ASSET VALUATION FOR THE GAS CONTROL INQUIRY

A Report for NGC Holdings

Prepared by NERA

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Sydney

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TABLE OF CONTENTS

SUMMARY AND CONCLUSIONS

In undertaking its inquiry as to whether gas services should be controlled, the Commerce Commission is required to consider asset valuation methodologies and to advise the Minister of Energy as to the methodology it considers most appropriate.

The inquiry is taking place under section 52 of the Commerce Act, which allows goods or services to be controlled if they are (or will be) supplied or acquired in a market in which competition is limited or likely to be lessened ***and*** it is necessary or desirable for those goods or services to be controlled either in the interests of acquirers or suppliers. To determine whether gas services meet the second part of the test, the Commission proposes comparing the prices likely to prevail in the absence of control with those likely to prevail if control is imposed, where:

- the prices likely to prevail in the absence of control would be determined by reference to the business plans, etc of the firms in question; and
- the prices likely to prevail in the presence of control would be determined through a building block approach, which is intended to mimic the prices in a workably competitive market.

The Commission has proposed estimating the asset base according to both the historical cost and the optimised depreciated replacement cost (ODRC) methodologies. The Commission has also stated that it may not consider a price path unreasonable if it is above a price path based on a particular asset valuation or depreciation schedule. While such a pragmatic approach is useful, it is quite likely that asset valuations based on historical cost and ODRC methodologies will differ significantly and that a choice will ultimately need to be made.

In our view, the ODRC methodology is superior to an historical cost approach for the following reasons:

- the historical cost approach involves a high degree of arbitrariness, making it problematic as a basis for deciding whether or not a firm's prices reflect its use of any market power:
    - the historical cost approach requires the selection of an ***arbitrary*** date for determining the starting value of the asset;
    - the historical cost approach requires the selection of an ***arbitrary*** depreciation schedule for determining how the asset value has changed since its starting point;
- the ODRC methodology is consistent with assessing the prices that would be set by an efficient hypothetical new entrant, and is therefore consistent with the prices that would prevail under effective or workable competition; and

- the theoretical basis for optimisation of assets, as occurs under the ODRC approach, is more consistent with workably competitive market outcomes than the 'used and useful' and 'prudently acquired' principles that would need to be applied under an historical cost approach.

1 INTRODUCTION

The Commerce Commission (the Commission) is undertaking the Gas Pipeline Inquiry (the Inquiry) in response to a request from the Minister of Energy (the Minister). The Commission is required to report on whether goods and services supplied by persons in markets directly related to either a natural gas transmission system or a natural gas distribution system (or both) should be controlled. In reaching its view on whether control should be introduced the Commission is to advise the Minister on:

- whether gas services may be controlled in terms of section 52 of the Commerce Act;
- the methodology that the Commission considers appropriate for valuation of pipeline assets for the purposes of its advice on matters covered in the terms of reference;
- the net benefits to the public of control; and
- any other matter that the Commission may think relevant to a decision on whether control should be introduced.

On 16 July 2003, the Commission released its paper ***Gas Control Inquiry Draft Framework Paper*** (***Draft Framework Paper***), setting out the Inquiry background and presenting the proposed legal and analytical frameworks to be used.

NGC Holdings Ltd (NGC) has commissioned NERA Economic Consulting (NERA) to comment on the asset valuation methodology the Commission has proposed in its ***Draft Framework Paper***. In summary, the Commission is proposing to consider both the historical and replacement cost approaches in the context of a building block assessment of revenues to determine the extent to which future expected revenues may reflect monopoly pricing.

Our report is structured as follows. Section two considers the framework the Commission is proposing as far as it relates to the asset valuation methodology. The Commission is proposing a forward-looking assessment of expected actual and expected "efficient" prices to determine whether firms can be considered to be taking advantage of market power. Within this framework the asset valuation methodology is tasked with providing prices consistent with competitive market conditions.

Section three compares the two asset valuation approaches the Commission is intending to focus on, historical cost and optimised depreciated replacement cost (ODRC). In our view, ODRC is the appropriate approach to asset valuation for the purposes of determining whether or not prices exceed those that could be expected in a market where competition was not limited.

Section four briefly discusses the issues likely to arise when considering which assets should be included in the asset base.

2 THE COMMISSION'S PROPOSED APPROACH

2.1 Asset Valuation in Context

There are a variety of methodologies available for valuing infrastructure assets; the most appropriate will depend on the context within which the valuation is taking place and the questions being addressed. In the present context, the valuation would be used to assess whether gas services should be subject to price control under section 52 of the Commerce Act, which states that goods or services may be controlled if:

> ***(a) the goods or services are, or will be, supplied or acquired in a market in which competition is limited or is likely to be lessened; and***
>
> ***(b) it is necessary or desirable for those goods or services to be controlled either—***
>
> ***(i) in the interests of persons acquiring the goods or services (whether directly or indirectly), if the goods or services are acquired from a person who faces limited or lessened competition for the supply of those goods or services; or***
>
> ***(ii) in the interests of suppliers, if the goods or services are supplied to a person who faces limited or lessened competition for the acquisition of those goods or services.***

There are potentially two ways to assess whether gas transport services satisfy the criteria under part b. The first is to assess prices in the absence of regulation against the prices that would be expected to prevail in a workably competitive market. This construct is based upon the prerequisite of "limited competition" for considering the benefits of control. The second approach would be to assess prices in the absence of regulation against the prices that would be likely under an "efficient and workable" regulatory framework.

