

ATTACHMENT 1
RESPONSE TO E25: INITIAL CAPITAL BASE

INDEPENDENT EXPERTS' REPORT

Professor J. Gans and J. Snow



CHARLES RIVER ASSOCIATES (ASIA PACIFIC) PTY LTD

Level 40, 140 William Street, Melbourne, VIC, 3000, Australia
Tel: + 61 3 9607 8228 Fax: + 61 3 9607 8282

Review of the QCA's Application of the DORC Methodology for Gas Distribution Networks

prepared for

Envestra Ltd

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By

Joshua Gans and Jim Snow



CHARLES RIVER ASSOCIATES (ASIA PACIFIC) PTY LTD

Level 40, 140 William Street, Melbourne, VIC, 3000, Australia
Tel: + 61 3 9607 8228 Fax: + 61 3 9607 8282

Executive Summary

This report deals with specific asset valuation aspects of the Queensland Competition Authority's Draft Decision for Envestra Limited's Access Arrangement for the Queensland Distribution Network

It is apparent that the QCA has not consistently applied the DORC methodology as it is intended to be applied. In particular, it should reconsider the assumptions it has made with regard to the following:

- Incumbent owner status in determining replacement costs;
 - *This distinction between an incumbent and entrant approach is not relevant because, as a matter of principle, replacement cost refers to service level and is independent of the actual service provider.*
 - *Basically, by embarking on the dangerous path of excluding sunk assets from the initial capital base, the QCA is sending a signal to investors in infrastructure that they will be treated less favourably than if they were to wait in the hope that others may assume the access provider role.*
 - *The potential consequences of these distorted incentives on future private investment in infrastructure in Queensland are substantial and negative.*
 - *Redressing this poor signal requires a regulatory commitment to consider all assets as part of the initial capital base. By applying the DORC methodology as it was always intended, to focus on the costs of replacing services rather than a firm-specific role, appropriate incentives can be restored.*
- No residual/trench values in determining depreciation;
 - *The rejection of residual value without a corresponding adjustment for the life of the assets deviates from the notion that depreciation should reflect the economic life of an asset – and in an optimised framework, in terms of the optimal maintenance of the economic life of an asset.*
 - *The QCA has decided that Envestra's current assets should be depreciated without taking into account the fact that the use of insertions can prolong the economically useful life of an asset.*
 - *Envestra proposed that this life extension be taken into account, not by extending the useful life of an asset, but by applying a residual value to those assets at the end of their un-prolonged life.*

- *The QCA has rejected this approach and set residual values at zero; however, the QCA has not made any adjustment to the economically useful life of the assets. In this respect, the QCA has not adhered to a DORC methodology.*
- *To think of the economic life of an asset as if it never received maintenance would clearly be absurd. However, in effect, by failing to take into account the potential for insertion, the QCA are doing just that. Insertions have the same economic role as on-going maintenance in terms of optimising the use of assets. And it is with respect to this that the life of those assets should be judged.*
- *If actions that prolong asset life are not taken into account, then infrastructure providers will have diminished incentives to explore technologies that give them options to extend asset life.*
- *In addition, providers face choices as to whether assets should be upgraded or not. If they are not rewarded for upgrade decisions, they will have an incentive to replace entire assets rather than optimally manage asset life.*

The QCA in neglecting assets that are sunk in the initial capital base as well as by failing to provide a capital cost reward for insertions is creating an environment where future investment decisions are likely to be taken in an economically inefficient manner. This is inconsistent with the aims and principles of good regulatory practice throughout the world.

Other Related Issues

- The QCA has rejected the inclusion of capital expenditure for the “accelerated mains replacement programme” (AMRP), because a DORC valuation is used.
 - *This is inconsistent with the Code as Section 8.16 does not refer to the original basis for setting the ICB as impacting forecast capital expenditure, but addresses the validity of the investments being put forward for increasing the ICB from the commencement of a new access arrangement, as in this case.*
 - *As covered in this report the use of DORC for the ICB recognises the replacement cost of an optimised network that would provide the same current level of service provided by the existing network, depreciated for economic life.*
 - *The AMRP is a roll forward of this position in that the Service provider is investing in maintaining and improving this level of service for users and those seeking access.*
 - *For these reasons the AMRP must be allowed in the capital base as envisaged by the Code.*

- Decrease in operating expenditure forecast for costs associated with system leakage (SUG) because a DORC valuation is used.
 - *Similarly the Authority considers that it is consistent with a DORC methodology for the ICB, that costs for unaccounted for gas (SUG) for each service provider should be no more than that based on the industry average level of unaccounted for gas which the Authority has estimated at 3%.*
 - *This is inconsistent with the Code as Sections 8.36 and 8.37 do not refer to the original basis for setting the ICB as impacting non-capital costs, but addresses the validity of the non-capital costs in terms of being efficient and in accordance with accepted and good industry practice.*
 - *The QCA has ignored the direct relationship between the capital investment in the AMRP as a new facility and the level of SUG that will be experienced by the network.*
 - *This is a situation that is best remedied through an AMRP and as outlined by Envestra this is planned to be implemented within the regulatory period and therefore it is correct to allow this cost during that period.*
 - *Similarly the costs associated with the above system leakage above the QCA estimated industry average should be allowable within the first access period.*

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1. INTRODUCTION

Envestra Limited owns and manages a Natural Gas Distribution Network in Queensland. With the introduction of the National Competition Policy¹ and relevant laws to support this policy Queensland is moving to make the Natural Gas industry in Queensland more open to competition, along with other industries such as the electricity supply industry.

In order to facilitate competition in Natural Gas it is necessary to make significant networks such as those held by Envestra Limited accessible to all third parties seeking to haul gas through such networks. In Queensland the QCA has the role to regulate this activity.

The industry has developed a National Third Party Access Code for Natural Gas Pipeline Systems that has been agreed by COAG (Nov 1997) and sets out the way the items and issues to be regarded for third party access and what issues QCA must consider when approving an Access Arrangement i.e. any Access Arrangement must be in compliance with the Code as a minimum.

It is the application of this code to Envestra that is of concern. Under the code the QCA must take into consideration a number of key issues including²:

- The service providers legitimate business interests and investment in the Covered Pipeline;
- Firm and binding contractual obligations of the Service Provider or other persons (or both) already using the Covered Pipeline;
- The operational and technical requirements necessary for the safe and reliable operation of the Covered Pipeline;
- The economically efficient operation of the Covered Pipeline;
- The public interest, including the public interest in having competition in markets (whether or not in Australia);
- The interests of Users and Prospective Users;
- Any other matters that the Relevant Regulator considers are relevant.

¹ COAG, February 1994

² National Third Party Access Code for Natural Gas Pipelines Systems - Section 2.24

Whilst it is accepted that the QCA review role is complex and sometimes requires the balancing of competing factors (and in some instances the Code does not necessarily suit the Queensland circumstances) Envestra Limited is concerned that the QCA has made some assumptions that

- are not consistent with the Code;
- not consistent with economic theory;
- not consistent with regulatory thinking;
- do not consider the legitimate business interests of Envestra Limited in its role as the Service Provider;
- are not in the public interest in that Queensland is seeking to develop its gas industry through major investment in network assets in order to bring gas from various new reserves and distribute it to business and residential customers.

Increased use of natural gas is strongly supported by Government Policy (greenhouse gas reduction policy) and it is clear that consideration of investment in Covered Pipeline Networks could be severely effected should the QCA continue to adopt the assumptions (as outlined in this paper) to the detriment of the public interest.

Ultimately Envestra Limited believes that these same assumptions if retained will have an adverse impact on gas infrastructure investment, the development of competition in Queensland and access to natural gas supply for many prospective users.

