Depreciation within ODRC valuations

Australian Competition and Consumer Commission

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1. Introduction

The Australian Competition and Consumer Commission (ACCC) has engaged Sinclair Knight Merz Pty Ltd to comment on the depreciation element of an ODRC valuation for the purposes of setting an Initial Capital Base (ICB) under the gas Code.

The terms of reference of this review as provided by the ACCC are as follows:

> *The Commission is currently assessing a number of third party access arrangements for natural gas transmission pipelines. The Access Arrangements were submitted under section 2.2 of the National Third Party Access Code for Natural Gas Pipeline Systems (the Code). In each case the Commission has used a straight line approach to the depreciation of the assets to establish the depreciated optimised replacement cost (DORC) as part of its assessment of the initial capital base (ICB) valuation for the regulated assets, pursuant to section 8.10 of the Code. In the case of several pipelines Agility Management Pty Ltd on behalf of the applicants proposed an alternative depreciation framework to calculate the DORC. Broadly, Agility emphasises that the DORC derivation from ORC should be independent of the past or proposed frameworks for establishing tariffs. Instead, the value should be based on the NPV of revenues that could be generated by the assets over their remaining useful life as if tariffs were set on the basis of what would be charged by a new entrant in a contestable market.*
>
> *The Commission in its draft decision on the Moomba-Sydney Pipeline (MSP) access arrangement rejected the Agility approach in favour of the traditional straight-line methodology. Agility has subsequently submitted that the Commission is in error in rejecting its approach and provided supporting consultancy work done by Professor Stephen King.*
>
> *The Commission is currently reviewing submissions from interested parties, including Agility, in response to the Draft Decision. The Commission proposes to hold a pre-decision conference prior to making its Final Decision on the MSP access arrangement. No date has yet been set for this conference.*
>
> *In order to establish a value for the ICB the Commission has identified a number of possible options:*
> *(1) Accept the Agility formulation of DORC and re-assess the value assigned to the ICB to be consistent with this formulation;*
> *(2) Accept the Agility formulation of DORC but reject the resulting DORC as a basis for establishing the ICB. Instead, the Commission would rely on separate calculations to establish an ICB which takes account of other Code criteria, specifically sections 8.10(f),(g),(j) and (h);*
> *(3) Reject the Agility formulation of DORC and apply the traditional straight-line approach as pursued in the Draft Decision on the MSP Access Arrangement;*
> *(4) Other option/s identified by consultant.*

The Commission is seeking an approach that best meets the requirements and intentions of the Code. To assist in this choice the Commission wishes to obtain independent advice on the validity of the Agility approach pursuant to the Code and advice on which option should be adopted by the Commission. The consultancy should also take into consideration statements made by the Commission in previous decisions and regulatory guidelines relating to this issue when reviewing possible options.

2. Discussion

2.1 The ODRC model

The ODRC model is a model for establishing a value for a monopoly asset based on a simulated scenario where new entrants are considering whether to bypass the asset in question with their own asset. The replacement asset is assumed to be constructed of modern engineering equivalent materials etc, and where the design of the replacement asset is optimised in its configuration (with fixed source and load points) and design.

In the New Zealand Commerce Commission's handbook[1], "the ODRC measures the cost of replicating the system in the most efficient way possible, from an engineering perspective, given its service capability and the age of the existing assets."

Sinclair Knight Merz do not consider that that the application of ODRC is a slavish adherence to the new-entrant bypass scenario however. For example, the valuation of easements is often not the full value that a new entrant would have to pay to replicate the asset in question's functionality. There is also general industry discussion as to whether greenfields or brownfields optimisation applies for the replacement model. In this sense, ODRC is perhaps more of an algorithm than an economic model.

Sinclair Knight Merz usually has regard to the NSW Treasury Paper of 1995 with respect to the NSW electricity system for matters relating to the methodology for ODRC, notwithstanding that this document has no broader standing than NSW (government owned) electricity networks.

With respect to depreciation within the ODRC methodology, this paper suggests a preference for straight line depreciation. This issue is discussed as:

Under Section 5.2 "Principle in Determining Depreciation":

> *All non-current assets with limited useful lives are to be depreciated in accordance with Australian Accounting Standard AAS4 "Depreciation of non-current assets", except that the definition of "useful life" in SAP1 is to be used. Under SAP1, useful life is defined as "the estimated total period, from the date of acquisition, over which the service potential of the asset is expected to be used up in the business of the entity".*
>
> *As such, it is the period before it becomes necessary for safety, economic or technical reasons to replace or fully refurbish it. The impact of technology may subsequently lead to changes in economic lives and, from time to time, remaining useful lives may need to be reassessed.*
>
> *Useful lives may be on a time or use basis, and there are a number of methods for the calculation of depreciation including straight line, reducing balance and production units method. This policy does not mandate one single depreciation method for all assets.*

[1] "Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Line Businesses", April 1999

This last point is important as it says, at least in the case of NSW government owned assets, that alternative depreciation regimes can be countenanced.