The Commission has recognised each of these approaches in its ***Draft Framework Report***:[1]

> ***"The Commission considers that, as part of the process of determining whether the second statutory threshold for control…has been met, and whether control should be recommended, it must judge the behaviour of suppliers of gas services against an 'efficient prices' standard. [FN Efficient price, in this context, means a price that may be observed in a market characterised by effective or workable competition, rather than the (sic) perfect competition.]"***
>
> ***"In order to consider the second key issue (control necessary or desirable in the interests of acquirers) the Commission proposes to compare outcomes in the counterfactual against the likely outcomes under control."***

The Commission has then undertaken a methodology that, in a sense, combines these two approaches. In its discussion of how it will compare outcomes in the counterfactual against the outcomes under control, the Commission writes:[2]

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[1] Paragraphs 5.74 and 5.13.

[2] Paragraph 5.13

"To achieve this, the Commission will:

- ***use a building blocks type approach (in addition to comparative performance analysis, if possible) to determine an 'efficient level of revenue' and therefore an 'efficient prices' standard for the supply of gas services. (Efficient prices in this context means the prices that are likely to be observed in a market that is workably, rather than perfectly, competitive);***
- ***assess the current and expected behaviour of suppliers of gas services against the 'efficient prices' standard; and***
- ***analyse the benefit to acquirers (using the efficient prices standard and supplier behaviour) of imposing control relative to a counterfactual)."***

Given this construct, the asset valuation methodology is being asked to do two things:

- mimic the valuation likely to be placed on assets in a competitive market; and
- mimic the valuation likely to be applied under a regulatory framework.

These two tasks will not be comparable unless the regulatory framework is aimed at establishing the prices that are likely to prevail under competitive market conditions, which appears to be the Commission's intention.

2.2 Criteria for Assessing Asset Valuation Methodologies

Although the Commission has not explicitly developed a set of criteria for determining which asset valuation methodology should be preferred, it has set out pricing principles which it has drawn upon to determine the efficient price applying under a building block approach, including the asset valuation.

These principles can be summarised as follows:

- the valuation methodology should promote allocative efficiency by:
  - promoting an efficient level and structure of prices;
  - promoting service quality that is consistent with prices and meets consumers' preferences;
  - avoiding cross subsidisation, both across services and over time;
  - providing normal returns to service providers;
  - satisfying the "NPV" principle – by this, the Commission means that the capital charges over the life of an asset should approximately equal the actual capital expenses incurred in respect of that asset, in present value terms;
  - encouraging cost minimisation;
  - taking a short-run perspective;

- encouraging productive efficiency by encouraging cost minimisation; and
- being dynamically efficient by encouraging investments and innovations to maintain allocative and productive efficiency over time.

However, in its conclusion to this section[3] the Commission makes the following comments in relation to its pricing principles:

- that it expects to focus on the efficient level of average prices (including over time) rather than both the level and structure of prices;
- that these principles are expressed over the medium term to avoid short term fluctuations in the market; and
- that the Commission will have particular regard to the NPV principle.

We have two comments regarding this focus. First, it would be useful for the Commission to specify the theoretic underpinning of the efficient level of average prices. This would clarify the Commission's approach to various components of the building block methodology and assist in identifying the most suitable asset valuation methodology. In our view, the appropriate theoretical underpinning is the hypothetical new entrant test, which provides an estimate of average prices in the market if competition were not limited.

Second, although the NPV principle is theoretically sound for price setting over the life of the asset, it may need to be re-evaluated in the context of a one-off test for prices over a segment of the asset's life. This is especially so in light of the information requirements needed to assure the principle is met, the need to address past under- or over-recovery in prices and the implied inflexibility for dealing with market changes.

These issues are discussed further in the following sections.

2.2.1 Theoretical underpinnings for price levels and the ***Hypothetical New Entrant*** test

Under the "perfect competition" paradigm, prices are equated to marginal costs. The Commission has recognised that the efficient level of average prices in this industry will not be consistent with forward-looking marginal costs, due to the presence of fixed and common costs. However, the Commission has not established an alternative theoretical basis for assessing average prices. Fixed and common costs would be present in this industry with or without effective competition (although the presence of these costs reduces the likelihood of effective competition being present). The issue is how to deal with these costs in a way consistent with competitive market outcomes. The Commission has proposed ensuring that businesses achieve "normal" returns, however, this is only part of the answer.

[3] Paragraphs 5.116 to 5.119.