1.1. LEGISLATIVE REQUIREMENTS

The *Gas Pipelines Access (Queensland) Act 1998* among other things encompasses and gives effect to the *National Third Party Access Code for Natural Gas Pipeline Systems*.

The Act and the Code provide for the Authority to approve access arrangements for the covered gas distribution networks owned by Envestra in Queensland in accordance with the National Code.

1.2. GOALS OF THIS REPORT

This report focuses exclusively on the asset valuation aspects of the proposed access arrangements. In particular, our focus is on the application of the DORC methodology by the QCA.

Of particular concern are the following issues:

- Use of 'incumbent approach' in lieu of 'new entrant approach' for determining replacement costs. This is an assumption by the QCA in its interpretation of the DORC methodology, and
- Rejection of residual/trench values in determining depreciation. This is also an assumption by the QCA in determining the treatment of these assets.

Two other issues are also briefly covered, because of the QCA's view that they are related to the DORC valuation:

- Rejection of the inclusion of capital expenditure for the "accelerated mains replacement programme," because a DORC valuation is used, and
- Decrease in operating expenditure forecast for costs associated with system leakage (SUG) because a DORC valuation is used.

1.3. REPORT OUTLINE

The structure of this report is as follows.

- The next section describes in detail the QCA's application of the DORC methodology.
- Section 3 then contrasts this with application of DORC as envisaged by economists.
- Section 4 then considers the economic rationale behind the use of the DORC methodology and evaluates the QCA's approach in this regard.
- Section 5 then contrasts the QCA's approach with regulatory practice in Australia and elsewhere. A final section concludes, offering recommendations.

2. THE QCA'S APPLICATION OF DORC

In this section, we summarise the QCA's application of the DORC methodology in arriving at an initial capital base as outlined in Section 13 of their draft determination.

Using a DORC methodology requires the regulator to follow three steps.

1. Determine the optimal distribution system
2. Calculate the cost of replacing that distribution system
3. Applying depreciation to take into account the age of the existing system.

The QCA accepts each of these steps. However, within each of these steps there are other details that are required for a DORC methodology to be applied. Here we list each of these details in turn.

2.1. OPTIMISATION

In assessing a system's DORC it is necessary to evaluate the replacement cost of the system. This requires the determination of a basic system service design- what level of service will be provided by the system.

Capacity that is going to be utilised in the system during a regulatory period is determined and any excess is removed from the capital base by a process of technical optimisation of the distribution system. This process is also used to account for technological obsolescence as it generally uses assumptions on delivery technology that are current at the time of the review. The concept is to determine the technical specification to deliver the required service.

The QCA has accepted the findings of Brown and Root that the optimisation process used by Envestra is sound.

2.2. REPLACEMENT DETAILS

The QCA believes that there are two main issues with respect to calculating the replacement cost of the optimised network. First, the QCA believes a decision needs to be made to distinguish between an incumbent and entrant cost, and second whether to adopt a brownfields rather than greenfields base.

2.2.1. Adoption of Incumbent Cost

The QCA notes that an incumbent may be able to replace its network at a cost substantially below that of an entrant. It cites that an entrant would have costs associated with project management, design, easement location and identification, construction and restoration costs. Such costs would either not exist or would be substantially reduced for an incumbent.

The QCA has adopted an incumbent cost approach as it believes it is required by the Code “which describes DORC as a methodology used to value the *covered pipeline*.” (p.123)

2.2.2. Adoption of Brownfields Concept

The QCA has adopted a brownfields concept when considering the value of Envestra’s distribution network. That is in contrast to a greenfields approach, it assumes that the network would have to be replaced in an already built up area; perhaps in contrast to the laying of pipes in new estates that may have actually occurred in the past.

The QCA acknowledged that this may mean that the asset value applied may exceed the actual cost of investment in the existing network, it considered a brownfields concept more appropriate in terms of approximating “the actual cost of replacing the network.” (p.124)

2.3. DEPRECIATION

In terms of depreciation, there were two related aspects to the details of the QCA’s decision: the depreciation rate and the calculation of residual values.

2.3.1. Depreciation Rate

The QCA adopted a straight-line depreciation approach as it preferred to use a method common to all assets that make up a gas distribution network and argued that differing methods might be appropriate to different asset classes. Once again, they viewed this as a “reasonable approximation” (p.126) of reality.

2.3.2. Zero Residual Value

When there are existing pipes in trenches in the ground, if one were to prolong the life of a network, one would (where it is economically efficient to do so) insert polyethylene into mains and inlets rather than replacing the pipes themselves. In this sense, existing pipes and trenches continue to have use beyond their anticipated life in the absence of such technology. Therefore, some have argued that when considering depreciation, it is inappropriate to fully depreciate the value of the existing network because that network actually has a positive “residual value,” by virtue of their usefulness given the possibility of insertion.

The QCA held that the “residual value” should be set at zero. They stated that they preferred to treat any insertions that do occur as new capital investment rather than related to the value of the existing assets (p126). They argued that a residual value was:

- inconsistent with the DORC concept as it was a “future value to the incumbent, not a replacement cost to be incurred.” (p.126);
- inconsistent with other regulatory decisions elsewhere;
- inconsistent with the Code’s requirement that depreciation occur over the economic life of the assets concerned. The QCA are of the view that once a pipe – on its own – stops transporting gas, its economic life is held to be over.
- based on a forecast of technology and insertion decisions rather than actual ones.

3. ECONOMIC RATIONALE OF THE USE OF DORC

In this section, we outline the economic rationale behind the use of DORC in asset valuation in regulation of prices for access to networks. DORC is a standard concept: For instance,

Replacement costs are the costs of replacing the facility with another facility that would provide comparable services, but would not necessarily be the same plant. That is, it measures what it would cost today to provide the same capacity.³

The QCA has provided a similar definition in its Issue Paper⁴

The replacement cost of an asset is an estimate of the current cost of replacing the asset with similar assets, which can provide equivalent services and capacity to the asset being valued. That is, it measures what it would cost today to provide an asset to deliver the same service potential as the asset being valued

This economic approach has several features. First, it emphasises 'existing services' and not 'existing physical infrastructure' per se. This is in contrast with reproduction cost methods of valuation that would reproduce the existing facility. (Reproduction costs, i.e. relaying the distribution network with cast iron pipes, would be significantly more costly than using the modern engineering equivalent of polyethylene.) Replacement cost requires only that the same service potential be provided regardless of the specific infrastructure used to achieve that potential.

Second, because of its focus on services, any valuation under a replacement cost methodology must proceed de novo. It is not the cost of augmenting or refurbishing existing facilities per se. In particular, it should proceed by considering the cost of putting in a network from scratch so that a particular set of services is provided.

³ J. Bonbright, A. Danielson and D. Kemerschen, *Principles of Public Utility Pricing*, 2nd ed., Public Utility Reports, Virginia, 1988, p.239.

⁴ QCA - Access Arrangements for Queensland Gas Distribution Networks Issue Paper November 2000, p.33.

3.1. BENEFITS OF USING REPLACEMENT COST

The use of replacement costs in determining asset valuation has become commonplace in regulatory settings. This stands in contrast to valuation based on 'historical' costs (sometimes termed depreciated actual cost or DAC) that take into account the actual expenditures of incumbent networks.

At a broad level, using replacement cost is a means of building more socially desirable incentives into key decision-maker's choices regarding investment, network expansion and the like. Two of these perhaps loom largest. First, the use of replacement cost discourages inefficient by-pass of existing networks. Second, the use of replacement cost provides a base upon which the timing of investment decisions by private firms more closely aligns with an economically efficient timing choice (from a social perspective). Each of these rationales is outlined in turn.