However when the paper comes to discussing Practical Implementation Guidelines on the same point it says, at Section 5.4:

> *Depreciation is a function of the total life and the remaining life of an asset. The generally accepted method of depreciating electricity network assets is on a straight line basis, although there are other approaches to estimating changes in an asset's value as it becomes "older" and its remaining life decreases. To ensure consistency, Network Businesses should use straight line depreciation.*

2.2 The Initial Capital Base (ICB)

Section 8 of the Code clearly considers that in many circumstances where an existing asset is entering the regulatory regime for the first time, the historic data necessary to establish what the wealth-neutral initial capital base should be in a deterministic manner, is lost or was never gathered.

ACCC advise that the determination of such a historic tariff derived ICB value is often problematic in terms of availability and reliability of the data. Even when good data is available small changes in assumptions (eg the WACC - sensitive to inflation and past risks) can lead to quite substantial changes in the residual value - giving rise to an unacceptable range of uncertainty for the ICB. Further, Agility have argued that by deriving the ICB in this way the regulator is essentially regulating retrospectively in a way that was never intended by the Code.

Notwithstanding this, an assertion that the ICB should be as wealth neutral as possible as between the asset owner and the users of the asset (except for wealth accreted inappropriately due for example to monopolistic behaviour) might be justified by:

- An expectation that the process of establishing a regulated regime for the asset is to be fair and reasonable to both asset owners and customers as far as practical, and
- Clause 8.10(g) of the Code which refers to the reasonable expectation of the parties, which presumably includes the shareholders of the asset owner and shareholders of the entities using the asset. We would assume that it is a reasonable expectation that the start of the regulation process does not intend to expropriate wealth from either the asset owner or the asset users.

If it is not possible to construct from historic data an ICB that matches the original wealth inherent in the asset when it was new, as adjusted by the intervening tariff cashflows, capex and opex expended by the asset owner, and a fair return on the owner's capital in each of the intervening years, then there is a risk of wealth transfer of an unknown magnitude and direction.

Faced with this risk, it is considered reasonable to expect the regulator to accept only an ICB that was such that the regulator felt that there was a roughly equal risk that the ICB was transferring wealth either way.

Whilst it is a pity that this wealth-neutral constraint, if it exists, is not explicitly included in Clause 8.10, it does not seem too presumptuous to expect that it might be implied.[2]

Considered in this light, the following assertions might be made:

- Where users of the system believe that energy market reform necessarily implies a step change reduction in tariffs at the start of the regime, this would seem inappropriate, notwithstanding that a step change up or down might fall out of the process from other considerations,
- Where the owner of the system enters the regulatory regime with the expectation of constant (real) tariffs at historical levels, which might thence involve multiple depreciation of the same asset, this might likewise be considered an inappropriate expectation because to this extent it would perpetuate an ongoing wealth transfer reflective of monopoly pricing without counter-balancing competitive forces.

If it is not possible to construct an ICB from the original capital cost and all the intervening data, and if it is agreed (as it is in the Code) to use the ODRC value as a nominal cap on the ICB (subject only to special circumstances), then it is necessary to consider how the depreciation element of ODRC should be determined in a way that has the lowest risk of bias up or down in the ICB.

2.3 Distinction between historic depreciation and going forward depreciation

We would draw a distinction between the depreciation within the ICB and the depreciation schedule going forward after the start of the regulatory regime.

Historically, the data might not be available to determine how much of the existing asset's ORC has already been returned to the owner.

Looking forward, the regulatory process under the Code can monitor the depreciation schedule and ensure multiple depreciation of the same asset value is avoided.

We believe there is merit in allowing the asset owner to develop their own depreciation schedule going forward, subject only to the constraints in Clauses 8.32 & 8.33 of the Code. Whilst the regulator would pay particular attention to ensuring multiple depreciation is avoided, and also to considering the interests of users of the system, the asset owner is in the best position to manage the risk of delaying depreciation too far into the life of the system, and potentially never being able to recover it. It may well be that the asset owner chooses a structured depreciation regime such as a credit foncier method ('principal' and interest repayments similar to a home mortgage and per the Agility/Professor King proposed regime), or a continual bypass assessment cost such as an ODRC or even accelerated depreciation if warranted, instead of a straight line.

[2] It is recommended that the ACCC seek legal advice as to the extent that such a wealth neutral requirement might be implied by s51(xxxi) of the Constitution which deals with the 'acquisition' of 'property' by the Commonwealth.

Historically however if there is insufficient information as to what depreciation has been taken out prior to the access regime, then if the depreciation regime to be applied is 'at large' then the ICB is also 'at large'[3], which would mean the ODRC is useless as an ICB measure.

Where there is no clear relationship between consumption of the economic potential of the asset and time, as is the case with the asset in question, then it cannot be said that any particular depreciation model for past depreciation is more economically correct than any other. This does not imply that the choice should be left solely to the asset owner as the interests of the users also need to be considered.

In the search for a depreciation regime to be applied in the ICB, the following should be considered.

