingly

[18] It may be efficient to build 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 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 utilisation. This interpretation is supported by RPP section 7A(7) of the NEL which states that 'regard should be had to the economic costs and risks of the potential for under and over utilisation of a distribution system or transmission system with which a regulated network service provider provides direct control network service.'

- adopting good demand forecasting practices that support efficient network planning expansion to meet demand and avoiding significant over or under investment. [19]

### 3.3.3 Dynamic efficiency

52. 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 NEO.

53. Dynamic efficiency in producing electricity 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
- adopting new technologies where it is efficient to do so
- management and workforce training and development.

## 3.4 What economic problems does the NEL seek to address?

54. In my opinion, further guidance on the meaning of the NEO can be gained by asking the question:

[19] The 'long term interest of consumers' will be promoted where an optimal balance is struck between under and over investment in a distribution network. Electricity distribution networks 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 7A(6) of the NEL which requires that 'regard should be had to the economic costs and risks of the potential for under and over investment in a distribution system or transmission system with which the operator provides direct control network services'.

> *what are the economic problems the parts of the NEL dealing with economic regulation of electricity distribution businesses are trying to address?*

55. 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 electricity distribution businesses 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 electricity distribution businesses 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.

56. 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 NEO.

### 3.4.1 The market power problem

57. Electricity distribution businesses provide a range of different services which vary in the extent to which the business can exercise market power. For this reason the NER set out rules for classifying services and specify different methods for controlling prices or revenues which reflect the extent to which the business can exercise market power. These concepts are discussed in further detail in section 4.1.1 below.

58. For example, the cost function for provision of electricity distribution network services is currently accepted as being characterised by declining costs to scale and network characteristics.[20] There are also often significant amenity costs in providing electricity network assets.[21] These features mean it is economically efficient (and socially desirable) to build a single electricity distribution network to serve a particular market. These circumstances give

[20] 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.

[21] For example, the amenity costs to the community from providing power polls and overhead wires is minimised by there being only a single network.

rise to concerns about the potential for the exercise of market power in provision of network services by a commercially[22] motivated electricity distribution business.

59. The extent to which market power is a concern depends on the specific situation including the extent of any countervailing forces that limit the ability of an electricity distribution business to exercise market power. Typical countervailing constraints on the exercise of market power include the ability for a significant new user to negotiate with an electricity distribution business, competition in the energy market from other energy sources or the ability of the user to bypass the network.

60. For example, consumers in a market may have access to a range of options for meeting their energy needs such as non-grid electricity (e.g. rooftop solar) or gas (reticulated or bottled gas). This means an electricity 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 electricity; and maintain or enhance its reputation as a reliable supplier. This situation may result in the potential for services with a high level of market power inefficiently cross subsidising the pricing of competitive services.

61. An electricity distribution business is likely to have significant market power where it faces insufficient countervailing competitive constraints on pricing for its services. The incentive and the ability to exercise market power could harm the interest of consumers of electricity 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 was workably competitive; being provided with unsatisfactory standards of service; or not being able to access the electricity network. The indirect harm could be reduced competition in upstream and downstream markets. High electricity distribution prices for example may limit opportunities for marginal electricity producers to enter the competitive upstream electricity production market.

62. Therefore the NEL and NER seek to limit the potential exercise of market power by electricity distribution businesses: firstly by determining the classification of services and the type of control mechanism that should apply to each service category; and secondly by guiding the detailed application of the relevant control mechanisms for determining revenues and tariffs.

## *Conclusion*

[22] Another way in which market power in electricity networks can be managed is through government ownership.

63. The reference to 'promotion of ….the … interests of consumers' means, in part, setting charges and prices for direct control services in a manner that avoids the harm to consumers from the potential exercise of market power.

### 3.4.2 The regulatory commitment problem

64. Electricity distribution networks comprise capital intensive, durable, long lived and largely immovable assets. The JEN network is an example of such an electricity distribution business.

65. Economic literature[23] 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.[24]

66. 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….'*[25]

67. 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.

68. One way that electricity distribution 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 an electricity distribution network solution, an electricity business could supply consumers with a small scale distributed generation service.[26] If an electricity distribution network has already been constructed, an electricity business may have incentives to underinvest in the network in order to protect itself from the risk of financial loss resulting from the threat

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[23] 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.

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

[25] Newbery op cit pg. 2.

[26] A PV solar product may be competitive and not require regulation.

or reality of adverse government pricing decisions. This could result in a decline in the reliability or safety of electricity supply. Both situations may cause harm to the long-term interests of consumers.

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

### *Conclusion*

70. An overarching objective of the NEL and NER taken together with the reference to 'efficiency….for the long term interest of consumers' in the NEO means (in part) that investors in regulated electricity distribution 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.

71. This interpretation is supported by the following RPPs:

- Section 7A(2) of the NEL 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 7A(4) of the NEL which requires that economic regulation decisions have *regard to the regulatory asset base* from the prior period
- Section 7A(5) of the NEL which requires that a reference tariff should allow for a *return commensurate with the regulatory and commercial risks* involved in providing the service.

## 3.4.3 The inefficient economic regulation problem

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

73. 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'[27]) and not create the normal incentives for dynamic efficiency in the long run expected in a workably competitive market.

74. Secondly, the regulator faces the so called 'information asymmetry'[28] problem – that is, it may be difficult for the regulator to know what efficient costs should be.

75. The development of incentive based regulation techniques[29] over the past 30 years or so aims 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.

76. Recent amendments to the NEL 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*

77. The reference to 'efficient investment and operation… for the long term interest of consumers' in the NEO taken together with RPP 7A(3)[30] means (in part) that economic regulation should create incentives for dynamic efficiency in the way a electricity businesses invests and operates; and should promote overall efficiency by revealing information on efficient costs as occurs in a workably competitive market.

## 3.5 With respect to price, quality, safety, reliability and security of supply of electricity

78. My interpretation of this component of the NEO is that it limits the types of benefits (or harm) that may be considered to only those that relate directly to

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[27] 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.

[28] 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.

[29] *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.