3.2. AVOIDING BY-PASS

Technological change often means that the cost of building a network declines over time. This typically means that an asset's replacement cost is less than its historical cost. This is definitely true in relation to gas mains, mainly due to advances in pipe materials.

If then access prices were to be based on historical cost, then prices may be so high that an entrant may be encouraged to build new infrastructure rather than seek access. The end result would be that the entry decision is distorted from a social perspective and that potentially, if it occurs at all, too much investment in infrastructure would occur from a social perspective. That is, there would be duplication of investments without a similar doubling in terms of service levels.

A 'replacement' cost based valuation means that incentives for inefficient by-pass can potentially be eliminated because access prices are based on the current technology available to entrants rather than past level of technology. Some argue that this means that access prices can mimic the entry incentives that would arise in a perfectly contestable market – potentially, an appropriate benchmark when access prices are designed to reflect competitive outcomes in network industries. The idea here is that potential competition disciplines the behaviour of incumbent firms.

3.3. INVESTMENT INCENTIVES

In many network industries, by-pass is not the principal concern, as incumbents usually have substantial advantages. What is of more concern is that incumbents and access seekers alike are given appropriate incentives to invest in new infrastructure (for incumbents) or to 'enter' (for entrants).

A replacement cost base for asset valuation facilitates the provision of good incentives for investment.⁵ Consider the decision of a firm to invest in infrastructure. That firm looks to their own profits and also the revenue earned through providing access to potential seekers and compares it with an alternative. In some situations, that firm is the only potential investor. In that case, it will be concerned about when a potential seeker will choose to seek access. Under an historic cost methodology, by investing in an inefficient technology (sooner rather than later), an incumbent can increase the access price paid by the seeker. In contrast, under a replacement cost methodology, such manipulation is not possible as the access price is based on the timing of seeker decisions rather than on the incumbent's actual time of investment. As they otherwise bear such costs, the incumbent has no incentive to distort investment timing to manipulate access prices.

Moreover, in many situations in which incumbents and access seekers compete, a regulator must take care to avoid situations where one may free ride upon the other. Current regulatory decisions send signals to potential investors about the access methodology that might be put in place. Therefore, if a regulator were to manipulate access prices downward by a judicious application of an asset valuation that would make an incumbent be put in a disadvantageous position relative to a new entrant this may result in delayed infrastructure investment. That is, a firm that knows that investment would allow a competitor access at a low price would have an incentive to wait and see if another firm would invest first and allow them to seek access to that other firm's assets. By doing so, their potential disadvantage as an incumbent is turned into their advantage in becoming an access seeker. The end result is *delay* in infrastructure investment from a social perspective and a loss of services to consumers. To avoid this, regulators need to take care to treat access providers and access seekers symmetrically when making critical determinations such as those regarding asset valuation.

This seems to have been clearly recognised by the QCA in its Issue Paper⁶ when considering the link between prices and asset values:

In regulated industries not subject to market based determination of the cost of capital, the determination by the Regulator of an appropriate return on capital is central to generating prices which encourage efficient network usage in the short term and efficient investment in the medium to long term.

⁵ For a review of these concepts see Joshua S. Gans and Philip L. Williams, "Access Regulation and the Timing of Infrastructure Investment," *Economic Record*, 1998.

⁶ Access Arrangements for Queensland Gas Distribution Networks Issue Paper November 2000 – pp24

An inappropriate rate of return on gas distribution infrastructure may:

- *Result in over or under investment in the infrastructure. For example, if too high a rate of return is set, service providers would be encouraged to invest in the network to an excessive extent and users would be required to pay too much for using the network. However if too low a rate of return is set, service providers would not be compensated adequately for their investment. While this would lower prices in the short term, service providers would be unlikely to undertake further investment (including replacement investment) in the network; or*
- *Favour or penalise pipeline gas compared to other energy sources, such as electricity or bottled gas. This would lead to an inefficient allocation of resources across the economy.*

It should be emphasised that the above concerns are an important consideration in any access determination whether investments have taken place or not and whether access providers compete with access seekers in downstream markets. This is because the rationale behind a regulator's access pricing determinations sends signals to investors in all sectors under the regulator's jurisdiction. As will be noted below, moving away from a replacement cost rationale can *both* undermine investment incentives for the firm being regulated as well as for other potential infrastructure providers in Queensland.

3.4. SUMMARY

In summary, while there is some reason to use replacement cost methods of valuation as a means of avoiding inefficient by-pass of existing networks, the main rationale comes from the ability to provide more appropriate investment incentives from a social perspective. In particular, replacement cost methodologies reduce incentives for access providers to manipulate investment timing. Also, replacement cost is a means of putting providers and seekers on a more equal footing in access pricing determination; thereby, reducing incentives for firms to free ride upon one another in an effort to avoid bearing risky and costly infrastructure investment costs.

The simple message is that, in terms of providing appropriate incentives, regulators need to consider the impact of a decision upon incentives to invest in infrastructure and appropriate technologies from a social perspective. Whilst this seems to have been recognised by the QCA in its Issue Paper, it is that basic analysis that we next apply to the details of the QCA's draft determination.

4. IS THE QCA'S APPROACH CONSISTENT WITH THE ECONOMIC RATIONALE FOR DORC?

We now turn to evaluate whether the QCA's application of DORC is consistent with the economic rationale regarding DORC. Specifically, we are concerned with the effect that the QCA's details may adversely impact investment incentives or send unfavourable signals to future investors in infrastructure in Queensland.

Our focus here is on two details that appear problematic at first glance because they deviate from generally accepted definitions of replacement cost. This is the distinction between an incumbent and entrant approach that is problematic because, as a matter of principle, replacement cost refers to service level and should be independent of the actual service provider. Also, the rejection of residual value without a corresponding adjustment for the life of the assets appears to deviate from the notion of that depreciation should reflect the economic life of an asset – and in an optimised framework, in terms of the optimal maintenance of the economic life of an asset. Each is dealt with in turn.

4.1. THE 'INCUMBENT' VERSUS ENTRANT ASSET VALUATIONS

The notion of replacement cost envisages the costs associated with replacing *all* of the assets being valued. The idea is that it is a measure of the current technology required to provide a service rather than a particular firm's ability to provide a service (consistent with the QCA Issues Paper). In this regard, to attempt to create a distinction between an incumbent and an entrant replacement cost is inconsistent with the DORC methodology. The idea is that the methodology should assess the replacement cost of the network by *any* firm and *not by a particular type* of firm.

For an economist, however, the issue is not so much whether the DORC methodology has been adhered to or not, but what the QCA's approach means for efficiency; in particular, investment incentives. By actually distinguishing between an 'incumbent' and 'entrant' approach and applying the former, the QCA has *excluded* from Envestra's initial capital case any value associated with the existing trenches and the easements. All of the assets excluded from the 'incumbent' calculation that are in the 'entrant' calculation means that the QCA has made a decision that the access provider *will not be able to earn a rate of return on those assets (let alone market rates)*. It is in this decision that the QCA is potentially undermining incentives to invest in infrastructure and sending a very poor (and dangerous) signal to any infrastructure provider under their jurisdiction.

To see why a zero rate of return on costly and productive assets leads to poor incentives, note that while such assets are sunk – that is essentially what distinguishes the 'incumbent' and 'entrant' perspectives – their inclusion in the initial capital base is required to provide firms with an incentive to invest in them in the first place.

Firms would not invest if they thought that, after the fact, assets would be deemed sunk and no return would be required. Financiers would not lend to firms that believed this. All investment takes place with a view to future return and the potential irreversibility of investment decisions is a constraint that requires potential investors to be even more secure in their expectations of generating a return.⁷ So far from not requiring a return, the requirements are in fact more stringent than for investments that were reversible and whose expenditures were not sunk.