2.4 The role of the depreciation element in the ICB

The depreciation element in the Initial Capital Base (ICB), and in the ODRC when that method is used to calculate the ICB, is to account for:

- That some of the life of the existing asset has already been consumed prior to the date of the ICB, and flowing from this the current value of the asset is less than full amount of the value of the asset when new, and
- That relative to the replacement asset that might be built by a new entrant or if the existing asset had to be replaced under a deprival valuation regime, the future life of the existing asset is less than the life of the replacement. Since an asset cannot be valued at better than it is, the value of the notional replacement asset should be reduced (depreciated) to account for this difference.
- That users of the existing asset will probably have already 'paid' for some portion of the existing asset. It is not intended by this statement to suggest that users are somehow buying the asset from the owner by instalments.

This last point is a backward looking criterion and reflects the users' interest in depreciation of an asset that they 'pay' for under a regulated regime where the asset owner is given his long run marginal cost, as is the case here.

Accounting standards, including AAS4, focus on 'future economic benefits' in the recognition and valuation of assets, which is inherently a forward looking criterion. This ignores the circumstances of the past, as is the nature of accounting standards ('sunk costs'). We would suggest a backwards looking element needs to be considered in the setting of the ICB however, for the benefit of users.

In a competitive market, depreciation as above does not play a role in setting of the market price. The only entity who can decide to be paid the long run marginal cost of their asset is the new entrant at the moment of commitment of their proposed project. Every other entity in the market, and the new entrant after entry to the market, must take the market price. If the market price will consistently be below the entity's short run marginal cost, the entity would logically close down the asset.

[3] In this context meaning anything from zero to 100% or further: "subject to unilateral selection by a non-arms-length party".

Competitive markets thus comprise a number of entities who receive a price generally somewhere between their own short run marginal cost and the long run marginal cost of the new entrant, and with new entrants coming into the market when the price is around the new entrant LRMC and entities leaving the market when the market price is around or below their own SRMC.

In times of increasing construction productivity and the ingenuity of the market in conceiving projects, it would be expected that the new entrant LRMC would fall in real terms over time. In the absence of special competitive advantage, such as market power, it is hence likely that for any entity already in the market they would not expect to sustainably be returned a market price above their own original LRMC adjusted for inflation.

This suggests that for any particular asset, the price it receives in a competitive market could be in a wide band (particularly for a capital intensive asset) between its own short run marginal cost and the long run marginal cost of a new entrant. The ODRC method is a method of estimating the top price in this wide, grey band – the cost of a new entrant competitor bypassing the asset in question.

Conventionally the ORC component of this calculation tends to follow the new entrant bypass cost model closely with departures only for a handful of reasons (eg easements).

2.5 Accounting standard AAS 4

Australian Accounting Standard AAS 4 deals with depreciation.

It must be noted that there is no rule or element of the ODRC methodology incorporating particular standards such as AAS 4, which are generally drawn up for reporting of a company's affairs to interested parties and not for the purpose of price setting. AAS 4 is mentioned however in the NSW Treasury Paper.

Further there is no obvious requirement that depreciation for tariff setting purposes should be the same as accounting depreciation, any more so than accounting depreciation needs to be the same as tax depreciation.

Nevertheless the recommendations of Australian standards could provide an indication as to what the understanding of other parties might have been of the depreciation regime being applied in the absence of any prior signals to the contrary.

AAS 4 says, at clause 5.5.11 that:

> *Where the useful life is estimated on a time basis, several methods are available for allocating the depreciable amount, according to whether it is considered that the pattern of exhaustion of the asset's service potential will remain constant from reporting period to reporting period, or will increase or decrease over time. The straight line method is a means of determining systematic allocations which are constant from reporting period to reporting period and is most commonly adopted because of its simplicity. The reducing balance method is one of several methods yielding allocations which decrease from reporting period to reporting period. Such decreasing allocations would be justified where an asset can be expected to yield more service in the earlier reporting periods than in the later, so that it could be argued that the earlier reporting periods ought to bear a larger allocation of the depreciable amount of the asset.*

The measures discussed are inward looking measures of service potential for the asset rather than external, market focussed measures. This may merely reflect the object of such standards.

Nevertheless, the clause suggests that straight line depreciation is the most common applied. Further, for a pipeline there is nothing evident to suggest the pipeline's capability (in terms of its ability to deliver an amount of gas per year for example) changes through its life and hence if only this, internally focussed, capability is considered, the straight line method is apparently most appropriate.

Unless it has been declared otherwise, it is considered likely that an external party such as a user of the system or an independent observer, would have expected that straight line depreciation was being applied.

2.6 Consideration of other ODRC valuations

As far as we are aware straight-line depreciation has been applied within the ODRC methodology for the initial capital base calculation for Australian gas and electricity networks.

This includes the Victorian gas distribution and transmission network ICB's.

In the Victorian gas distribution businesses initial valuations, we note that the ICB was adjusted down from ODRC as a matter of policy by the Victorian government for the start of the regime. This was interpreted as a setting of the ICB at a different value (less than) the ODRC rather than any different application of the ODRC methodology.

The New Zealand Commerce Commission, in its "Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Line Businesses", April 1999, Clause 3.19 requires straight line depreciation.

That we believe straight-line depreciation has been previously applied tends to indicate that straight line depreciation is both part of the normal ODRC methodology, as well as being the likely expectation of the parties prior to the regime as to what the regime would provide in the ICB.