[30] RPP 7A(3) of the NEL states that 'a regulated network service provider should be provided with effective incentives in order to promote economic efficiency'.

the provision and consumption of certain electricity services, and ignores possible external costs and benefits.[31]

79. The promotion of the long term interests of consumers with respect to price, quality, safety, reliability are relevant in the context of JEN's regulatory proposal. I understand that security of supply is not relevant.[32]

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

[32] Security of supply is an important outcome for the total power system, rather than an individual distribution network. Security of supply is a measure of the power system's capacity to continue operating within defined technical limits even in the event of the disconnection of a major power system element, such as an interconnector or large generator. (See http://www.aemo.com.au/Electricity/Policies-and-Procedures/System-Operating-Procedures)

# 4. Question 2: How should the objective be operationalised?

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

> *How should the objective be operationalised by a decision-maker in making decisions – that is, what does it mean to make decisions that:*
>
> *"to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to—*
>
> *(a) price, quality, safety, reliability and security of supply of electricity; and*
>
> *(b) the reliability, safety and security of the national electricity system"*

## 4.1 Design of an economic regulation regime that promotes the NEO

### 4.1.1 Initial design issues

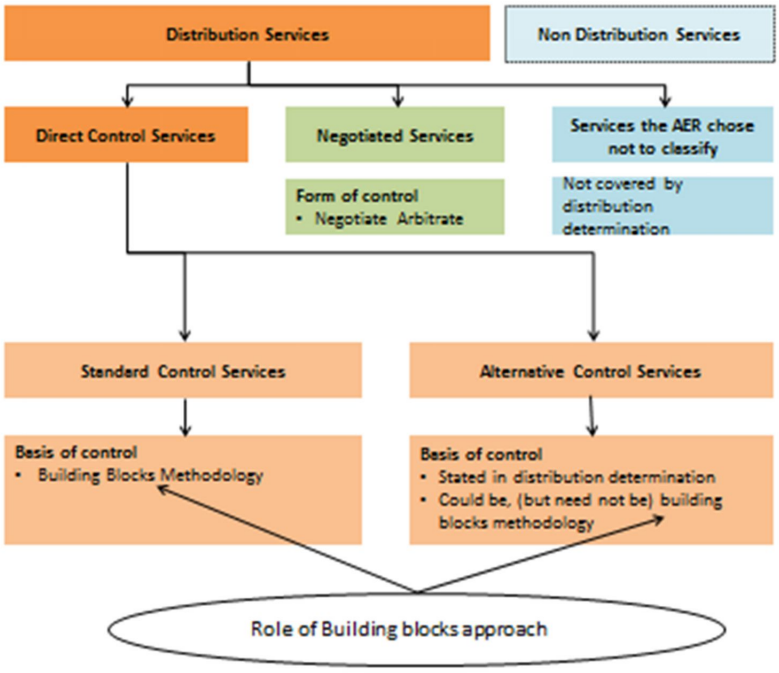
81. Initial design issues for any effective economic regulation regime are:

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.

#### Definition of service(s) to be regulated and form of regulation

82. The first step in designing any economic regulation regime is to define the services to be regulated and the forms of regulation that should apply to regulated services. Figure 1 summarises the concepts and terminology used by Chapter 6 of the NER for classifying services and specifying mechanisms for controlling prices or revenues. It also shows the role of the building blocks approach in regulation, which is discussed further in section 5.

**Figure 1: Service classification and control mechanisms- role of building blocks approach**




Source: Australian Energy Regulator [33]

83. The following concepts and terminology are relevant to considering how the NEO is operationalised by the NER:

84. An Electricity Distribution Business will provide distribution services to end use customers and could also provide non-distribution services (for example contracting services to other businesses). Non-distribution services are not regulated by the AER, but are relevant on considering how common costs should be allocated as between distribution and non-distribution services.

85. Distribution services are classified as either:

a) Direct control services

b) Negotiated services – services that are subject to negotiation / arbitration

c) Unregulated services

[33] Consultation Paper: Matters relevant to the framework and approach. ACT and NSW DNSPs 2014–2019 Classification of electricity distribution services in the ACT and NSW, December 2011.

86. Direct control services are services where prices or revenues are set by the AER. They are further classified as either:

a) Standard control services

b) Alternative control services

87. The building blocks approach is

a) the basis of control of prices or revenues for Standard Control Services.

b) could be (but need not be) the basis of control for prices or revenues for Alternative control services

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

88. Once a decision has been made that the long term interests of consumers of particular electricity service(s) would be best served by regulation of total revenues (in order to determine either a revenue or price cap) then a decision needs to be made about how to approach this task.

89. 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.

90. When regulating a particular electricity distribution network in Australia I believe that there is currently no readily available independent market information on prices or revenues for other similar distribution businesses that could be used to set regulated revenues or prices in a way that could meet the NEO. Each electricity distribution business 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 the demand characteristics. This means that the task of setting the 'right' revenue / price needs to take account of the specific characteristics of each electricity distribution network.

91. The need to take account of each electricity distribution network's specific characteristics underpins the 'propose – respond' model whereby each business puts forward a detailed revenue proposal based on its detailed understanding of the network and its costs, and the regulator reviews the proposal.

92. I note that the AER's current annual reporting requirements require electricity distribution business to provide economic benchmarking data which the AER is starting to take into account when making decisions[34] on regulatory proposals. The potential role for benchmarking in economic regulation is discussed in section 6.2.1 below.

93. 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.

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

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

95. 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 NEO

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

97. 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.

98. 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 distribution network may

[34] For example, in its draft decisions on the New South Wales state owned electricity businesses.

be sub-optimal - either outcome would harm the long term interests of consumers.

99. 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 distribution business may be discouraged from undertaking needed investment - which would harm the long term interests of consumers.

100. 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.

101. 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 NEO

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

103. Part C of chapter 6 of the NER[35] requires application of the building blocks approach for determining regulated electricity distribution regulatory proposals:

> *(a) A building block determination is a component of a distribution determination.*
>
> *(b) The procedure and approach for the making of a building block determination is contained in Part E of this Chapter and involves the submission of a building block proposal to the AER by the Distribution Network Service Provider.*

[35] Rule 6.3.1(a) and (b) NER.