Basically, by embarking on the dangerous path of excluding sunk assets from the initial capital base, the QCA is sending a signal to investors in infrastructure that full recovery of investment costs *cannot be assured*.⁸ The potential consequences of these distorted incentives on future private investment in infrastructure in Queensland are substantial and negative. Redressing this poor signal requires a regulatory commitment to consider all assets as part of the initial capital base. By applying the DORC methodology as it was always intended, to focus on the costs of replacing services rather than a firm-specific role, appropriate incentives can be restored.

4.2. THE ZERO “RESIDUAL” VALUE

The QCA has decided that Envestra’s current assets should be depreciated without taking into account the fact that the use of insertions can prolong the economically useful life of an asset. Envestra proposed that this extension be taken into account, not by extending the useful life of an asset, but by applying a residual value to those assets at the end of their un-prolonged life. As discussed earlier, the QCA rejected this approach and set residual values at zero. However, they did not make any adjustment to the economically useful life of the assets. In this respect, they have not adhered to a DORC methodology.

⁷ For an explanation see A. Dixit and R. Pindyck, *Investment Under Uncertainty*, Princeton University Press: Princeton (NJ), 1994.

⁸ In an access setting, the detrimental consequences go beyond the case of gas in Queensland. In that situation, service providers, such as Envestra, do not actually compete downstream with access seekers. In other industries, this is not the case. Therefore, an approach of neglecting legitimate investment costs in access pricing can lead to diminished investment incentives, free riding and delay. By applying a low capital base rationale here, the QCA is sending a signal to all investors in infrastructure that a similar treatment will befall them. The end result is likely to be reduced infrastructure investment in Queensland. See Joshua S. Gans and Philip Williams “Efficient Investment Pricing Rules and Access Regulation,” *Australian Business Law Review*, Vol.27, No.4, August, 1999, p.268. See also J S Gans and S P King, “When Being First Doesn’t Pay”, *The Australian Financial Review*, Friday 30 January 1998, p 32.

To see this, suppose that a firm invests in pipes that, without insertion, would last 50 years. Suppose, however, that under current technology, having placed pipes in the ground, it is economically efficient to use insertions when those pipes' economic use as a transporter of gas is ended (as per the scenario in section 4.1 above). Suppose that by using insertions, the firm can continue to transport gas for an additional 25 years. This means that, from the perspective of the initial investment in laying pipes, a total of 75 years can pass before the pipes themselves need to be replaced in order to continue distributing gas. Hence, in terms of service potential, the life of the assets is 75 rather than 50 years.

In working out the age of the current assets, therefore, assets must be depreciated over their entire economically useful life and not simply their life as if they were not optimally utilised. To take an analogy, by maintaining pipes, a gas distribution network ensures that gas can be transported. If there is a leakage or another problem, they take actions to stop that problem. To think of the economic life of an asset as if it never received maintenance would clearly be absurd. However, in effect, by failing to take into account the potential for insertion, the QCA are doing just that. Insertions have the same economic role as on-going maintenance in terms of optimising the use of assets. And it is with respect to this that the life of those assets should be judged.

Now, a pure application of the DORC methodology would be to depreciate assets over their economic life, taking into account the potential for insertions. This would involve calculating the net present value of the earnings from those assets taking into account the costs and timing associated with upgrades that prolong their life.

However, as elsewhere, it is sometimes appropriate to use an *approximation* to take these types of activities into account. It is in this context that the concept of a positive 'residual' value has merit and is consistent with the application of the DORC methodology. The 'residual' value is a substitute for the approach of depreciating assets over their entire economic life. Indeed, if calculated perfectly, the two approaches would be equivalent.

What are the consequences of neglecting the role of insertions? Once again, the key test is to consider the impact of this on the decisions of infrastructure investors. In terms of gas, providers have options regarding the type of assets they invest in as well as the actions taken to prolong the life of such assets. If actions that prolong asset life are not taken into account, then infrastructure providers will have diminished incentives to explore technologies that give them options to extend asset life; i.e., that can be upgraded.

For example, consider the following scenario: A town in Queensland is able to obtain natural gas for the first time as a result of a new pipeline passing nearby. A service provider decides to reticulate the town. Due to forecasted low demand, it is more cost effective to install a new type of thin-walled, cheap PVC pipe, operating at low pressure. In due course, as loads increase, the PVC can be easily inserted with polyethylene pipe and the system operated at higher pressures. However, wary of the regulator's treatment of such assets in the event of the pipeline becoming regulated, the service provider decides it is less risky if it initially installs a polyethylene network. The additional costs of such investment can be passed through to access seekers under the QCA's current methodology. This results in higher access prices for users of the network. As a consequence, not only are investment decisions distorted but the costs of such distortions are borne by access seekers and ultimately all consumers on the network.

To the extent that upgradeable assets are socially desirable and minimise disruptions and other consequences associated with non-upgradeable assets, then such diminished incentives can lead to large social losses. In addition, providers face choices as to whether assets should be upgraded or not. If they are not rewarded for upgrade decisions, they will have an incentive to replace entire assets rather than optimally manage asset life. Once again, the additional costs associated with this will be borne socially and also by access seekers in terms of higher regulated access prices. Therefore, from a long-term perspective economic efficiency is diminished.

4.3. CONCLUSION

Providing infrastructure investors with appropriate incentives to take economically efficient actions is a difficult task. It requires balancing of the competing incentives of access providers and seekers as well as a regard for technological uncertainty and consequent risks.

The QCA in neglecting assets that are sunk in the initial capital base as well as by failing to provide a capital cost reward for insertions, is creating an environment where future investment decisions are likely to be taken in an economically inefficient manner. The setting of residual values of assets to zero without taking into account their greater economic life resulting from insertions sends signals to infrastructure investors that distort their technology choices in a socially undesirable way. The neglect of assets that would comprise an entrant replacement cost can lead to delay and under-provision of basic infrastructure services. This type of distortion may well lead to lower levels of infrastructure investment in Queensland and a consequent drain on the growth potential of the Queensland economy. Essentially, while a squeeze on an initial capital base may bring lower access prices in the short-run, in the long-run the distortions to investment and the like create costs that ultimately impact negatively on the long-term interests of consumers of gas in Queensland.

In summary, in our opinion, by not adhering strictly to a replacement cost methodology in calculating the initial capital base, the QCA has set a poor precedent for regulation of access in Queensland. In effect, the use of a so-called 'incumbent' approach amounts to a regulatory decision not to reward investors for investment costs that are sunk. In addition, the non-allowance of a residual value coupled with a neglect of upgrades from insertions, ultimately means that the QCA will 'second-guess' many key technological decisions in gas distribution investment. In either case, the signal sent to infrastructure providers with regard to the management of their businesses is a poor one; going far beyond what would be regarded as sound regulatory practice designed to generate maximum economic efficiency.

5. COMPARISON WITH EXISTING REGULATORY PRACTICE

As noted in Section 2, one of the reasons the QCA adopted both the incumbent cost detail and a zero residual value was that in their view it was consistent with existing regulatory practice in other jurisdictions.

This section evaluates that claim and finds that the QCA has taken a differing approach on some aspects of the DORC methodology from other Regulators, and that in general other Regulators have not taken such a definitive stand as the QCA.

The Draft Decision and Issues Paper review the work of other regulators but it is clear that this decision is not in line with the thinking of other regulators – no other Regulator has issued a Final Decision that concurs with the QCA approach.

Furthermore the QCA, whilst reviewing other jurisdictions, did not make many comparisons with the market conditions in Queensland, except as noted on the gas demand issues.