It is not considered likely that all parties had expected that the manner of calculation of the ODRC for the ICB was 'at large' or at the discretion of the asset owner.

2.7 Is economic depreciation ODRC a viable alternative ODRC method?

It is suggested above that the usual ODRC calculation, and the calculation that would be expected by most parties leading up to these submissions, includes straight line depreciation in the ICB calculation.

There is nothing known to preclude an alternative methodology for ODRC becoming accepted since the ODRC method is not codified or immutable.

Such variations are not part of the current methodology however as has been traditionally applied.

ODRC calculations with economic depreciation such as proposed are an elegant form of forward looking valuation. Even if this were accepted however as the ODRC value for the purposes of the Code Clause 8.10(b), there should be some form of backward looking element considered, whether by giving more weight to the depreciated historic cost or by considering an additional calculation modelling historic depreciation. This is considered necessary to account for the interests of the users of the system in the ICB and could be required under Clause 8.10 (c), (f), (g) or (k).

If it is not accepted that ODRC calculations with economic depreciation such as proposed are the ODRC for Clause 8.10(b), then they might be an additional means of calculating a potential value for the ICB to the traditional method. However, since this proposed method will invariably result in a value above the ODRC with straight line depreciation, and since such a value is normally applied as a 'cap', this is a moot point.

2.8 OFTEL's review of British Telecom

While not described in ODRC terms (but rather Current Cost Accounting (CCA) terms), a discussion of issues regarding economic depreciation versus straight line depreciation took place within OFTEL's review of British Telecom's Network charges from 1997. By way of contrast to the usual circumstance in gas and electricity networks (particularly given the high historic inflation rates over the lives of most gas/electricity assets in consideration in Australia) where the Depreciated Historic Cost (DHC) value is less than the ODRC value, for BT the CCA valuation was less than the DHC value.

Relevant and informative quotations from some of the OFTEL discussion papers include:

From the 1996 Oftel discussion paper, Chapter 3[4]:

> ***Measurement of Incremental Costs***
>
> *3.5 Oftel and the industry have been developing a methodology to calculate incremental costs for more than two years. A robust methodology for incremental (and common costs) has now been established through the development of the top-down model, the bottom-up model and through the reconciliation work (see below). Long run incremental costs may be defined in general as the costs that are caused in the long run by the provision of a defined increment f output. The network assumed for the purpose of developing the incremental cost methodology is a standalone network of inland Public Switched Telephone Network (PSTN) services and inland private circuits. The network assumed in the methodology therefore excludes the international network and the specific equipment required for advanced services such as the Digital Derived Services Network (DDSN), the Integrated Services Digital Network (ISDN) and Virtual Private Networks.*
>
> *3.6 In order to establish a robust methodology to calculate long run incremental costs, two modelling approaches have been adopted. BT has developed a top-down model, which starts from its financial accounts and removes costs that are not incremental. For a description of the top-down approach see BT's Top Down Incremental Cost Methodology, BT 1996, which is available from BT. The Incremental Cost Working Group has constructed a bottom-up model of the network components using economic engineering models that identify the engineering elements required to build a network, and has sought to populate the models with the generic costs of a fully efficient operator. For a documentation of the bottom-up model, see Long Run Incremental Costs: The Bottom-Up Network Model, Oftel, 1996, which is available from Oftel.*
>
> *3.7 Both approaches have had a role to play in deriving the robust methodology and the estimates of incremental cost through the third essential element in establishing the methodology: the reconciliation and production of hybrid figures. Each model has its own strengths and weaknesses and each therefore provides a useful cross-check on the other. The results from both approaches have been reconciled and hybrid incremental cost figures derived for 1993/94 and 1994/95 (see ...).*

And in Chapter 5[5]:

> ***Asset Price Changes***
>
> *5.21 An important determinant of the way in which costs will move over time is the change in value of the capital assets employed in the network. It is also important to consider how the costs of these capital assets are recovered over time, in terms of the appropriate asset lives and depreciation profiles.*

[4] http://www.oftel.gov.uk/publications/1995_98/pricing/netcha97/chap3.htm

[5] http://www.oftel.gov.uk/publications/1995_98/pricing/netcha97/chap5.htm

> *5.22 The underlying principle, in the top down and bottom up incremental cost models, and in the Oftel financial model, is that assets should be valued on the basis of their Modern Equivalent Asset value. That is, assets are valued according to the lowest cost method of providing the services delivered by the assets in question. The lowest cost assets will generally incorporate the latest proven technology available.*
>
> *5.23 The bottom up model calculates the recovery of capital costs on the basis of principles of economic depreciation. This is a methodology by which an asset is depreciated according to its earning power over its life, with the end of the asset's life coming when the earning power falls to zero. While this is conceptually the correct way to value assets and recover capital costs, the methodology requires a number of assumptions (eg about the future movements in asset prices and maintenance costs) in order to e implemented. These assumptions are difficult to forecast with confidence.*
>
> *5.24 The top down incremental cost model uses straight line depreciation, with some allowance for holding gains and losses as assets change in price over time. This might approximate to the profile of capital charge recovery implied by economic depreciation and is rather simpler to implement. Whilst this type of accounting depreciation differs from the estimated economic depreciation for the bottom up model, the analysis conducted in the reconciliation exercise found no evidence of systematic bias. The financial model is based on a similar approach, with holding gains and losses incorporated in line with the assumptions made about changes in asset valuation. It is clearly important that similar assumptions about asset lives and asset price changes are made in the Incremental Cost Model outputs as are made in the financial model.*