104. The building blocks components and details for how each of the building blocks are calculated are set out in rule 6.4.3 of the NER.

105. I consider that the building blocks approach as it is implemented through the NEL and NER reflects each of the principles discussed in the previous section:

- It establishes rules and a 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.

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

### 4.2.1 Other approaches for determining regulated revenues

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

108. 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 good incentives for dynamic economic efficiency.

109. 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 electricity distribution allowed revenues over the regulatory period.[36] This approach seeks to provide stronger incentives for dynamic efficiency and potentially reduce the cost of regulation, by reducing the

[36] Ontario: TFP is considered in rate setting for all distribution companies. TFP was used for rate setting for San Diego Electricity 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

linkage between costs and prices. However, it may provide weaker assurances to investors about the ability to recover efficient costs over time because it does not take account of the recovery of past capital expenditures deemed efficient by the regulator. It may also not be as effective in constraining the exercise of market power because the rate of return is not explicitly taken into to account and therefore actual returns could be significant higher than regulated returns allowed under building blocks regulation. This approach has been considered in Australia but has not been adopted.[37]

## 4.3 The institutional framework for applying the building blocks approach

110. 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.

111. 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.

112. 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.[38]

[37] On 22 December 2011 the AEMC published its final determination in relation to a proposed rule change to allow the use of TFP methodology as an alternative economic regulation methodology to be applied by the 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.

[38] 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

113. 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:

- require that the regulator take into account the NEO and the RPPs (see section 4.3.1 below)
- separate the ongoing review and amendment of the rules from the application of the rules[39]
- 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).

114. In my opinion each of these features of Australia's institutional arrangements for electricity 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

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

116. The AER generally has discretion to accept or approve, or to refuse to accept or approve, any element of a regulatory proposal or proposed tariff structure statement.[40] These discretions are limited by certain provisions of Chapter 6 of the NER that explicitly negate or limit the AER's discretion.

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

- interpreting the relevant NER requirements
- developing and consulting on guidelines to assist electricity businesses to prepare their regulatory proposals and other supporting information
- analysing information put forward by the regulated distribution business, the AER staff and consultants, and other stakeholders

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.

[39] The AEMC reviews and amends the rules and the AER applies the rules, for example in making electricity distribution regulatory proposals determinations.

[40] Clause 6.12.3(a) of the NER.

- exercising its discretions in interpreting relevant rules under the NEL requirement to choose the preferable decision.

118. Section 16 of the NEL sets out certain requirements the AER must follow in making decisions and exercising its discretions on an regulatory proposal including:

- The AER must exercise power to contribute to the achievement of the NEO
- The AER must consider interlinked matters
- The AER must take into account the RPPs.

119. Each requirement is discussed below.

## AER must exercise power to contribute to the achievement of the NEO

120. The AER must make decisions in a manner that 'will or is likely to contribute to the achievement of the NEO'.[41]

121. Where there are two or more possible designated reviewable regulatory decisions that will, or are likely to, contribute to the achievement of the NEO, the NEL requires that AER must make a decision 'that the AER is satisfied will or is likely to contribute to the achievement of the NEO to the greatest degree and specify reasons'.[42]

## AER must consider interlinked matters

122. 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.[43] This is discussed further in section 5.2.6 below.

## AER must take into account the revenue and pricing principles

123. The AER must take into account the RPPs when 'exercising a discretion in approving or making those parts of a distribution determination or transmission determination relating to direct control network services' or

[41] Section 16(1)(a) NEL.

[42] Section 16(1)(d) NEL.

[43] Section 16(1)(c) NEL.

'when making an access determination relating to a rate or charge for an electricity network service'.[44]

[44] Section 16(2)(a) NEL.

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

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

> *Clause 6.4.3 of the national electricity rules requires the revenue requirement for a distribution network service provider for each year of a regulatory control period to be determined using a building block approach. Clause 6.4.3 also specifies the components ('building blocks') of the revenue requirement.*
>
> *In your view, is such an approach (correctly applied) likely to contribute to the achievement of the national electricity objective (and if not, please identify any approaches which would be preferable, in terms of contributing to the achievement of the national electricity objective)?*

## 5.1 Building blocks approach

### 5.1.1 Overview of the building blocks approach

125. The building blocks approach is summarised in Figure 2.

126. The total revenue requirement for standard control services must be determined using the building blocks approach on an ex ante basis, typically for a five year period.[45]

127. The total regulated revenue requirement for each year of a regulatory control period is calculated by adding together the categories of forecast costs as shown in Figure 2. The projected capital base for each year is calculated by a roll forward model which adds conforming actual and forecast capital expenditure[46] to the opening capital base, and subtracts depreciation, disposals over the current regulatory control period..

128. Total revenue requirements are used to determine the base year tariffs for the first year of the regulatory control 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 2 are demand

[45] As noted above, the building blocks approach may also be used for determine the regulated revenue requirement for alternative control services.