5.1. INCUMBENT/ENTRANT ISSUE

The NSW IPART whilst considering the AGL Access Undertaking⁹ looked specifically at the issue of “Whether DORC should be interpreted as applying to a new entrant or the incumbent owner.” This is the main case referred to in the QCA Draft Decision.

This issue arose in the Ewbank Preece report¹⁰ prepared for IPART:

An incumbent RC is that cost that could be incurred by the existing network owner given the existing infrastructure. Under these conditions insertion methods may be considered. However, due regard should be given to the value of the “hole in the ground” under such a valuation philosophy. However EP have made no attempt at valuing the “hole in the ground”. Also, no distinction is made between asset replacement and refurbishment.

It is clear here that EP advocated the need, regardless of whether an incumbent or new entrant approach was taken, to value the “hole in the ground”.

⁹ Draft Decision Access Arrangement for AGL Gas networks Limited Natural Gas System in NSW – Section 6.6.2 pp 92

¹⁰ Technical Review of AGLGN’s DORC and Capex in NSW for IPART October 1999 – pp

Unlike the QCA, the IPART review of this issue did not reach any firm conclusions:

Under the current provisions of the Code, DORC is not defined. The Tribunal is of the view that the Code is not clear whether it intends to assign a DORC valuation to a new entrant or the incumbent. In light of the economic and accounting perspective, the Tribunal considers DORC can be interpreted as either the value to the new entrant or incumbent.

The QCA therefore cannot draw upon the IPART conclusion for any support of its position. To the contrary, IPART's final decision on ICB was based on AGLN's DORC valuation, which in turn was based on a new entrant, replacement cost approach to DORC.

The South Australian Independent Pricing and Access Regulator (SAIPAR) in its Draft Decision last year¹¹ decided to accept the concept of a new entrant approach DORC and 100% of DORC as the ICB rather than an incumbent approach on the following basis:

After due consideration of the requirements of relevant sections of the Code which are designed to balance the interests of both the Service Provider and Users, SAIPAR proposes DORC is the most appropriate methodology to use in determining the Initial Capital Base.

It is the intention of the DORC methodology to use today's costs as the basis for valuing the assets. The DORC calculation adopts a means of determining the current asset value, based on replacement cost with use of appropriate adjustment factors.

It is the opinion of SAIPAR that failure to establish and appropriate DORC, would over time ultimately result in a contraction in the scale and scope of services being provided.

Further in its conclusion on this issue (pp 48):

After due consideration of the requirements of section 8.10 of the Code, and taking into account the needs of both the Service Provider and the Users, SAIPAR is inclined to accept Envestra's arguments with respect to the use of the DORC methodology in preference to other methodologies. SAIPAR considers that the DORC is the most appropriate methodology to use in determining the ICB.

¹¹ Draft Decision Access Arrangement for the South Australian Distribution Systems SAIPAR April 2000 Section 4.6.1 pp 37.

And on p38:

The replacement of mains and inlets was taken to be in the context of "brownfields" conditions ... This approach is proposed on the basis that it more closely aligns itself to the cost that would be incurred by a new entrant to the market who would be required to replicate the existing system.

It is clear here that the QCA 'incumbent' approach differs from that undertaken by SAIPAR.

In Victoria, the ORG accepted the valuations of the three gas distribution businesses (see ORG and ACCC ODRC Asset Valuations Review, Victorian Natural Gas Transmission and Distribution Businesses, 13 February 1998) based on replacement costs which in turn were based on industry contract rates for direct burial of pipe. Implicit in this is the assumption of a new entrant approach. The QCA approach therefore also differs from that undertaken by the ORG.

In Western Australia, the issue of new entrant versus incumbent did not arise as an issue, as it is apparent that OffGas were in no doubt that a DORC approach necessitated a new entrant approach. This is evident in p.85 of the Draft Decision for the Mid-West and South-West Gas Distribution Systems:

The argument that tariffs based on a DORC valuation of the capital base would replicate the tariff outcomes of a competitive market arises from the consideration that the capital costs of an efficient entrant to the market would also be equal to a DORC value ...

Once again the QCA approach appears to differ from other regulators' thinking.

The ACCC has settled on a DORC approach based implicitly on a new entrant approach for gas transmissions systems. This was evident in the EAPL Moomba to Sydney Pipeline Draft Decision in December 2000¹² where the Commission discussed the use of Replacement Costs (pp 26):

Replacement cost and optimisation:

If gas transportation was a contestable market, it could be expected that tariffs and revenues would tend to follow the costs faced by a new entrant. Therefore, if the Code intends that pricing should reflect behaviour in a competitive market (as suggested by section 8.1(b) of the Code) the value of the initial capital base should be based on the replace-

¹² Access Arrangement for East Australian Pipeline Limited for the Moomba to Sydney Pipeline System Draft Decision, ACCC 19 December 2000 (GR9903)

ment cost of the assets in question. For example, the Code (section 8.10(i)) requires the Commission to take account of:

The comparability with the cost structure of new pipelines that may compete with the pipeline in question (for example, a pipeline that may by-pass some or all of the pipeline in question).

5.2. RESIDUAL VALUES

The QCA Issues Paper and Draft Decision point out that there has been some debate within the regulatory arena on this issue.

It is surprising that this issue remains unresolved, as clearly either residual values need to be included in the DORC valuation or asset lives need to be adjusted to reflect the economic life of the assets.

It is also noteworthy that the QCA has sought advice from independent experts on demand forecasting and operational costs, and, while it has sought engineering advice in relation to asset valuation, does not appear to have sought independent expert advice in relation to the economics of DORC and residual value, which have the potential to influence access pricing to a greater degree.

The QCA do not seem to have taken a balanced view on this issue nor is it consistent with other regulatory approaches.

For example, the ACCC also took into account the ability to “reline” a section of the pipeline to extend its economic life¹³ (pp vii):

Because of the type of coating used and deterioration to the pipeline due to stress corrosion cracking, EAPL assumed a shorter life for the Moomba to Wilton pipeline than other pipeline segments of the MSP (60 years as opposed to 80 years).

However, APT has since submitted that the life of the Moomba to Wilton section could be extended from 60 years to 80 years through refurbishment (re-coating) of some 250 km of the pipeline.

While an asset life of 50 years has been used as the basis for determining the value of DORC, when looking forward to determine the remaining life of

¹³ Access Arrangement for East Australian Pipeline Limited for the Moomba to Sydney Pipeline System Draft Decision, ACCC 19 December 2000 (GR9903)

the assets of the MSP, the Commission has used the economic life proposed by APT, that is 80 years. Consequently, for depreciation purposes the remaining life of the Moomba to Wilton pipeline is 56 years, and the average remaining life for the other pipelines is 68 years.

This is consistent with the ACCC document Draft Statement of Principles for the Regulation of Transmission Revenues 27 May 1999 (CG 98/25) as stated in the Connell Wagner Report for Envestra on the Residual Value of "Hole in the Ground"¹⁴

The Australian Competition and Consumer Commission (ACCC) states that certain assets (e.g. Cast Iron pipelines) do not require full replacement to return to full operation at the end of their operational life. If in fact, under the normal DORC procedure, assets were valued as if the pipeline had to be re-installed from scratch, this would lead to "overstated costs and inefficient pricing". The solution proposed by the ACCC is to not devalue DORC, but to recognise that these assets have a residual value higher than their scrap value. According to the ACCC the residual value of insertable assets is the saving that "their availability represents over having to reconstruct the infrastructure from scratch.

And from page 44 of the Statement of Principles:

REFURBISHMENT ASSETS

A related issue concerns assets which do not require full replacement in order to regain full utility at the end of their technical life. These could be classified as refurbishment assets. The well known example of this is distribution gas pipelines originally based on cast-iron pipes laid underground. Full refurbishment of such assets typically involves relining the pipes with nylon insets, a procedure which does not require expenditure in digging up the ground or involve extra expenditure to accommodate existing 'brownfields' infrastructure.