Whilst it should be anticipated that the results discussed by Oftel for a telecoms business might not translate immediately to an Australian gas business, and in particular the finding that straight-line and economic depreciation give similar outcomes, the following elements are considered relevant from the above:

- That procedural difficulties exist for the economic depreciation method in forecasting prices and costs (very similar to the argument that historic tariff paths are problematic to un-ravel historic depreciation),
- That attention was paid to considering whether a systematic bias was being built-in.

This last point can be considered to support the suggestion by Sinclair Knight Merz in Section 2.2 above that a wealth neutral outcome should be a target. This suggestion is further reinforced in Oftel's 1997 discussion paper in the same review as follows[6]:

[6] http://www.oftel.gov.uk/publications/1995_98/pricing/nccjulap.htm

ANNEX D

LRIC Adjustment and windfall loss

D.1 The long run incremental cost (LRIC) adjustment is the term used to refer to the change in the cost base for interconnection charges: moving from historic cost accounting (HCA) fully allocated cost charges on 30 September to LRIC plus mark-up on 1 October 1997. This Annex investigates the proposition that the LRIC adjustment will result in BT suffering a windfall loss.

D.2 The issue arises because the asset base under LRIC, which adopts a forward looking approach to asset valuation, ie using replacement cost or current cost accounting (CCA), is lower than the asset base under HCA. The CCA asset base is lower now than the asset base when measured on an HCA basis, because of past reductions in real asset prices.

D.3 The proposition that there would be a windfall loss can be explained as follows. If interconnection charges had always been set using CCA costs, the path of charges would have been different from the path if interconnection charges had always been based on annual determinations of HCA costs. Either path followed consistently would allow shareholders a reasonable return on their investments. During some earlier period the charges based on CCA costs would have been higher than those based on HCA costs, eg during years in which there were large reductions in asset prices, because the charges based on CCA costs, unlike the HCA costs, would have reflected the holding losses (ie accelerated depreciation). By changing the cost base from HCA to CCA, it is argued that BT Network's customers obtain the advantage of the period when the charges using CCA costs are lower than HCA costs, but never pay the higher charges associated with the earlier period when CCA costs were higher than HCA costs. This scenario is illustrated by the graph at Figure D.1, which shows paths of costs (depreciation plus return on capital employed) for a single asset under HCA and under CCA approaches to asset valuation and depreciation.

Figure D1: HCA Costs versus CCA Costs [not shown]

D.4 In the case of BT, a vertically integrated company, Oftel considers that to measure whether in fact a windfall loss would be incurred in practice, it is necessary to focus on the interconnection charges to OLOs, abstracting from the payments between BT Retail and BT Network. In Oftel's view, there is a windfall loss only if the revenue from OLOs received by BT for inland conveyance (up to 30 September 1997), through the use of HCA costs to set interconnection charges, is less than the revenue from OLOs that BT would have obtained if charges had been based on CCA costs. Otherwise, a move to charges based on CCA on 1 October 1997 will not prevent BT shareholders from earning a reasonable return on their investments over their asset lives. The analysis is carried out for inland conveyance only, because IDD conveyance will not be subject to basket control of RPI-X (inter-tandem conveyance will also be outside basket control, but this is ignored for simplicity).

> ***Looking at past cost profiles***
> *D.5 It would be possible to take the view that history should be ignored and a purely forward looking approach should be adopted. If so, interconnection charges would be set on the basis of the most appropriate cost base, namely LRIC. But the past is relevant if there is to be an assessment of whether the LRIC adjustment would deny BT's shareholders a reasonable return on their investments. In other words, a backward looking approach is inherent in the proposition that there is a windfall loss.*

In the above, the positions of the asset owner, BT, and the customers are reversed to those in this discussion. The relevance of including a backward looking valuation element designed to minimise, as far as practical, wealth transfers to and from the asset owner (from and to the customers) can be seen however in Oftel's analysis.

2.9 Appraisal of the 'economic depreciation' proposed

The 'Report on the construction of DORC from ORC' by Stephen King dated February 14, 2001 is considered.

Firstly, there is nothing evidently wrong in itself with the method discussed by Professor King in finding a value for an asset that represents the value at any point in time that a potential new entrant might offer for the existing asset versus building his alternative new asset, and the method correctly adjusts for the difference in life of the existing asset and the replacement using an accepted methodology for comparing projects of unequal lives. (Refer to the discussion in Appendix B).

The method assumes constant technology and (real) prices for the alternative replacement asset, and matches the net present value of a perpetuity of replacement asset depreciations to the net present value of depreciation of the actual asset over its remaining life followed by a perpetuity of replacement asset depreciations.