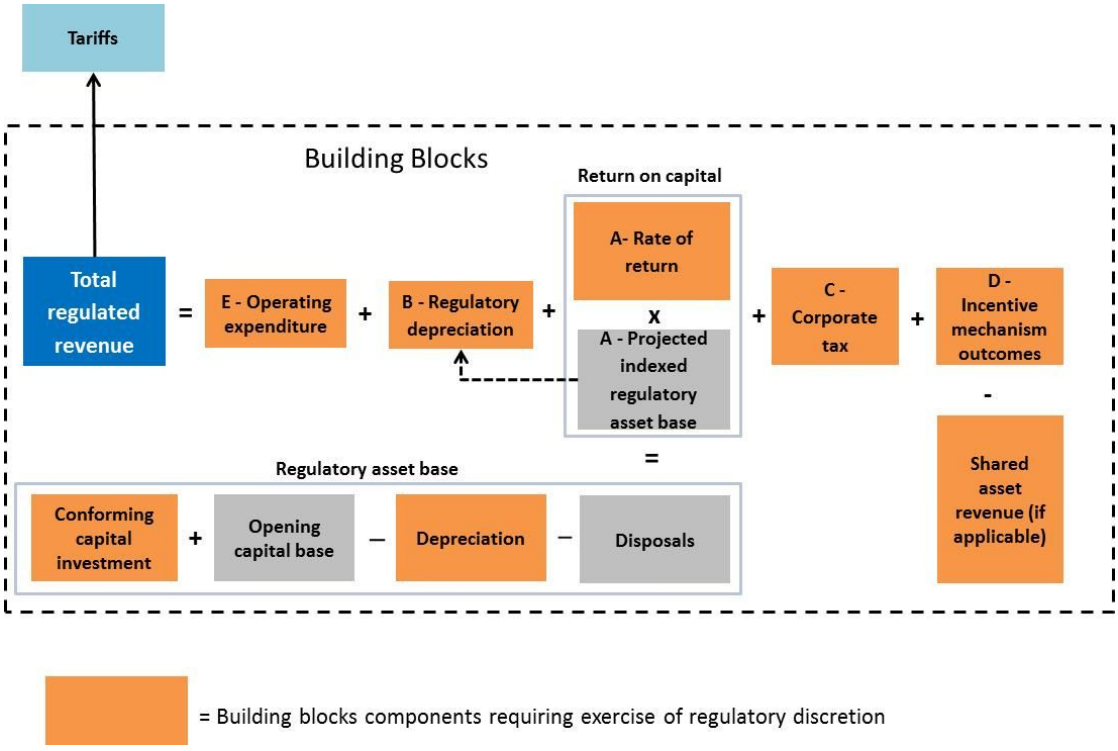
[46] Conforming capital expenditure is net capital contributions

forecasts, which are an important driver in determining some elements of conforming capital and operating expenditure, and in setting tariffs.

129. 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 regulatory control period.

**130.** The establishment of the total revenue (in JEN'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 mechanisms (see below) the business is able to retain the benefit of any efficiencies achieved, or is penalised if 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 2: Building blocks approach**




Note 1. This diagram summarises the key features of the building blocks approach and does not show all the interrelationships (see section 5.2.6). Note 2: Under the reliability of supply, quality of supply and customer service components of the service target performance incentive scheme (STIPS), total regulated revenue (through average tariffs for all customers) is increased (or decreased) based on changes in service performance from regulatory year to regulatory year. Note 3: Conforming capital investment is net of customer contributions.

131. A number of incentive mechanisms have been developed under the NER.

132. The AER has developed the following incentives mechanisms:

a) for operating expenditure - the Efficiency Benefit Sharing Scheme (EBSS)

b) for capital expenditure - the Capital Expenditure Sharing Scheme (CESS)

c) for reliability of services - the Service Target Performance Incentive Scheme (STPIS)

d) to encourage efficient non-network alternatives - the Demand Management and Embedded Generation Connection Incentive Scheme (DMEGCIS)

e) small scale incentive scheme.

133. The Victorian government also has implemented incentives for Victorian electricity distribution businesses to reduce the risk of fire starts caused by electricity infrastructure, and to reduce the risk of loss or damage caused by fire starts - the F-factor scheme.

### 5.1.2 Assessment of the building blocks approach

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

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

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

137. 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[47] and wholesale water and waste water businesses.[48] It is widely accepted[49] 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

138. This section:

- identifies and discusses the rules that determine each building block component; and
- discusses from an economic perspective how each rule (or group of rules) is directed at: promoting particular behaviours by a electricity business which are in the long-term interest of consumers, and providing assurances to consumers that regulatory decisions are in their long term interests.

### 5.2.1 The projected regulatory asset base

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

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

#### *NER rule 6.5.1and schedule 6.2: Regulatory asset base*

140. NER rule 6.5.1 states that the regulatory asset base is the value of the assets used to provide standard control services. It also specifies the requirement for the AER to publish a model for rolling forward the regulatory asset base and the contents of the roll forward model.

---

[47] 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 electricity networks.

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

[49] 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.

141. NER schedule 6.2 deals with the establishment of opening regulatory asset base for a regulatory control period and the requirement for the roll forward model to comply with this requirement. Amongst other things, it also specifies the method for adjusting the regulatory asset base as at the beginning of the first regulatory year of the immediately preceding regulatory control period (the previous control period) including:

a) How the previous value of the regulatory asset base is adjusted for actual capital expenditure over the previous regulatory control period, and for estimated capital expenditure when actual data is not available

b) When an estimate has been used to establish the opening regulatory asset base of the previous regulatory control period, the basis for adjusting for actual capital expenditure in a subsequent regulatory control period to remove any benefit or penalty associated with any difference between the estimated and actual capital expenditure

c) The requirement to remove from the previous value of the regulatory asset base:

d) the amount of depreciation of the regulatory asset base during the previous regulatory control period, calculated in accordance with the distribution determination for that period

e) any disposal value of any asset where that asset has been disposed of during the previous regulatory control period

f) the value of an asset where the asset was previously used to provide standard control services but, as a result of a change to the classification of a particular service under Part B, is not to be used for that purpose for the relevant regulatory control period.

142. NER schedule 6.2.2A enables the AER to not include inefficient past capital expenditure in the roll forward of the regulatory asset base in specified circumstances including where the overspending requirement is met. The overspending requirement arises where the sum of all capital expenditure incurred during the review period exceeds the sum of the forecast capital expenditure accepted or substituted by the AER for the review period and any net capital expenditure associated with pass through events during the review period. The AER's discretion with respect to the overspending requirement is limited.

### *NER rule 6.5.7: Forecast capital expenditure*

143. NER rule 6.5.7(a) requires forecast capital expenditure must achieve the following capital expenditure objectives:

> *(1) meet or manage the expected demand for standard control services over that period;*

> *(2) comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;*
>
> *(3) to the extent that there is no applicable regulatory obligation or requirement in relation to:*
>
> *(i) the quality, reliability or security of supply of standard control services; or*
>
> *(ii) the reliability or security of the distribution system through the supply of standard control services,*
>
> *to the relevant extent:*
>
> *(iii) maintain the quality, reliability and security of supply of standard control services; and*
>
> *(iv) maintain the reliability and security of the distribution system through the supply of standard control services; and*
>
> *(4) maintain the safety of the distribution system through the supply of standard control services.*

144. Under rule 6.5.7(c) the AER must accept the forecast capital expenditure included in a building block proposal if the AER is satisfied that the total of the forecast capital expenditure reasonably reflects each of the following capital expenditure criteria:

> *(1) the efficient costs of achieving the capital expenditure objectives; and*
>
> *(2) the costs that a prudent operator would require to achieve the capital expenditure objectives; and*
>
> *(3) a realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objectives.*

145. Rule 6.5.6(e) sets out various capital expenditure factors that the AER must have regard to when making a decision under rule 6.5.6(c).