To address this question fully, it is useful to recognise that prices in competitive markets are determined by entry opportunities (where entry may involve an entirely new firm or the expansion of capacity by an existing firm). It is the costs of efficient new entrants that determine the long-run sustainable price level in a competitive market. If prices are set above those costs, entry will be attracted until prices and new entrant costs are once again equated. Incumbents in such an industry have no ***ex post*** protection from adverse changes in demand or cost conditions – an incumbent with higher production costs than a potential new entrant will be unable to recover all of its costs through prices. However, firms will be compensated ***ex ante*** for the probability that adverse changes might occur.

A ***hypothetical new entrant test*** assesses an incumbent firm's price(s) against the maximum price(s) it could charge without encouraging entry into the market ***if it were subject to the threat of competitive entry***. The hypothetical new entrant test asks "are prices at a level that would encourage new firms to enter the market if entry and exit were not restricted?". If this is the case, the incumbent may be exercising market power. In the case of a business with the scale-economy features of a natural monopoly, a hypothetical new entrant test presumes that customers can form a coalition to purchase services from the new entrant as a group (without this assumption, scale economies can pose an entry barrier). In this case, the hypothetical new entrant test asks: what is the maximum price consumers would be willing to pay an existing infrastructure owner if they had the hypothetical option to overcome transaction costs and negotiate as a coalition with a new entrant to provide substitute services? By assuming away the barriers to consumers acting as a unified coalition, the hypothetical new entrant test (hypothetically) removes market power from incumbent producers.

By definition, the hypothetical new entrant test provides prices that reflect the long run equilibrium prices a competitive market would attain. That is, while a competitive market may set prices that deviate from new entrant costs in the short run (while entry or exit from the industry is occurring), the hypothetical new entrant test abstracts from the short run and calculates long run competitive price levels. For this reason, we believe the hypothetical new entrant test to be the appropriate theoretical underpinning for the Commission's investigation into gas services. It has recently been used in Australia by the National Competition Council for assessing the prices of the Moomba to Sydney gas pipeline where the Council was tasked with addressing whether or not regulation would improve competition in related markets (see the case study in section 3).

As discussed further in section 3, the asset valuation methodology consistent with the hypothetical new entrant test is ODRC.

2.2.2 The NPV principle

While the NPV principle may be theoretically sound for setting prices over the entire life of an asset under a regulated environment, this is not the situation the Commission has been asked to address. The Commission is tasked with identifying whether it is in the interests of acquirers for price control to be implemented. In doing so, the Commission has stated that it

will try to identify the prices that would prevail under effective competition and compare those with the prices likely to prevail in the absence of control. However, competitive pressures may result in prices that do not support the NPV principle over an asset's life. Changes in market conditions, including demand changes, technological changes and developments in related markets, will impact prices and most likely result in the NPV principle being violated over an asset's life. The expected return on assets would reflect this risk.

Furthermore, it is unlikely the Commission will have sufficient information to ensure that it satisfies this principle. To do so, the Commission would need information on the history of revenues, costs and required returns over the life of each asset. Undertaking analysis to ensure the principle was met from an arbitrary start date would not be consistent with ensuring the NPV principle was satisfied over the life of the asset. Almost all infrastructure assets are utilised relatively less in the early years, when returns tend to be below the long-term cost of capital. Correspondingly, a firm will expect to earn a relatively higher return in the later years, when utilisation is higher. It is important to recognise that, unless the extent of under- or over-recovery is estimated over the entire life of the asset, the NPV principle is unlikely to be satisfied. The more recent the start date, the more likely it is that the Commission will find that future prices are higher than those that would prevail in competitive conditions.

Therefore, while the NPV principle is theoretically appealing, we question its dominance in the Commission's decision as to the appropriate asset valuation technique.

2.3 Applying the Valuation

The Commission proposes[4] to assess the potential benefits of control to acquirers by comparing efficient revenues (derived from its preferred current asset value) with forecasts derived from businesses' current and planned prices, as indicated by current business plans and pricing policies. The Commission intends to compare the NPV of future free cash flows with the current value of efficient capital employed to assess whether projected prices could be interpreted as being above efficient levels.

The use of such an approach necessarily introduces a further level of complexity into the analysis that might have been avoided with the use of out-turn analysis, as in the case of the airport inquiry. In particular, an NPV-based approach:

- relies on forecasts of revenues, cost, capital expenditure, etc, that would have been prepared for other purposes and may reflect inherent forecasting biases;
- may result in firms being "punished" for events that have not happened and which may never be realised; and

[4] Paragraph 5.128

- gives rise to a need to include, and therefore forecast, future asset value changes as well as future revenues and costs.

Nevertheless, an NPV-based approach is theoretically appealing and arguably more consistent with the Commission's objectives than an analysis of out-turn cost and revenue data. Just as there is no guarantee that projected events will eventuate, so there is no guarantee that past behaviour is a good indication of expected future behaviour.