The relevant extract from Professor King's paper is:

> Given an ORC valuation of V_n, a real interest rate of r and the assumptions noted above, the new firm faces two alternatives. It can invest in new technology with a cost of V_n and an expected life of T_n or it can purchase the existing assets at price P. The existing assets have an expected life of T_o. In either case, when the relevant assets reach the end of their life, the firm will purchase new assets to continue serving the market. Under the 'maximum price' interpretation, the DORC value of the existing assets will be the maximum value of P that just makes the new firm indifferent between these two alternatives.

To calculate the value of P, it is convenient to annualize the new asset cost. Let v_n be a constant amount of dollars per year over the life-time of the new assets that is equivalent in present value to the new assets. In other words, $V_n = \frac{v_n}{(1+r)} + \frac{v_n}{(1+r)^2} + \ldots + \frac{v_n}{(1+r)^{T_n}}$. Then, for the new firm to be indifferent between buying the existing assets or purchasing new assets we require that

$$\frac{v_n}{r} = P + \frac{v_n}{r(1+r)^{T_o}}$$

The left hand side of this equation is the present value cost to the new entrant of supplying the relevant services using current technology forever. The right hand side is the cost of purchasing the existing assets plus the present value cost of providing the relevant services with the new technology after the existing assets cease to be viable. In other words, purchasing the existing assets allows the new firm to postpone its purchase of new assets by T_o years. Rearranging, this implies that $P^* = \frac{v_n}{r}\left(1 - \frac{1}{(1+r)^{T_o}}\right)$ where P^* is the DORC valuation.

This analysis could be extended (using Professor King's nomenclature) to the solution that:

$P^* = Vn\ (1-1/(1+r)^{T0}) / (1-1/(1+r)^{Tn})$

This can be compared to the traditional ICB based on $P^* = Vn\ To / Tn$

This last formulation assumes that the adjustment suggested for consideration in the MSP draft decision for the difference in life of the actual asset and the replacement asset is acceptable[7].

However the analysis by Professor King is essentially to calculate the value of the existing asset as at the date of the ICB from the NPV over the remaining life of the actual asset, of the annualised prices projected forward in time that would amortise the replacement asset. This is a valuation that has some economic merit (subject to Section 2.8) however it is not considered an ODRC value according to the custom previously applied. Considering the historic application of straight-line depreciation within ODRC valuations that we are aware of, Sinclair Knight Merz interpret the ODRC method as prima facie including straight-line depreciation unless special circumstances apply (such special circumstances of which we are unaware in this case).

Agility/Professor King's method is a forward looking technique that does not attempt to seek to know how much depreciation might already have been recovered prior to the ICB.

[7] This approach was suggested for consideration by Rohan Zauner, Principal of Sinclair Knight Merz, in a paper presented to the ACCC's conference on asset valuation in June 2000. Refer to Appendix B for additional discussion.

The benefit of the formulation suggested by Professor King looking forward is for a relatively stable tariff path. Unless there was some evidence that this tariff setting method had been applied in the past however, it is evident that users of the pipeline would face a very high probability of paying multiple depreciation if this method were used for the ICB.

2.10 Significance of the Commission's 'Draft Statement of Principles'

The Commission's 'Draft Statement of Principles' suggests a preference for economic depreciation to be applied. Only the Commission can fully explain its intentions in this regard, but we have interpreted this to apply in the regulatory periods after the ICB has been established only.

This interpretation is based on the belief that all previous ICB valuations have universally applied straight-line depreciation, and also the discussion points in this paper.

3. Recommendation

Sinclair Knight Merz recommend that an ODRC valuation based on the traditional, straight line, methodology for depreciation be applied.

If only forward looking ICB valuations were to be considered, then there is significant merit in the Agility/Professor King formulation. However, while the past is usually irrelevant in an economic valuation context, to ignore backward looking elements in the ICB would appear to overlook the 'equitable interests'[8] of the users of the system in the amounts they have already contributed to the asset owner.

We note that Agility warn of the fear of regulatory expropriation of value, and we would note that users of the system have the same fear. We would expect the ICB to be a balance of their interests attempting to avoid wealth transfers within the setting of the ICB.

The justification for suggesting that the traditional straight-line method is superior to Agility's proposed method, at least for the ICB, is that:

- The traditional, straight-line, method is considered likely to minimise the risk of multiple depreciation of the same element (Clause 8.33(d), although this clause is more related to forward depreciation than depreciation in ODRC), and hence considered to be more likely to be wealth neutral as between the asset owner and customers,
- It better matches the expectations of the broader industry going into the process (including it is suggested in particular, users),
- It is consistent with previous decisions (which produces the previous point)

Further, whilst it is not mandated by any standard that we are aware of that the ODRC method apply straight-line depreciation, several descriptions of the method indicate that straight-line depreciation is the method normally applied and is the method applied in circumstances with which we are familiar.

If there is a complete set of reliable information from the past that reflects the value depreciated in the asset already, from the initial capex or from an arm's length sale process, we would recommend this should be held in high regard. This discussion assumes that a value for the ICB cannot be reliably worked out from the historic tariffs, costs of capital, opex and capex etc. If this historic calculation were possible then this would to us be preferred as a means of minimising the risk of wealth transfer between users of the asset and owners of the asset, notwithstanding that the Code does not express that this is a necessary or desirable outcome[9].