**How these rules promote the long-term interest of consumers**

146. NER rule 6.5.1 and schedule 6.2 means that any actual capital expenditure previously held to be conforming and that continues to be used to provide standard control services is not generally re-visited at the commencement of each regulatory period except under specified circumstances (see discussion of NER schedule 6.2.2A above). This provides some assurance to investors in regulated business that the value of the capital base will not be subsequently expropriated by the regulator. This assurance helps provide incentives to investors to make ongoing investment in long-lived assets.

147. 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.

148. NER rule 6.5.7 contributes to achieving the NEO by enabling investments to proceed where the capital expenditure is necessary to: (i) meet expected demand for services; or (ii) to comply with a regulatory obligation or requirement; or (iii) to maintain the quality, reliability and security of services; or (iv) to maintain the safety of services.

149. This rule provides 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). This rule also benefits consumers by providing an assurance that capital expenditure forecasts are subject to regulatory scrutiny (productive efficiency).

### 5.2.2 Return on capital

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

**NER rule 6.5.2: Rate on capital**

151. This rule requires that the allowed rate of return be determined such that it achieves the allowed rate of return objective:

> *…the rate of return for a Distribution Network Service Provider is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the Distribution Network Service Provider in respect of the provision of standard control services (the allowed rate of return objective).*

**How this rule promotes the long-term interest of consumers**

152. The return on capital rule contributes to achieving the NEO 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

153. Building blocks component B is depreciation on the regulatory asset base which is deducted from the regulatory asset base.

154. **NER rule 6.5.5** sets out: that depreciation must be calculated on the regulatory asset base at the beginning of that regulatory year; how

depreciation schedules are used; and the depreciation schedule requirements. These rules set out the basis on which depreciation is calculated for different classes of the business assets constituting the regulatory asset base.

155. **NER schedule 6.2.2B** provides discretion to the AER to determine whether depreciation for establishing the regulatory asset base as at the commencement of the following regulatory control period is to be based on actual or forecast capital expenditure.

**How these rules promote the long-term interest of consumers**

156. The depreciation rules contribute to achieving the NEO by:

- providing an assurance to investors in a regulated business that efficient 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 through:
  - assuring consumers that capital expenditure will only be recovered once (allocative efficiency)
  - spreading the recovery of capital expenditure across current and future generations of consumers, which helps ensure tariffs are efficient and equitable over time (allocative efficiency).

### 5.2.4 Estimated cost of corporate income tax

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

**NER rule 6.5.3: Estimated cost of corporate income tax**

158. Investors incur a tax liability each year which must be paid from pre-tax earnings. NER rule 6.5.3 sets out a formula to calculate an estimated cost of corporate income tax payable by a benchmark efficient entity in providing standard control services, such estimate being determined in accordance with the post-tax revenue model.

159. 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 promotes the long-term interest of consumers**

160. The corporate income tax rule contributes to achieving the NEO 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 efficient entity (rather than for example by reimbursement of actual corporate income tax[50]) (productive efficiency efficiency).

### 5.2.5 Forecast operating expenditure

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

**NER rule 6.5.6: Forecast operating expenditure**

162. Rule 6.5.6(a) provides Distribution Network Service Providers with an allowance for the operating expenditure component of the building blocks to achieve the following operating expenditure objectives:

> *(1) meet or manage the expected demand for standard control services over that period;*
>
> *(2) comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;*
>
> *(3) to the extent that there is no applicable regulatory obligation or requirement in relation to:*
>
> *(i) the quality, reliability or security of supply of standard control services; or*
>
> *(ii) the reliability or security of the distribution system through the supply of standard control services,*
>
> *to the relevant extent:*

[50] If corporate income tax costs were based on reimbursement of actual corporate income tax then a business would not have any incentive to engage in normal commercial activities to legally minimise corporate income tax costs. Over time this could adversely affect the long term interest of consumers.

> *(iii) maintain the quality, reliability and security of supply of standard control services; and*
>
> *(iv) maintain the reliability and security of the distribution system through the supply of standard control services; and*
>
> *(4) maintain the safety of the distribution system through the supply of standard control services.*

163. Under rule 6.5.6(c) the AER must accept the forecast operating expenditure included in a building block proposal if the AER is satisfied that the total of the forecast operating expenditure reasonably reflects each of the following operating expenditure criteria:

> *(1) the efficient costs of achieving the operating expenditure objectives; and*
>
> *(2) the costs that a prudent operator would require to achieve the operating expenditure objectives; and*
>
> *(3) a realistic expectation of the demand forecast and cost inputs required to achieve the operating expenditure objectives.*

164. Rule 6.5.6(e) sets out various operating expenditure factors that the AER must have regard to when making a decision under rule 6.5.6(c).

**How this rule promotes the long-term interest of consumers**

165. The operating expenditure rule contributes to achieving the NEO 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 obligations or requirements (productive efficiency)
  - encourages efficient operation and maintenance of the electricity network to meet expected demand for the long term interest of consumers (allocative and productive efficiency)
- benefiting consumers by:
  - recognising that 'the efficient costs of achieving' and 'the costs that a prudent operator would require to achieve' the operating expenditure objectives are likely to change and potentially improve over time (dynamic efficiency)
  - encouraging ongoing provision of reliable services (allocative efficiency)
  - assuring consumers that operating expenditure is subject to regulatory scrutiny (productive efficiency).

### 5.2.6 Incentive mechanism to encourage gains in efficiency

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

167. NER rule 6.3.2(a)(3) requires that the building block determination must specify how any applicable efficiency benefit sharing scheme, capital expenditure sharing scheme, service target performance incentive scheme, demand management and embedded generation connection incentive scheme or small-scale incentive scheme is to apply to over a regulatory control period.