3 VALUATION METHODOLOGIES

The Commission considers several approaches to determining asset valuations:

- ***historical cost*** – which sets the current asset value according to past expenditure and revenue and which the Commission states is consistent with the NPV principle;
- ***opportunity cost*** – which the Commission has defined as Net Realisable Value (NRV) should the pipeline be sold as scrap;
- ***replacement cost*** – which the Commission considers to be akin to the opportunity cost from the perspective of consumers; and
- ***market transaction value or discounted cash flow analysis of future costs and revenues*** – the Commission considers these approaches to be problematic, as they reflect the supplier's revenue expectations and may include expectations of monopoly rents.

The Commission states that it intends to consider both historical and replacement cost approaches in determining asset valuations and noted that in practice pricing involves many pragmatic considerations and commercial judgments:[5]

> ***"The Commission would not necessarily consider a specific price path to be inefficient merely because it differed from a price path consistent with ODRC with tilted annuity depreciation, or from a price path consistent with historical cost valuation with straight line depreciation. Nevertheless, the Commission must establish some benchmarks for efficient price paths in order to determine whether there is evidence of monopoly pricing, and to assess the net benefits of control."***

This is a sensible premise, given the difficulties in arriving at a definitive view as to whether revenues are above or below "efficient" levels. However, it is quite likely that a price path based on an historical asset valuation methodology will differ substantially from a price path based on a replacement cost approach.[6] Thus the Commission will most likely need to decide between these two approaches at some point.

The Commission has asked:

44.	What asset valuation approach or approaches should the Commission use to establish the current efficient asset value (and thereby establish the efficient level of prices)?

Our view is that the Commission should use the ODRC valuation methodology. The reasons for this are set out below.

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[5] ***Draft Framework Paper, page*** 79.

[6] Although we recognise that under certain start date and depreciation schedule choices, the historical cost and ODRC valuations may not be substantially different.

3.1 Historical Cost versus Replacement Cost

3.1.1 Historical cost

For the purposes of the Commission's investigation, the historical cost approach to asset valuation is both theoretically and practicably inferior to the ODRC methodology.

It is theoretically inferior because historical cost based asset valuations are problematic when attempting to estimate "efficient" prices part way through the life of an asset. The Commission has established that the appropriate comparison is between the prices that would be expected to prevail in a competitive environment versus those that the incumbent businesses are likely to set. Historical cost valuations provide no information relevant to assessing the prices in a competitive market. Book values reflect various accounting practices and potentially different approaches to asset capitalisation and revaluation and are irrelevant to price setting under competitive conditions. In a competitive market, investors expect to achieve a return on the current or replacement cost of assets rather than on their original or historical valuation.

The Commission also recognises that, contrary to first impressions, implementing the historical cost valuation methodology is unlikely to be straightforward and, in practice, will involve a number of judgements that will have significant impact on the estimated asset value. There are three issues that will be particularly critical to the valuation and the conclusion the Commission draws from it. The first is the choice of an arbitrary start date for the valuation. The second is the choice of depreciation schedule. The third is the allocation between depreciation, return and on-going costs over the period since the start date in order to assess whether revenues have historically under- or over-recovered efficient total costs.

3.1.1.1 The Starting Point

The Commission recognises that information limitations will probably mean an historical cost, from some arbitrary date, will need to be used rather than the original cost.[7] The choice of start date has the potential to alter the asset valuation substantially. The Commission has identified a number of alternative dates, which will most likely lead to widely divergent estimates of the asset value. In other words, an arbitrary date will lead to an arbitrary asset valuation.

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[7] While most of NGC's assets have been owned continuously, we understand that the company's document retention policy is consistent with the guidelines published by the Chartered Institute of Corporate Management (NZ) Inc (The Disposal and Retention of Documents, 4th Edition February 2000). Consequently, many documents relating to the assets will have been disposed of over the life of the assets. It is unlikely that a consistent approach to allocating expenses between operations and capital could be audited by examining available records. Similarly, it is likely to be difficult to reconcile the depreciation schedule over the life of the assets.

The potential exception to the arbitrariness of selecting a date part way through the assets' life as the basis of an historical cost valuation occurs when the assets have been privatised. In this situation, governments may implicitly write-off any early under-recoveries and/or provide assurances to investors about the future basis for cost recovery. Sovereign and regulatory risk considerations would argue for values established or commitments made as part of a privatisation process to be taken into account.

However, even this approach is likely to be problematic in the case of NGC, due to the application of different accounting policies around the time of its public listing in 1992. In March 1988, pipelines and compressors were revalued to reflect their acquisition valuation, based on the assigned cost of acquisition when Fletcher Challenge acquired 100 per cent of the issued capital of Petroleum Corporation of New Zealand Limited (NGC's former parent company). All other fixed assets were valued at their historical cost. Thus, when a prospectus was issued in 1991 for the offer of Natural Gas Notes, fixed assets were included on the basis of a mix of historical cost and acquisition values.[8] By 1992, however, accounting practices had been revised so that all fixed assets were valued according to historical cost. In a subsequent prospectus issued for the offer of convertible capital notes and ordinary shares, all fixed assets were included at cost.[9]

The following table illustrates the extent of the changes in the valuation for pipelines and compressors in these two prospectuses.