[8] We interpret that such interests might exist and should be considered by the regulator by Clause 8.10 (f) and (g), and also by inference from Clause 8.33 (d) although we do not interpret that Clause 8.33 applies to depreciation in the ICB, only to forward looking depreciation. Whether an actual legal equitable interest exists, or whether the regulator is obliged or may consider such interests whether they are legally enforceable or otherwise, is a legal issue that the regulator should seek other guidance on. We have assumed it is the case however that these interests should be considered.

[9] And again, the regulator should seek legal advice as to whether this is an implied requirement for consideration

The method proposed by Agility/Professor King appears to have merit in the forward depreciation schedule, but this should largely be at the ongoing discretion of the asset owner provided the objectives and requirements of Clause 8.33 are met.

We have recommended that straight line depreciation is used for the purposes of the ICB. Whether this outcome is derived by asserting that the ODRC method necessarily implies straight line depreciation, or because of widespread expectation that straight line depreciation would be applied, or because the regulator is entitled to seek other, usually lower, values for the ICB than ODRC when considered appropriate (and presumably at the regulator's reasonable discretion) under the other elements of Clause 8.10, appears to be an academic point.

Appendix A Code provisions

A.1 General principles

The Initial Capital Base (ICB) of the asset is to be determined as part of the process of establishing the Reference Tariffs and the Reference Tariff Policy for the asset. The objectives of this process are described in Section 8 of the Code.

The general principles from Section 8 of the Code are reproduced below:

> 8.1 Reference Tariff and Reference Tariff Policy should be designed with a view to achieving the following objectives:
>
> (a) providing the Service Provider with the opportunity to earn a stream of revenue that recovers the efficient costs of delivering the Reference Service over the expected life of the assets used in delivering that Service;
> (b) replicating the outcome of a competitive market;
> (c) ensuring the safe and reliable operation of the Pipeline;
> (d) not distorting investment decisions in Pipeline transportation systems or in upstream and downstream industries;
> (e) efficiency in the level and structure of the Reference Tariff; and
> (f) providing an incentive to the Service Provider to reduce costs and to develop the market for Reference and other Services.
>
> To the extent that any of these objectives conflict in their application to a particular Reference Tariff determination, the Relevant Regulator may determine the manner in which they can best be reconciled or which of them should prevail.

A.2 Principles relating to the Initial Capital Base

The principles to be applied in establishing the Initial Capital Base within the Code are:

> 8.10 When a Reference Tariff is first proposed for a Reference Service provided by a Covered Pipeline that was in existence at the commencement of the Code, the following factors should be considered in establishing the initial Capital Base for that Pipeline:
>
> (a) the value that would result from taking the actual capital cost of the Covered Pipeline and subtracting the accumulated depreciation for those assets charged to Users (or thought to have been charged to Users) prior to the commencement of the Code;
> (b) the value that would result from applying the "depreciated optimised replacement cost" methodology in valuing the Covered Pipeline;
> (c) the value that would result from applying other well recognised asset valuation methodologies in valuing the Covered Pipeline;
> (d) the advantages and disadvantages of each valuation methodology applied under paragraphs (a),(b)and (c);
> (e) international best practice of Pipelines in comparable situations and the impact on the international competitiveness of energy consuming industries;

(f) the basis on which Tariffs have been (or appear to have been)set in the past, the economic depreciation of the Covered Pipeline, and the historical returns to the Service Provider from the Covered Pipeline;
(g) the reasonable expectations of persons under the regulatory regime that applied to the Pipeline prior to the commencement of the Code;
(h) the impact on the economically efficient utilisation of gas resources;
(i) 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);
(j) the price paid for any asset recently purchased by the Service Provider and the circumstances of that purchase; and
(k) any other factors the Relevant Regulator considers relevant.

8.11 The initial Capital Base for Covered Pipelines that were in existence at the commencement of the Code normally should not fall outside the range of values determined under paragraphs (a) and (b) of section 8.10.

A.3 Principles relating to the Depreciation Schedule

For completeness, the Code provisions relating to the Depreciation Schedule are also reproduced below:

8.32 The Depreciation Schedule is the set of depreciation schedules (one of which may correspond to each asset or group of assets that form part of the Covered Pipeline) that is the basis upon which the assets that form part of the Capital Base are to be depreciated for the purposes of determining a Reference Tariff (the ***Depreciation Schedule***).

8.33 The Depreciation Schedule should be designed:
(a) so as to result in the Reference Tariff changing over time in a manner that is consistent with the efficient growth of the market for the Services provided by the Pipeline (and which may involve a substantial portion of the depreciation taking place in future periods, particularly where the calculation of the Reference Tariffs has assumed significant market growth and the Pipeline has been sized accordingly);
(b) so that each asset or group of assets that form part of the Covered Pipeline is depreciated over the economic life of that asset or group of assets;
(c) so that, to the maximum extent that is reasonable, the depreciation schedule for each asset or group of assets that form part of the Covered Pipeline is adjusted over the life of that asset or group of assets to reflect changes in the expected economic life of that asset or group of assets; and
(d) subject to section 8.27,so that an asset is depreciated only once (that is, so that the sum of the Depreciation that is attributable to any asset or group of assets over the life of those assets is equivalent to the value of that asset or group of assets at the time at which the value of that asset or group of assets was first included in the Capital Base, subject to such adjustment for inflation (if any)as is appropriate given the approach to inflation adopted pursuant to section 8.5A).