¹⁴ Envestra Limited SA Gas Distribution System Access Arrangement – Review of "Hole in the Ground" Residual value Concept April 2001 App E.

The normal DORC procedure would involve valuing the assets as if the pipelines had to be re-laid from scratch as this identifies the potential costs for a competitor of duplicating the system (a property of the DORC approach). However, the DORC valuation of such refurbishment assets seriously overstates the long run capital costs associated with related service provision. This is seen as potentially leading to long run cost estimates which are overstated and may lead to inefficient pricing.

The solution to this dilemma is not to adjust the DORC valuations downwards but to recognise that, with such assets, the residual value of assets at the end of their technical life is not their scrap value, rather it is the savings that their availability represents over having to reconstruct the infrastructure from scratch. The natural conclusion then is that in determining the depreciation allowances contributing to price formation, the accumulated depreciation needs only account for the fall in asset value from its initial ORC value to the market value just prior to refurbishment. Such reduced depreciation allowances provide for pricing which better reflects true long run incremental costs. It is not inconceivable that similar 'refurbishment' opportunities exist for other infrastructure assets and the refurbishment approach should be applied.

A treatment of refurbishment costs, which the Commission will develop in consultation with experts and key stakeholders, will be considered in the Commission's guideline on DORC.

In the IPART AGL (Draft) Decision document IPART considers the Valuation of Trenches (pp 95):

The value of the "hole in the ground" could be considered to be the cost that a new entrant would incur in excavating and restoring sites or boring. If this value for the "hole in the ground" is incorporated, the value of the total network may not be substantially different to that for a new "entrant". However, this may raise concerns if the "hole in the ground" has been fully (or partly) depreciated and its costs have already been recovered from users. It may be argued that the "hole" should not be depreciated in the future and should not have been depreciated in the past, given its value in perpetuity.

It is clear that this issue is more one dealing with distribution systems that have been or are to be refurbished using insertion or re-lining techniques. This is generally in systems that have cast iron mains that have been converted from “wet” gas to “dry” gas and therefore the actual “hole in the ground” is of some value.

The cases sited of SA and NSW, and ACCC are the most appropriate, as they had to deal with this issue directly and are the most recent Regulatory outcomes. All appreciate that there is a value to the “hole in the ground” and do not dismiss it in the way QCA has chosen to not allow a residual value nor extend the life of the asset for regulatory depreciation.

It is also clear from the ACCC Statement of Principles that this could become a more universal issue as pipeline life is extended on existing systems and they have sought to give their view on this issue, and it is clear that the QCA is at odds with that view.

6. OTHER ISSUES EFFECTED BY DORC VALUATION

6.1. REJECTING THE INCLUSION OF CAPITAL EXPENDITURE FOR THE “ACCELERATED MAINS REPLACEMENT PROGRAMME” (AMRP), BECAUSE A DORC VALUATION IS USED

Envestra has sought the inclusion of its AMRP as part of its New Facilities Investment as allowed under the Code in Section 8.16.

This capital is required to maintain the integrity of the network in accordance with 8.16 b (iii). It is also argued by Envestra that the investment would also satisfy section 8.16 b (i) as it facilitates the delivery of network services at sustainable prices over the medium to longer term.

The QCA do not dispute the need for this investment¹⁵ based on advice from its consultants that they are technically prudent (that is, they are based on appropriate costs and are generally optimal in design). The argument put forward is that the Authority is of the view that the allowance of a DORC for the ICB implicitly assumes a network in good working order.

This is inconsistent with the Code as Section 8.16 does not refer to the original basis for setting the ICB but addresses the validity of the investments being put forward for increasing the ICB from the commencement of a new access arrangement, as in this case.

¹⁵ Proposed Access Arrangements for Gas Distribution Networks: Allgas Energy Limited and Envestra Limited – Draft Decision March 2001, pp 165

As covered in this report the use of DORC for the ICB recognises the replacement cost of an optimised network that would provide the same current level of service provided by the existing network, depreciated for economic life.

The AMRP is a roll forward of this position in that the Service provider is investing in maintaining and improving this level of service for users and those seeking access.

For these reasons the AMRP should be allowed in the capital base as envisaged by the Code.

6.2. DECREASE IN OPERATING EXPENDITURE FORECAST FOR COSTS ASSOCIATED WITH SYSTEM LEAKAGE (SUG) BECAUSE A DORC VALUATION IS USED

Similarly the Authority considers that it is consistent with a DORC methodology for the ICB that costs for unaccounted for gas (SUG) for each service provider should be no more than that based on the industry average level of unaccounted for gas which the Authority has estimated at 3%.

This ignores the relationship between the capital investment in the AMRP as a new facility and the level of SUG that will be experienced by the network.

The QCA should also seek to understand the technical issues associated with supplying Natural Gas (a dry gas) into an existing system that has cast iron fittings such as parts of the Envestra Limited system and has been operated under “wet” gas conditions.

The growth of SUG, unless action is taken, continues over time due to the continuing degradation caused by the change in gas type. It is not a static situation and expenditure to alleviate this problem is required for safety and system integrity reasons.

There is also a relationship with the operating costs as such systems have other problems that reduce the level of service provided to users and access seekers (such as water ingress).

This is a situation that is best remedied through an AMRP and as outlined by Envestra this is planned to be implemented within the regulatory period and therefore it is correct to allow this cost during that period.

Similarly the costs associated with the above system leakage above the QCA estimated industry average should be allowable within the first access period.

APPENDIX A – CONSULTANT PROFILES

Here are the profiles and background of the principal authors of this report

A.1 PROFESSOR JOSHUA GANS – SENIOR CONSULTANT

A.1.1 EDUCATION

Stanford University, U.S.A., Doctor of Philosophy (in Economics), 1990 - 1994, Dissertation Title: *Essays on Economic Growth and Change*, Advisors: Professors Paul Milgrom, Kenneth J. Arrow and Avner Greif.

University of Queensland, Australia, B.Econ (First Class Honours) with majors in Economics and Law, 1986 - 1989.

A.1.2 FULL TIME POSITIONS HELD

- Professor of Management (Information Economics), Melbourne Business School University of Melbourne (October 2000 to present).
- Associate Professor, Melbourne Business School, University of Melbourne (July, 1996 – October 2000).
- Lecturer, School of Economics, University of New South Wales (September, 1994 - July, 1996).

A.1.3 HONOURS AND AWARDS

- Fellowship, Jerusalem Summer School in Economic Theory, 1993
- Stanford Center for Conflict and Negotiation Fellowship, 1993
- Fulbright Postgraduate Scholarship, 1990
- Stanford University Graduate Fellowship, 1990
- University Medal, University of Queensland, Australia, 1989
- Reserve Bank of Australia Cadet Scholarship, Australia, 1988

A.1.4 PROFESSIONAL EXPERIENCE**TEACHING**

- *Associate Professor*, Melbourne Business School, University of Melbourne.

Subjects taught: Economics of Incentives and Strategy in Organisations (3rd Semester, 1996, 1997); Managerial Economics (2nd Semester, 1997, 1st Semester, 1998, 1st Semester, 1999, 2nd Semester, 1999; 1st Semester, 2000); Incentives and Contracts (2nd Semester, 1999; 1st Semester, 2000, 1st Semester, 2001); Competing with Technology (2nd Semester, 1999); Economics of Innovation (2nd Semester, 2000); Advanced Game Theory (2nd Semester, 2000).

- *Lecturer*, School of Economics, University of New South Wales.