168. The detailed requirements for how the AER must apply each incentive mechanism are set out in the NER as follows:

| Incentive mechanism | NER Rule |
|---|---|
| Efficiency benefit sharing scheme (EBSS) | 6.5.8 |
| Capital expenditure sharing scheme (CESS) | 6.5.8A |
| Service target performance incentive scheme (STPIS) | 6.6.2 |
| Demand management and embedded generation connection incentive scheme (DMEGCIS) | 6.6.3 |
| Small scale incentive scheme | 6.6.4 |

**How these rules promotes the long-term interest of consumers**

169. The incentive mechanism rules contribute to achieving the NEO by:

- avoiding excessive incentives for cost reduction at the expense of other outcomes that are in the interest of consumers (allocative efficiency) by balancing the value of benefits between the incentive components
- encouraging improvements in efficiency over time for the long term interest of consumers (productive and dynamic efficiency).

## 5.3 Interrelationships between constituent elements of a determination

170. The NEL requires the AER to specify all relevant relationships between constituent components of its decision and explain how it has taken these into account.[51]

[51] Section16(1)(c) of the NEL.

171. A new aspect for operationalising the NEO in decision-making is government's policy decision that merits review should consider all interrelated matters. 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 NEL, was to allow the regulator to raise issues that could impact on the matter before the Tribunal. In practice, this has not occurred.*

172. Reflecting this concern NEL amendments impose specific requirements on the Tribunal in merits review to:

> *…..consider how the constituent components of a reviewable regulatory decision interrelate with each other and with the matters raised as a ground for review*[52]

173. The purpose of this new provision is to ensure that in merits review, logical economic relationships between different constituent elements of a determination are identified and considered to ensure consistent treatment of common parameters or factors. This promotes the NEO in merits review by reducing the scope for errors arising from inconsistencies in common parameters or factors that determine related constituent elements of a determination.

174. The following sets out examples of interrelationships between different parameters or component of the building blocks cost forecasts:

- **Capital Asset Pricing Model (CAPM**). Consistency issues often arise in the estimation of the expected return on equity using the CAPM. The AER[53] noted the following specific examples of consistency issues which it took into account in a 2008 review of the WACC parameters:
  - the assumed value 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

[52] Section 71) 2(b) of the NEL.

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

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.
- **Changes in demand forecasts**. These can affect expenditure forecasts, and the setting of tariffs.
- **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

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

> *If there is a material error in the application of the building block approach set out above:*
>
> *(a) is the outcome likely to contribute to the achievement of the national electricity objective?*
>
> *(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?*

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

## 6.1 Material error in application of the building blocks and the NEO

177. 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 NEO?*

### 6.1.1 Limitation

178. 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 NER as a regulatory practitioner and economist.

### 6.1.2 Analysis of material error

179. A material error in the estimation of a building blocks component would arise from an incorrect or mistaken application of a relevant rule[54] setting out how the building blocks expenditure components are to be determined (the

[54] As discussed above, Part C of chapter 6 of the NER deals with the implementation of the building blocks approach.

'building block rules'). I understand that it is also possible that an error could 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.[55]

180. 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.

181. A material error in the estimation of a building blocks component is likely to change the calculation of the total revenue requirement, because of the additive nature of the building blocks calculation.[56]

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

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

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

185. The following table outlines examples of possible effects on the achievement of the NEO of a material error in the calculation of a building blocks component that reduces total regulated revenue. The table first refers to the relevant rules for each building block component. It then sets out the outcome if the rule is correctly applied. Finally it sets out the effect of a material error in the application of that rule on the long term interest of consumers.

[55] Section 16(2)(a)(i) NER:- 'The AER must take into account the revenue and pricing principles when exercising a discretion in making those parts of a distribution determination or transmission determination relating to direct control network services.'

[56] This effect is subject to there not being equal offsetting effects from a change in other interrelated building block component(s).

| 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 (NER rules 6.5.1 and 6.5.7 and schedule 6.2) | …the proposed capital expenditure is efficient | Allocative efficiency is reduced |
| | …. the proposed capital expenditure is in fact necessary to maintain the integrity of services | Reliability standards or regulatory obligation not met or safety is compromised |
| | …. 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 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 arising from a lack of assurance that efficient capital expenditures will be able to be recovered |
| Rule for return on the projected capital base (NER rule 6.5.2) | …there is an adequate assurance to investors that they will be able to earn an appropriate risk adjusted rate of return | Allocative efficiency redeuced - ongoing investment is discouraged |
| Rule for estimated cost of corporate income tax for the year (NER rule 6.5.3) | … there is an adequate assurance to investors that in future regulatory periods they will be able to recover corporate income tax liability | Allocative efficiency reduced - discourages ongoing investments |
| Rule for operating expenditure (NER rule 6.5.6) | … there is sufficient revenue to enable the business to undertake 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 |

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

## 6.2 Nature and types of consequences that might arise

187. 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?*

188. 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

189. This section discusses three examples where a material error in the application of the building blocks approach in a final determination made by the AER results in a regulated business not being provided the opportunity to recover its efficient costs incurred in providing standard control services within a regulatory control period. The consequences of the error in each case are discussed.

190. The first example is where benchmarking models are used by the AER to determine expenditure allowances, without proper regard to the individual circumstances of each business and their particular expenditure drivers.

191. The second example is where the AER makes an error in the determination of gamma in the calculation of the benchmark cost of corporate income.