Appendix B Consideration of an adjusted ICB

Consideration might be given to whether a method along the lines of Professor King's formulation might have application in adjusting the ORC value where the MEA has a life, when new, greater than the existing (actual) asset.

The formula proposed by Professor King has a more robust adjustment for the difference in life of the existing asset and the replacement asset (considering the time-value-of-money) and could be considered as a better modifier for the life to that proposed in the paper by Rohan Zauner[10], vis it might be suggested that the ODRC value could be:

$$P^* = Vn \times T0/T0n \times (1-1/(1+r)^{T0n}) / (1-1/(1+r)^{Tn})$$

This formulation still includes the straight line depreciation but a modified factor for correcting for the different lives.

Where the nomenclature is as used by Professor King and with the additional term, T0n, being the life, when new, of the existing asset.

Where:

T0 = 36 years
Tn = 80 years
T0n = 60 years
r = 7.5%

Then:

P* = Vn x 36/60 x 0.986954 / 0.996929
= 59.4% of ORC

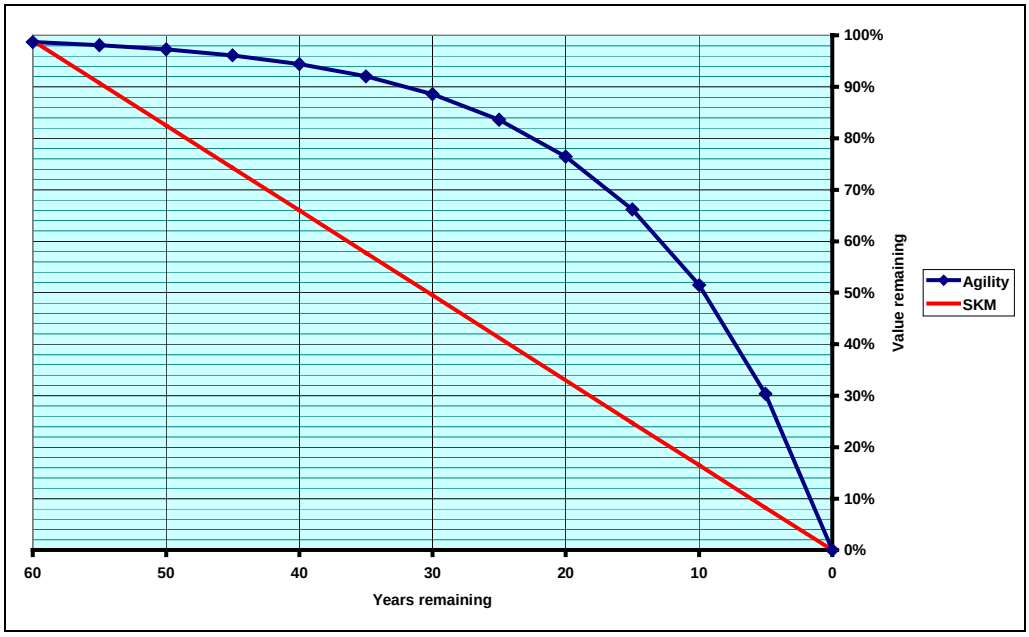
Versus the value suggested by Professor King's method using the same parameters of:

P* = Vn x 0.925989 / 0.996929
= 92.9% of ORC

The difference between the formulations can be seen in Figure 1 below. It can be seen that the method of Professor King has much higher ODRC values than the traditional, straight line, methods.

[10] Suggestion presented for consideration by Rohan Zauner of Sinclair Knight Merz at a workshop organised by the ACCC on ODRC, Melbourne, June 2000

■ **Figure 1 Adjustment of initial value for differing lives**



Note that we are not aware of previous ODRC valuations being reduced because the replacement asset has a longer life than the existing asset when new and this may be persuasive in itself. In the case of the Victorian gas networks it was not necessary to make any adjustment because an economic limiting life was applied. The economic limiting life limits the life of both the replacement asset and the actual asset to the same duration regardless of their technical lives.

Where this is not the case however, that some adjustment should be applied when the replacement asset has a longer life than the existing asset when new is supported by the following extract from the NSW Treasury Guidelines for the electricity industry (Dec 1995):

> *It should be stressed that the MEA at DRC valuation approach is not concerned with improving the system from its current state. The system must never be valued at better than it is, whether in terms of capacity or other standards, whether this would cost more or less.*

Notwithstanding that the method discussed above for adjustment of the ORC with differing lives when new using the method following Professor King is economically attractive, it should be noted that SAP1, Current Cost Accounting, infers that the traditional, linear method would normally be applied in an accounting evaluation.