Table 1
Net Book Value of Pipeline and Compressors (as at 30 June)

1991 Prospectus Valuation, $000s		1992 Prospectus Valuation, $000s	
1989	***1990***	***1991***	***1992***
$454,804	$436,161	$356,860	$338,635

The Commission has asked:

27.	What is the appropriate opening valuation date for each gas pipeline business (e.g. end of last price control, public flotation, other)?

In our view, there is no opening historical cost valuation date applicable to NGC that can avoid unacceptable arbitrariness when undertaking a test for control.

[8] See ***Prospectus for the offer by Natural Gas Corporation Limited of Natural Gas Notes***, pages 45, 54, 61, 63

[9] See ***Prospectus for the offer of Convertible Notes and Ordinary Shares in Natural Gas Corporation Holdings Limited***, pages 92 and 95

3.1.1.2 The Depreciation Schedule

The second major disadvantage with the historical cost approach is the need to identify an historical depreciation schedule. The Commission has proposed two options, the use of a schedule consistent with "efficient prices", or the use of a depreciation methodology consistent with the depreciation policy disclosed by each business in relevant annual financial statements.

Each of these alternatives will likely be problematic to implement. Estimating a depreciation schedule consistent with efficient prices will require decisions as to the optimal time profile of those prices, which will substantially alter the level of the accumulated depreciation. For instance, such a depreciation schedule would need to address:

- how prices should respond to demand fluctuations;
- how prices / revenue reflect the increasing utilisation of pipelines over their lives; and
- how the depreciation schedule reflects changes in the replacement value of the asset.

Using the depreciation schedule contained in financial statements is also likely to be problematic. Financial statements are prepared for a range of reasons and the depreciation schedules they contain may or may not be appropriate for the Commission's purposes. For instance, for tax purposes, depreciation schedules are likely to be weighted towards early depreciation of assets.

The Commission has asked:

29.	What is the appropriate rate of depreciation to apply to historical costs?

In our view, unless detailed regulatory accounts or financial disclosure statements have been in place from the outset, there is no practicable rate of depreciation to apply to historical costs for the purpose of deriving a current asset valuation for undertaking a test for control.

3.1.1.3 Information on historical costs and revenues

Once the asset value has been determined since the start date, the Commission will need to assess whether the revenues associated with the asset reflect any over- or under-recovery of costs in the past. The Commission has said that such over- or under-recovery would be taken into account in assessing future prices. This approach requires information on the weighted average cost of capital (WACC), taxes, capital additions and disposals, and operating costs in each year since the start date.

In order to calculate required returns for a specific business segment (such as gas transport) it is necessary to estimate the above parameters for that segment. Accounting records may not report the data in such a way that this is easily calculated. It is possible that the data will need to be adjusted and assumptions made in order to obtain the necessary information. For

instance, it may be necessary to make assumptions regarding the allocation of revenues and costs to each segment because of past tariff bundling. There will also be a range of suitable WACCs, substantially affecting the estimate of cumulative over- or under-recovery.

3.1.1.4 Sensitivity tests

The chosen start date and depreciation schedule will substantially alter the Commission's asset valuations; assumptions regarding ongoing costs and revenues have the potential to alter substantially the conclusions the Commission may draw from those valuations. At the very least it will be necessary to undertake sensitivity tests to determine the extent to which these arbitrary decisions impact the asset base and the conclusions with respect to the extent of monopoly pricing. It would be contrary to the principles of natural justice to conclude that a firm had abused its market power by virtue of a number of arbitrary decisions.

In Australia, the Victorian Office of the Regulator General (since restructured as the Essential Services Commission) undertook a similar exercise to that now contemplated by the Commission in its landmark decision regarding gas pipeline tariffs in 1998. In short, the wide range of potential historical cost asset values once past under- or over-recoveries of capital costs were taken into account, meant that it was impossible to draw a definitive conclusion as to whether or not past customers had already paid for infrastructure assets. This was an important factor in the regulator's decision to adopt a replacement cost valuation methodology and is discussed further below.

Case Study A – The Victorian Gas Transport System[10]

In its 1998 determination of gas pipeline tariffs to apply in the restructured Victorian gas transport system, the then Office of the Regulator General (the Office) considered both the ODRC methodology and depreciated actual cost (DAC), recognising that no single asset valuation methodology provides a uniquely appropriate valuation in all cases.

The Office concluded that the ODRC methodology has significant advantages from the viewpoint of economic efficiency. In particular, it noted that ODRC is consistent with the price charged by an efficient new entrant into an industry and so is consistent with the price that would prevail in the industry in long run equilibrium. The Office believed there would be benefits to establishing broadly symmetrical pricing and incentive structures across regulated and competitive markets for ensuring general resource allocation and that the use of ODRC valuations would minimise the likelihood of significant shocks to tariffs in the future when assets were replaced.

The Office noted that the main argument in favour of DAC was that, if tariffs were set on a cost of service basis in the past, then it would be consistent with all parties' expectations of the value of the assets at that point in time. It noted, however, that it was difficult to determine how tariffs for the market as a whole had been in the past and the extent to which those tariffs had already recovered the capital costs.