Subjects taught: Growth, Technology and Structural Change, Session 1 1995, 1996; Microeconomics 1, Session 2 1994; Microeconomics 3, Session 1 1995, 1996; Microeconomic Analysis 1, Session 1 1995, 1996; Microeconomic Analysis 2, Session 2 1994, 1995; Macroeconomics 1, Session 2 1995; Macroeconomics 3, Session 2 1995; Topics in Advanced Economics, Session 2 1995

- Workshop Organiser and Presenter, Scientia Challenge, UNSW

“Using Game Theory to Understand Economic and Social Interactions,” July 13-14, 1995.

- *Adjunct Faculty Member*, Australian Graduate School of Management, UNSW

Issues in Financial Economics, 2nd Quarter 1996

Macroeconomics for Managers, 3rd Quarter 1995

The Economics of Organisations and Management, 1st Quarter, 1996

- *Teaching Assistant*, Stanford University

Intermediate Microeconomic Theory (Paul Milgrom), Fall 1993.

Cities, Regions and Nations (Paul Krugman), Spring 1994.

- *Specialist Tutor*, University of Queensland, Australia, Feb 1989 - July 1990.

Subjects taught included: Introductory Economics, Political Economy and Comparative Economic Systems, Australian Economic History, and the Economic Aspects of Information Technology.

CONSULTING**Long-term Associations**

- Charles River Associates (February, 2001 -)
- Australian Competition and Consumer Commission (October, 1999 – June 2000)
- The Economist Advocate (February, 1999 -)
- London Economics, Australia (February 1997 - May, 1999)

Projects by Industry*Electricity*

- Expert testimony for TXU in appeal at the Victorian Supreme Court over the ORG's electricity pricing determination (March, 2001).
- Report critiquing the form of regulation of Victorian electricity distribution, on behalf of United Energy (September - October, 2000).
- Participation in a training program for Macquarie Generation (December, 1999)
- Economic analysis of electricity generating asset in preparation for a bid (March, 1999)
- Analysis of a contract for sale of electricity to a smelter project (February, 1999)
- Report on NEMMCO pricing principles for the National Retailers Association (September, 1998)
- Analysis of gaming the National Electricity Market Rules (February, 1998)
- Analysis of proposal for allocation of power purchasing agreements in Queensland (December, 1997)
- Analysis of vesting contract arrangements for the Queensland Electricity Reform Unit (December, 1997)
- Analysis of proposals for electricity transmission pricing in Queensland (September, 1997)
- Report on options for electricity industry reform in Western Australia (September, 1997)

- The role of greenhouse gas regulation on electricity pool behaviour (July, 1997)
- Advisor to Queensland Electricity Reform Unit: review of generator market strategies in the NEM and the implications of contracts (May 1997 - November, 1999).
- Bid for Loy Yang: report on the implications of market power for asset values (October-February 1997);
- ETSA Generation: report on the regulation of market power (August, 1996);
- NSW Electricity: report to ACCC on potential for anti-competitive behaviour (March - April, 1996);

Gas

- Analysis of the competitive implications of a gas contract for electricity generation (March, 1998).
- Advice on the use of electricity prices in gas supply contracts to generators (May, 1997).
- Evaluation of R.J. Rudden report on AGL's cross subsidies (April, 1997)
- Gas transmission pricing: reviewed IPART gas transmission submission on behalf of BHP (October 1996-April 1997);
- Gas market: report on the market power implications of the proposed Victorian gas market and examined alternative market arrangements (January-March 1997);
- ETSA Gas: reports on appropriate pricing of gas in electricity use (April, 1996);

Telecommunications

- Report submitted as part of SingTel submission to the ACCC evaluating the competitive implications of Vodafone's undertakings with respect to its proposed bid for C&W Optus (February, 2001).
- Assistance to C7 in determining appropriate access pricing for Foxtel/Telstra's cable television infrastructure (December, 2000 – January, 2001).
- Research report for ACCC on Mobile termination of fixed line calls (December, 1999)
- Research report for ACCC on PSTN termination by non-dominant networks (December, 1999)

- Expert witness for the Australian Communications Authority/ACCC in a matter against Cable and Wireless Optus at the Administrative Appeals Tribunal on local number portability (August, 1999)
- Advice to ACCC on commercial churn matter against Telstra (March, 1999 – January, 2000)
- Analysis of criteria for declaration of intercity transmission lines in telecommunications (ACCC); (March, 1998)
- Report on contracting arrangements in telecommunications (October, 1997)
- Report on local number portability and technology adoption for Telstra (November, 1996)

Banking and Financial Services

- Research report and assistance to the National Australia Bank in assessing the competitive implications and regulatory options for the setting of interchange fees in credit card associations (March, 2000 – March, 2001).
- Examination of theoretical arguments regarding horizontal mergers in Australian banking industry (March, 1997 and May, 1998)
- Analysis, on behalf of Lend Lease, of submission to the ACCC for a joint venture between Lend Lease and National Mutual (November - December, 1997)
- Report on access to the electronic payments system for the National Australia Bank (March - July, 1998).

Pharmaceuticals

- Advice to Faulding Healthcare on implications of COAG review of the pharmaceutical industry (April, 1999 – June, 1999)
- Economic analysis, on behalf of Faulding, of the competition issues surrounding a proposed takeover of AMCAL by Faulding Retail (September, 1998).
- Report on merger authorisation for Sigma and QDL (Nov, 1996)

Other

- Submission to the Victorian Treasury on the role of economic regulation and supply security in the proposed Essential Services Commission, on behalf of the Regulated Businesses Forum (October, 2000).

- Submission to the Competition Review of the Wheat Marketing Act on behalf of AWB Limited (March - August, 2000).
- Analysis of the Victorian Freight Rail access pricing regime for Freight Australia (July, 2000).
- Paper for Inquiry into Intellectual Property on behalf of APRA (November, 1999).
- Competitive Analysis of the proposed acquisition of Hymix by Pioneer (December, 1998)
- Analysis of access pricing principles for interstate rail (ACCC); (December, 1997)
- Assistance to Fairfax on submission to Productivity Commission on broadcast regulation (April, 1999);
- Report on supply security in electricity, gas and water (December, 1998)
- Analysis of merger between two oil refineries (August, 1998)
- Report on the Efficient Allocation of Digital Spectrum for John Fairfax Holdings Ltd (February, 1998)
- Report on product standards for electrical appliances in Victoria (March, 1997)
- Report on social implications of a merger for the provision of radiology services in Queensland (Jan 1997)
- Report on infrastructure access dispute in aluminium mining (November, 1996).
- Freight Rail Corp (NSW): Access dispute resolution with IPART (October 1996).
- Rationale for group negotiations for regional medical practitioners (September, 1996).
- Air NZ: theoretical work on the efficiency of access pricing by airports (March - April, 1996);
- Local Government Reform in Tasmania: developing a conceptual framework for the re-organisation of governmental responsibilities among local and state governments (February - May, 1996).
- New South Wales Taxation Authority: Demand conditions in swimming pool construction (December, 1994).