192. The third example is where an error is expected to be repeated in future regulatory periods.

#### Example 1: Benchmarking models used to determine expenditure allowances without proper regard to the individual circumstances of each business and their particular expenditure drivers

##### *Background*

193. The rules for determining capital and operating expenditure forecasts are set out in section 5.2.1 and 5.2.5 above. In summary:

a) the AER must make decisions on whether or not to accept a regulated businesses forecasts of capital and operating expenditure

b) the AER must accept the forecasts if the AER is satisfied that the total of the forecast capital and operating expenditure for the regulatory control period reasonably reflects the capital and operating expenditure criteria respectively;

c) the capital and operating expenditure objectives include: to meet or manage the expected demand for standard control services over that period; to comply with all applicable regulatory obligations or

requirements associated with the provision of standard control services; and to maintain the safety of the distribution system through the supply of standard control services;

d) the capital and operating expenditure criteria are:

- the efficient costs of achieving the expenditure objectives
- the costs that a prudent operator would require to achieve the expenditure objectives
- a realistic expectation of the demand forecast and cost inputs required to achieve the expenditure objectives

e) under the operating expenditure factors, the AER must also have regard to benchmarking analysis and information including:

f) the most recent annual benchmarking report (published under rule 6.27) and

g) the benchmark operating expenditure that would be incurred by an efficient Distribution Network Service Provider over the relevant regulatory control period.

## *Analysis*

194. I understand that in practice that it may be difficult to be confident that benchmarking analysis is able to fully reflect the individual circumstances of a business and their particular expenditure drivers, to the extent that is required by the rules. This concern may be heightened at this time when there is limited experience with undertaking benchmarking analysis for making regulatory decisions and when the collection of supporting data that forms the benchmarking analysis is in relatively early stages of development.

195. The limitations of benchmarking analysis in regulatory decision making and the pathway to appropriate use of benchmarking analysis are discussed extensively in recent reports by the Productivity Commission[57] and the AER.[58] Key potential limitations with the benchmarking analysis in regulatory decision making identified include:

a) uncertainty as to whether any benchmarking model (or group of models) is capable of specifying the relationship between a distribution businesses' inputs and outputs with sufficient accuracy (model specification error)

[57] Productivity Commission 2013, Electricity Network Regulatory Frameworks, Report No. 62, Canberra.

[58] Australian Energy Regulator, *Benchmarking Opex and Capex in Energy Networks*, Working Paper no.6, May 2012.

b) potential problems with input and output data that is not sufficiently accurate or comparable across businesses (data error)

c) statistical limitations arising from using small sample sizes (sampling error)

d) where international data is used (to overcome statistical limitations from small sample sizes) there may be uncertainties about whether the data is accurate and sufficiently comparable (data error).

196. In relation to 'pathways' to using benchmarking analysis in economic decision making, the AER stated in 2012 that benchmarking is most effectively pursued as an integral part of the broad regulatory process:

> *Use of cost benchmarking would move from being mainly an informative tool to being a deterministic tool through the built-up of expertise (including learning by doing) and the gathering of necessary resources.*
>
> *Reflecting current practice and existing expertise, benchmarking should initially be used as an informative tool rather than a determinative one. For example, it can be used as a starting point for a conversation with regulated utilities about the level of operating and/or capital expenditures being incurred and proposed. A more sophisticated application could emerge over time.*[59]

## *Consequences of material error for the achievement of the NEO?*

197. This section considers two aspects of the consequences of a material error in determining expenditure allowances if the AER uses benchmarking analysis in a manner that does not having proper regard to the individual circumstances of each business and their particular expenditure drivers.

198. The first aspect considers different meanings of 'error' in estimating benchmark cost allowances, and the implication of these different meanings for the requirement that a regulated business should have a reasonable opportunity to recover its efficient costs.

199. The second aspect is to consider the consequences for JEN if the expenditure allowances determined by the AER from reliance on benchmarking techniques are materially less than businesses' actual efficient costs.

**The meaning of 'error' in estimating benchmark cost allowances**

200. A central and well known problem in the applied use of benchmarking analysis is to determine whether differences in modelled efficiencies between

[59] Pg 14 Australian Energy Regulator, Benchmarking Opex and Capex in Energy Networks, Working Paper no.6, May 2012

apparently more or less efficient businesses is due to errors (i.e. modelling specification error, data errors, sample size a errors) or genuine differences in efficiency.

201. Conceptually, the assessment of errors in determining costs allowances from using benchmarking analysis has the following dimensions that need to be considered:

a) the different individual sources of error (e.g. model specification error, data error, sampling error) arising from different aspects of the benchmarking analysis

b) the error bounds of the aggregate benchmarking errors.

202. Statistical theory and practice suggest that it is possible to develop reasonable estimates of the error bounds for some types of errors. Statistical techniques can in some circumstances be used to estimate the confidence intervals around a central estimate.

203. However, the confidence intervals for other types of errors may not be able to be estimated.[60] This will arise where there is a lack of relevant statistically valid information or reliance on modelling techniques not grounded in statistical methods (such as an engineering cost model).

204. To the extent that error ranges for a cost estimate can be estimated with a high level of confidence, using accepted statistical techniques, then it may be appropriate for the AER to use these estimates in setting benchmarking cost allowances, provided the AER uses the estimates conservatively, such that the business has a reasonable opportunity to recover at least its efficient costs as provided for under the NEL. That is, where the error bounds are able to be estimated, then provided an allowance is made to account for the possibility of error, it could be appropriate to rely on such a benchmarking technique.

205. However, to the extent that error ranges for benchmarking analysis are subject to uncertainty (that is, risk is not able to be measured), then it is arguably problematic for the AER to use the results in setting benchmarking cost allowances. This is because it may not be possible for the AER to be sure that the business is 'provided with a reasonable opportunity to recover at least its efficient costs'….. as required by the RPPs.[61]

[60] The economist Frank Knight first developed the distinction between uncertainty, which is a risk that is immeasurable and risk, that is subject to predictable variation and is capable of estimation. See Knight, F. H. (1921) *Risk, Uncertainty, and Profit.* Boston, MA: Hart, Schaffner & Marx; Houghton Mifflin Company.

[61] See revenue and pricing principles, section 71 (2) of the NEL.

206. It is beyond the scope of this expert report to assess the benchmarking analysis that has so far been undertaken by the AER in terms of whether error ranges can be estimated with reasonable confidence, or whether error ranges are uncertain.

207. The key conclusion of this section is that if benchmarking analysis is used to determine cost allowances without also considering other types of information, and the benchmarking analysis is subject to error ranges that are not able to be estimated with confidence, then it may be impossible to be sure that the costs allowances provide a network business reasonable opportunity to recover at least its efficient costs. This in turn means that it is impossible to be sure that such cost estimates are consistent with promoting the NEO (because the requires in part that a network business must be provided with a reasonable opportunity to recover at least its efficient costs).