The Office calculated a written down value for the assets of the former Gas and Fuel Corporation that reflected past tariffs and historical returns to the asset owner. The Office carried out sensitivity tests relating to the rate of return and the treatment of the cost of natural gas. The estimates of the asset value ranged from -$1,363,726 to $11,319,816, with the Office's preferred value being $7,944,901. This wide range of potential valuations illustrates the difficulties associated with arriving at a definitive historical cost valuation.

3.1.2 Replacement cost

ODRC is the theoretically most sound asset valuation approach for testing for excess returns. ODRC represents the maximum asset value consistent with the long-term prices a hypothetical new entrant would need to charge in order to serve the relevant market. Unless a business is earning returns in excess of its weighted average cost of capital on an ODRC asset valuation, it cannot be earning excess profits because no other company would be willing to provide the service on a sustainable basis at a lower price.

[10] Office of the Regulator General, Victoria (1998) ***Access Arrangements – Multnet Energy PTY LTD and Multinet (assets) PTY LTD, Westar (gas) PTY LTD and Westar (assets) PTY LTD, Stratus (gas) PTY LTD and Stratus Networks (assets) PTY LTD – Draft Decision***, chapter 4.2.

An explicit objective of the Ministry of Commerce in putting forward the optimised deprival valuation (ODV) principle in 1994 for electricity lines businesses was that it would reveal monopoly-pricing behaviour in a regime that relied explicitly on the threat of regulation:

> ***"[ODV]…is a superior methodology for revealing monopoly pricing behaviour, a key reason for disclosing financial performance measures."***[11]
>
> ***"In effect, ODVs put a cap on prices, because price levels which would support a business value in excess of an ODV-based asset value would show through as an excessive (ie greater than the Weighted Average Cost of Capital) return on ODV-based asset values."***[12]
>
> ***"A rate of return commensurate with the riskiness of the business and based on an ODV asset valuation will give a fair return to the LB owners while ensuring sustainability of the business."***[13]
>
> ***"The benefits of adopting a valuation method, such as ODV, will be reflected in improved industry monitoring. Other specific advantages include:…knowing the value of the business's assets for possible price setting purposes."***[14]
>
> ***"the intention behind information disclosure is to encourage self-regulation. The Government will monitor developments. If it becomes evident that any line business is abusing its market power, the Government is likely to give consideration to strengthening controls. Options are to seek more extensive disclosure of information or, as a last resort, to impose price control."***[15]

ODRC valuations also promote allocative, productive and dynamic efficiency. They signal the current cost of consumers' decisions and provide appropriate incentives to businesses regarding the mix of assets used to produce services. The use of optimisation limits any incentive businesses may otherwise have to over-invest and the inclusion of assets at their current cost provides appropriate information to firms considering various capital related decisions, such as whether to upgrade versus replace and whether and when to undertake new investments.

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[11] Energy Policy Group, Energy & Resources Division, Ministry of Commerce, ***Rationale for Financial Performance Measures in the Electricity Information Disclosure Regime*** , August 1994, page 9

[12] Energy Policy Group, Energy & Resources Division, Ministry of Commerce, ***Questions and Answers on Financial Performance Measures Optimised Deprival Valuations and Avoidance of Double Counting of Asset-related Expenses***, August 1994, page 8

[13] Energy Policy Group, Energy & Resources Division, Ministry of Commerce, ***Electricity Information Disclosure Adjustments to Financial Statements for Performance Measures***, August 1994, page 2

[14] Energy Policy Group, Energy & Resources Division, Ministry of Commerce, ***Questions and Answers on Financial Performance Measures Optimised Deprival Valuations and Avoidance of Double Counting of Asset-related Expenses***, August 1994, page 7 and 8

[15] Energy Policy Group, Energy & Resources Division, Ministry of Commerce, ***Questions and Answers on Financial Performance Measures Optimised Deprival Valuations and Avoidance of Double Counting of Asset-related Expenses***, August 1994, page 4

The Commission has stated that it considers an ODRC approach with tilted annuity depreciation may provide an upper bound for current asset values or a crosscheck on asset values "otherwise considered" (presumably historical cost valuations).[16] The main reason the Commission has not decided to use an ODRC valuation exclusively appears to be due to practical difficulties associated with identifying the appropriate "tilt". At paragraph 5.161, the Commission makes the following comment:

> ***In relation to tilted annuity depreciation, the Commission considers that while the appropriate tilt may be defined in principle, its empirical determination is not straightforward, because it requires numerous assumptions about the future, all of which are highly uncertain, such as:***
>
> - ***future demand for the services;***
> - ***the price elasticity of future demand (including the effect of possible substitute services); and***
> - ***the rate of technical change and other factors affecting future capital and operating costs.***
>
> ***In the face of these empirical difficulties it may not be practical (sic) to identify theoretically efficient prices based on a tilted annuity depreciation with a high degree of precision or certainty.***

In our view, the difficulties associated with determining an appropriate level of depreciation for the purposes of determining an ODRC valuation – addressed explicitly by the Commission in questions 30 through 33 - are likely to be much more manageable than the difficulties associated with undertaking an historic cost valuation. In each case, the process of deriving a current efficient asset value can be addressed by reference to both past experience (eg, the impact of past average rates of technical progress on expected asset replacement costs) and assessments of likely changes in market circumstances - such as in relation to upstream gas supply.