A.1.5 Litigation and Witness Statement Preparation

- Expert testimony for TXU in appeal at the Victorian Supreme Court over the ORG's electricity pricing determination (March, 2001).
- Expert witness at Appeal Tribunal for United Energy appealing the Office of the Regulator General's Determination on prices for electricity distribution in Victoria (October, 2000)
- Expert witness at the Administrative Appeals Tribunal for the Australian Communications Authority on dispute with Cable and Wireless Optus over local number portability requirements (August, 1999)
- Advice to ACCC on trade practices matter against Safeway (July, 1998 – August, 1999)
- Advice to ACCC on predatory pricing case against Boral (April, 1998 – February, 2000)
- Assistance to Professor Philip Williams in preparation of expert witness statement for Australian
- Competition Tribunal consideration of the authorisation of the Australian Performing Rights Association (January - August, 1998)
- Report on damages calculation for misleading information case in the building industry (August, 1997)
- Report on the economic theory of damages for price fixing violations (March, 1997)
- Submission of competitive implications of Pay TV mergers in New Zealand (Nov 1996)

A.1.6 Research

- *Research Assistant*, Stanford University
Prof. Paul Milgrom, Summer 1991, Fall 1992 - Summer 1993, Winter 1994.
- *Prof. Joseph Stiglitz*, Fall 1991 - Summer 1992
- *Graduate Economist*, Queensland Treasury Department, Australia, in the Budget Policy Division, 1989.
- *Cadet Economist*, Reserve Bank of Australia, Sydney, 1988-89.

A.1.7 ACADEMIC PUBLICATIONS

Books

Managerial Economics: Competition, Contracts and Incentives (in preparation).

Publishing Economics: Analyses of the Academic Labour Market in Economics, Edward Elgar: Cheltnam, 2000.

Principles of Economics (with Stephen King, Robin Stonecash and N. Gregory Mankiw), Australasian Edition, Harcourt, Sydney, 2000.

Principles of Macroeconomics (with Robin Stonecash, Stephen King and N. Gregory Mankiw), Australasian Edition, Harcourt-Brace, Sydney, 1999.

Principles of Microeconomics (with Stephen King and N. Gregory Mankiw), Australasian Edition, Harcourt-Brace, Sydney, 1999.

Publications

“Regulating Private Infrastructure Investment: Optimal Pricing for Access to Essential Facilities,” *Journal of Regulatory Economics*, (forthcoming), 2001.

“The Role of Interchange Fees in Credit Card Associations: Competitive Analysis and Regulatory Options,” (with Stephen King), *Australian Business Law Review*, (forthcoming), 2001.

“Numbers to the People: Regulation, Ownership and Local Number Portability,” (with Stephen King and Graeme Woodbridge), *Information Economics and Policy*, 2001 (forthcoming).

“A Technological and Organisational Explanation for the Size Distribution of Firms,” (with John Quiggin) *Small Business Economics*, 2001 (forthcoming).

“Using ‘Bill and Keep’ Interconnect Arrangements to Soften Network Competition,” (with Stephen King) *Economic Letters*, 2001 (forthcoming).

“Benefits and Costs of Copyright: An Economic Perspective - Part 2,” (with Megan Richardson, Frances Hanks and Philip Williams) *Australian Intellectual Property Law Bulletin*, Vol.13, No.6, 2000, pp.79-92.

“Benefits and Costs of Copyright: An Economic Perspective,” (with Megan Richardson, Frances Hanks and Philip Williams) *Australian Intellectual Property Law Bulletin*, Vol.13, No.5, 2000, pp.62-65.

“Mobile Network Competition, Customer Ignorance and Fixed-to-Mobile Call Prices,” (with Stephen King), *Information Economics and Policy*, Vol.12, No.4, 2000, pp.301-328.

“Incumbency and R&D Incentives: Licensing the Gale of Creative Destruction,” (with Scott Stern), *Journal of Economics and Management Strategy*, Vol.9, No.4, 2000, pp.485-511.

“Options for Electricity Transmission Regulation in Australia,” (with Stephen King), *Australian Economic Review*, Vol.33, No. 2, June 2000, pp.145-161.

“Network Competition and Consumer Churn,” *Information Economics and Policy*, Vol.12, No.2, 2000, pp.97-110.

“The Competitive Balance Argument for Mergers,” *Australian Economic Review*, Vol.33, No.1, March 2000, pp.83-93.

“The Role of Undertakings in Regulatory Decision-Making” (with Teresa Fels and Stephen King), *Australian Economic Review*, Vol.33, No.1, March 2000, pp.3-16.

“Economic Issues Associated with Access to Electronic Payments Systems,” (with Richard Scheelings) *Australian Business Law Review*, Vol.27, No.5, December 1999, pp.373-390.

“Efficient Investment Pricing Rules and Access Regulation” (with Philip Williams), *Australian Business Law Review*, Vol.27, No.3, August 1999, pp.267-279.

“First Author Conditions,” (with Maxim Engers, Simon Grant and Stephen King), *Journal of Political Economy*, Vol. 107, No.4, August 1999, pp.859-883.

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Other Professional Activities

- Economics Editor, *Australian Journal of Management* (1997 -)
- Board of Editors, *Information Economics and Policy* (1996 -).
- Book Review Editor (Microeconomics) for the *Economic Record* (1996 - 1998)
- Professional Memberships: Economic Society of Australia, American Economic Association, Econometric Society.

Languages

Intermediate Japanese

A.2 JIM SNOW – VP CRA, BRISBANE

B.E. (Chemical) Honours, Graduate Australian Administrative Staff College, Mt Eliza, Melbourne

Jim Snow spent 12 years in the Natural Gas Industry holding several senior positions involved with the technical end use of energy, tariff and contract pricing, analysis of energy projects investment and the promotion and marketing of energy.

Jim has run a major electrical power systems contracting company specialising in the design and construction of overhead power lines and electrical contracting. He has also had several years experience in project and process engineering, including design, tendering, procurement, process control, commissioning and training.

Areas of expertise cover full senior management capability, advising on utility strategy, gas related contractual and regulatory issues, and the design and implementation of detailed marketing and advertising plans, demand side management and the detailed planning and production of training programmes. He also retains a strong technical capability.

Professionally Jim is recognised as an expert in several areas including Utilities consulting on all issues but primarily energy markets, market development and marketing strategies, DSM (sits on the NECA DSM Advisory Group), FRC and building new businesses and opportunities such as EPC, BOO, gas and electricity trading, Web based businesses and strategies. He is also recognised as an expert in natural gas procurement and has worked all around Australia providing gas contract advice. Jim is also recognised as an expert on energy market regulatory work and regulatory reform, especially associated with network regulation and energy markets.

He is also able to work across many other sectors including:

- Energy Efficiency – Industrial primarily, cogeneration;
- Greenhouse Gas Reduction Issues – regulatory compliance, policy, implementation;
- Renewables - linked to above;
- Acquisitions – energy company buy-outs and privatisation projects (e.g. NZ, SA); and
- Water and Wastewater Authorities – done a few major assignments with these groups from technical to marketing related.

A.2.1 Recent Assignments

- Regulatory – wrote numerous submissions over an 18 month period to the NSW IPART review of the AGL Gas Undertaking for major energy users (CUB, NSW Health) and for a major competitor/new entrant (EnergyAustralia). This has proved to be a pivotal outcome and has flowed on across many sectors;
- Greenhouse – Major review of a greenhouse business opportunities for a Utility;
- Gas Businesses – Development of several new gas businesses for electricity groups in Australia and New Zealand – full business plans and follow on implementation work;
- Gas procurement – Acting for a major Queensland Industry on the potential purchase of 20 PJ of gas from either Timor or PNG;
- FRC – Study for ACTEW Corporation on the impacts of FRC on customers and analysis of the likely costs of implementation;
- DSM – a detailed study of the Ryde Epping area for SEDA and EnergyAustralia (public study) incorporating regulatory issues and greenhouse issues. This has also led to some major changes and Jim has been working closely with NECA to change the market rules to allow more DSM into the market including aggregators. This is a major change and proposals are now out for discussions (completed paper in early December); and
- A detailed research study of the NEM using the AiG customer base – 11,000 members (3-year partnership established with the AiG). Jim wrote both a public report and a private report. The private report was syndicated and sold to a number of energy Utilities along with a detailed briefing for staff and for Boards.