**Consequences for JEN if the benchmarking allowances are less than actual efficient costs**

208. Putting aside the issues discussed above about estimating error, this section considers the practical consequences for JEN if the benchmarking allowances determined by the AER from reliance on benchmarking techniques are less than actual efficient costs necessary for the business to meet customer requirements and regulatory obligations in delivering its standard control services.

209. 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.

210. JEN could manage the effects of inadequate cost allowances by:

a) seeking to maintain its target rate of return and reduce its costs at the expense of the least important outcomes, or

b) reducing its rate of return to less than the return expected by shareholders.

211. I understand that if JEN was to pursue the option a) (to reduce its costs) then it would not reduce expenditure on works and activities driven by perceived safety risks or concerns - as 'safety is non-negotiable.' Rather, I understand that JEN would either defer or abandon plans for expenditure that it says would otherwise be efficient to undertake currently, including expenditure to maintain network reliability. I understand that reduced network reliability would result in longer response times to incidents, and increased and more disruptive electricity supply.

212. If reliability related expenditure was reduced, then one potential effect is that it may result in increased 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.

213. 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.

### *Example 2: Gamma is set at a level within the regulatory period that does not provide the business an opportunity to recover at least the efficient costs it incurs in providing regulated services*

214. Assume that in relation to gamma that:

- the correct value of imputation credits is 0.25, but the regulator sets a value of 0.4 for this regulatory period, and
- all other building blocks are set by the regulator at an efficient level.

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

216. The practical consequence of this error for the business is the same as discussed above.

217. JEN could manage the effects of inadequate cost allowances for corporate income tax by, either:

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

218. JEN could defer or abandon plans for expenditure that it says would otherwise be efficient to undertake currently, including expenditure to maintain network reliability, or it could reduce its rate of return, but this may compromise the businesses ability to attract necessary capital for future investment.

### *Example 3: A regulated business on an ongoing basis is not provided the opportunity to recover at least the efficient costs it incurs in providing regulated services*

219. 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.

220. 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.

221. 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.

222. In addition, if the error is seen by electricity 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.

### 6.2.2 Expenditures not adequately reviewed

*Example 4: 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*

223. 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 5: Regulated business are not provided with incentives for improving efficiency over time*

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

225. 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

226. 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?*

227. 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

228. A review of historical examples from the economic regulation[62] literature is useful in illustrating the real world consequences of where government authorities have made major errors in not providing adequate assurances to private sector investors that they will be able to recover their efficient costs. These examples are outlined below.

229. These examples are not specifically connected to the application of the building blocks approach but concern implementation of economic regulation through mechanisms such as licensing or franchising schemes.

230. They are probably extreme in the context of Australian experience with economic regulation. 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 7(2) and in NER rules 6.5.6 and 6.5.7) - 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 1890s were near the end of their franchise. However, because the Tramway

[62] Economic regulation is broadly defined as imposition of rules by government, intended specifically to modify the economic behaviour of individuals and firms in the private sector.

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.[63]

- 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.[64]
- 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.[65]
- 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.[66]

### 6.3.2 Asymmetry of risks consequences of under investment

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

232. RPP section 7(6) of the NEL requires that regard should be had to the economic costs and risks of the potential for under and over investment by a regulated network service provider in a network system with which the operator provides direct control network services.

233. The Expert Panel noted that:

> *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).*[67]

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

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

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

[66] Pablo Spiller op.cit.

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

234. 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 an electricity network because they already have invested in electricity appliances and can only switch (say to electricity) at very high cost.

235. 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 electricity plant in October 1999. This incident was estimated to have caused economic loss to industry of around A$1.3 billion[68], 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

236. 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. Similarly the community typically values mitigation of bushfire risk highly.

237. For example, an inquiry into electricity distribution reliability outcomes in the UK[69] 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 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.*

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

[69] 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.

# Attachment A  Expert Terms of Reference

# Attachment 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 electricity, 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 electricity, 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 Jemma Gas Networks (NSW) Ltd on economic considerations for the interpretation of the National Electricity Objective (2014)

- 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 Electricity Networks (NSW) on the regulatory treatment of operating expenditure by the AER (2010)
- Independent expert report for Jemena Electricity Networks (NSW) on the appropriate classification of the NSW electricity 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 Electricity Supply Agreement. Matters covered included the effect of the implementation of the national electricity market on future electricity 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 Electricity 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 Electricity 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 Electricity 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)
- Adviser and member of Ausgrid EDPR Steering Committee: 2014 Electricity Distribution Price Review Price (2013)
- Adviser and member of SP AusNet Steering Committee: 2014 Electricity 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 electricity reform (1994-1999)
- Review of Indonesia Power Sector Reform Strategy, 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 electricity and electricity systems following a major incident at a electricity receiving facility (2004)
- Member of team undertaking major review of the New Zealand Electricity 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

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|---|---|
| 1982 - May 1983 | Policy Officer, Forecasting and Planning Division, Ministry of Energy (NZ) |

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| 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)<br>• Trans Power (Commercial and pricing issues connected with separation from ECNZ; Governance and ownership issues, Wholesale Market Development)<br>• Airways Corporation<br>• 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)<br>Deputy Project Leader, Electricity Supply Industry Reform Unit (1994 – June 1996)<br>Deputy Project Leader, Energy Projects Division (July 1996-June 1999)<br>Victorian representative, National Grid Management Council<br>Government observer<br>• Board of Directors, Victorian Power Exchange,<br>• Board of Directors, Victorian Energy Networks Corporation<br>• Citipower<br>• Ecogen |
| July 1999 – present | Director and owner, Farrier Swier Consulting Pty Ltd |
| 1999 to 2001 | Director, Victorian Energy Networks Corporation |
| July 2005 – June 2008<br>January 2007 | Part Time Member, Australian Energy Regulator,<br>Associate Commissioner of the Australian Competition and Consumer Commission |
| January 2008 - present | Director, Trustpower (NZ), chair audit committee |