While this does imply the need for assumptions pertaining to the future, the Commission is in any case proposing a forward-looking test of excess returns that will require a similar set of forecasts. Economic issues affecting the future cost of and demand for gas transport services must also be routinely examined by firms contemplating investment in new gas infrastructure. ODRC valuations have been undertaken in many regulatory regimes where the introduction or imposition of price control is being contemplated. The following case study illustrates the practicability of the ODRC approach vis-à-vis an historical cost approach.

ODRC valuations or their variant, ODV, have also been used in the New Zealand gas sector for some time. Consistent with this, both the Minister and officials have recently stated[17] that ODV should be formalised in the gas industry information disclosure requirements irrespective of the outcome of the Commission's inquiry.

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[16] Paragraph 5.165

A further reason the Commission favours the historical cost approach is its potential to be consistent with the NPV principle. However, both historical cost ***and*** ODRC valuation approaches will be consistent with the NPV principle if properly and consistently applied throughout the life of the asset, as recognised by the Commission in its section ***The NPV Principle and Path Dependency***. In any case, our discussion in section 2 indicates that a focus on the NPV principle may not be consistent with the Commission's wider objectives.

3.2 Other Issues

In its discussion of the opportunity cost approach to asset valuation, the Commission suggests that the appropriate opportunity cost to consider would be that of the assets in an alternative use:[18]

> ***For a fully sunk asset, any residual value (net of the costs of disposal) is its net realisable value (NRV) as scrap. In these circumstances the opportunity cost in relation to alterative uses of the asset is very low or even zero, as the owner forgoes very little (only its NRV) in its present use.***
>
> ***…As long as the regulator allowed the investor to earn a return above the opportunity cost of the asset, it would be in the interests of the owner to keep it employed in its current use. However, investors, finding the value of their investments expropriated, would be unwilling to replace the asset when it wears out.***

We disagree that the relevant opportunity cost is the value foregone by not exiting the business of supplying customers. To define opportunity cost as that of exiting the market implies that whether or not to continue to provide pipeline services is the most relevant issue for price setting in a competitive market. However, where there are profitable entry opportunities in an industry, it is entry decisions rather than the exit decisions that determine prices. Thus, the appropriate opportunity cost is that of entry. For this reason, we consider the ODRC to be the appropriate measure of opportunity cost.

The Commission has also recognised it would not be in the interests of dynamic efficiency to use NRV-based asset valuation. However, the purchasers of gas services may be inappropriately encouraged to take a different view, especially given the Commission's overs-simplistic statements with respect to allocative efficiency:

> ***"'First best' efficient pricing requires that users be charged a price equal to the marginal cost of supply. Marginal cost (MC) is the additional cost incurred when an additional unit of output is produced...***
>
> ***For suppliers with a high proportion of fixed costs, marginal cost is likely to be below average cost…"***

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[17] NGC Holdings Ltd, ***Submission in Respect of the Draft Framework Paper, Commerce Commission Gas Control Inquiry***, August 2003, page 25

[18] Paragraph 5.150

On this basis, some may attempt to argue that, as a matter of principle, lower asset valuations better serve the objective of allocative efficiency and so the NRV approach to asset valuation would be appropriate.

In Australia, the Productivity Commission recently carried out a year-long inquiry into the performance of Australia's national access regime over its first five years.[19] A principal finding of the Productivity Commission was that regulators should err towards the interests of investors when setting and re-setting price controls, because the cost of getting it wrong (ie, under-investment in infrastructure) is likely to outweigh any short term benefits that might accrue to customers from artificially low prices.

The Productivity Commission's findings are consistent with the need for the Commerce Commission to resist being drawn towards over-simplistic notions of allocative efficiency in determining the approach to asset valuation.

3.3 Experience in Other Jurisdictions

Care must be taken when considering the approaches used by regulators in other jurisdictions, where the objectives of regulation and the tools available to regulators may differ significantly from those available to the Commission. Both historical cost and replacement cost asset valuations are used in regulatory approaches internationally. However, given the Commission's objectives, international experience tends to support the use of replacement cost in this instance.

Historical cost valuations have typically been used in the United States under rate of return regulation. However, the use of historical cost in that context does not provide support for the Commission's use of historical cost:

- in the US context the historical cost methodology is typically used to regulate prices over the life of an asset, where it is understood in advance that such assets will be regulated - it is not used for the purposes of assessing whether prices are above those that would prevail under effective competition;
- US regulators typically apply regulation based on historical cost from the original purchase date of assets, when the necessary information is available, thus avoiding the need for arbitrary choices as to start date;
- prices are typically based on an identified depreciation schedule, thus avoiding the need to choose an arbitrary depreciation schedule that may not be consistent with past pricing decisions;
- prices are typically regulated over the life of the asset, satisfying the NPV principle; and

[19] Productivity Commission, ***Review of the National Access Regime,*** Report No. 17, 28 September 2001

- investors understand that this is the approach regulators are likely to apply before they make the investment, and so the risks to investors are well understood and the regulated return is consistent with that risk.

Replacement cost measures have been used extensively in Australia, where regulation has typically been introduced at a mid-point in the life of the assets of infrastructure businesses, and where the legal context places emphasis on mimicking competitive market outcomes rather than ensuring a reasonable return (and no more) for investors over the life of the asset.

The views of the Australian Competition and Consumer Commission (ACCC) are illustrated by the following comments, which were made in the context of determining price controls for Australian electricity transmission businesses:

> ***One interpretation of DORC [or ODRC] is that it is the [asset] valuation methodology that would be consistent with the price charged by an efficient new entrant into an industry, and so it is consistent with the price that would prevail in the industry in long run equilibrium.***[20]
>
> ***The Commission considers that a well-defined DORC approach has some significant advantages as a cap to asset valuation from the viewpoint of economic efficiency.***[21]

In the UK, where the term ***Modern Equivalent Asset*** is used instead of ODRC, the landmark Byatt Report commented on the implications of the competitive market paradigm for the valuation of assets:

> ***"The value of assets to a business means what potential competitors would find it worth paying for them, even if the competition is hypothetical. This will be a net replacement cost of the Modern Equivalent Asset if the asset would be worth replacing, or the recoverable amount if it would not.***
>
> ***For price makers the Modern Equivalent Asset will usually be the appropriate basis for valuation. Asset values should take account not only of general inflation but also specific relevant price changes, eg rising real fuel costs and the impact of technological progress in reducing real costs. The value is what it would be worth paying to bring replacement assets into use now and in the normal course of business, taking into account practical constraints, eg on the rate at which the latest equipment could be introduced."***[22]

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[20] Australian Competition and Consumer Commission, ***Draft Statement of Principles for the Regulation of Transmission Revenues***, May 1999, page 40

[21] ***Ibid***, page 48

[22] Byatt Report - Accounting for Economic Costs and Changing Prices – A Report to the HM Treasury by an Advisory Group, 1986, volume I, page 6

"….assets which represent sunk costs should be valued at their value to the business as if a competitive market existed, ie their net modern equivalent replacement cost, if they are worth replacing, or the recoverable amount if they are not."[23]

[23] ***Ibid***, volume I, page 27

Case Study B – The Moomba to Sydney Pipeline

Tests for price control are comparatively rare, especially in the context of whether or not price control should be imposed (as distinct from relinquished). In the UK and US, tests for control are primarily applied in the context of whether existing price controls should be removed, eg, in telecommunications and US gas pipelines. In these cases, the emphasis is on whether the relevant market is subject to workable or effective competition rather than whether existing prices constitute the taking advantage of market power.

Aside from the Commission's recent airports inquiry, the most relevant examples of tests for control are those applied in establishing whether particular gas pipelines should be subject to the provisions of the Australian Gas Code. The criteria applied in this test are whether:

- access will promote competition in at least one other market;
- it is uneconomic to develop an alternative pipeline;
- access can be provided without undue risk to health or safety; and
- access would not be contrary to the public interest.

If a pipeline meets the criteria for coverage, the Gas Code provides third party access at regulated tariffs (ie, price control). The most relevant case heard and decided by reference to these criteria is that of the Moomba to Sydney pipeline (MSP), which sought revocation of coverage under the Gas Code in June 2001.

The National Competition Council (NCC) commissioned academic interpretation of the above criteria by Professors Janusz Ordover and William Lehr, their main findings included:

- competition would be promoted by a move from monopoly to competitive market tariffs; and
- judging whether or not tariffs involve monopoly pricing (returns systematically in excess of the cost of capital) is difficult in practice, but can be done.

The NCC tested the existing MSP tariffs for the existence of monopoly profits, based on Professors Ordover and Lehr's findings. NERA (commissioned by the NCC) developed two main approaches to testing for monopoly profits:

- assessing whether returns were materially in excess of WACC over the entire life of the pipeline, based on its original cost; or
- applying a hypothetical new entrant test to existing tariffs.

The first approach was found to be impracticable in the context of the MSP because records of the original cost of assets and the operating costs and revenues throughout the life of the pipeline were not available. The second was defined and implemented in detail by NERA and adopted by the NCC.

Essential elements of the hypothetical new entrant test relevant to asset valuation are:

- ODRC asset values, on the assumption that the services provided by the pipeline are of greater economic value than its cost;
- capacity assumptions (adjusted for ODRC, or by market sharing assumptions);
- depreciation established by the ODRC concept; and
- an estimate of the relevant WACC.

The uncertainty around various assumptions underlying asset valuations makes the use of sensitivity tests critical. NERA estimated the ODRC asset values under a range of assumptions. We concluded that in each of the last two years the MSP had been charging tariffs around 30 per cent above an ***upper bound*** estimate of the hypothetical new entrant tariffs. On the basis of this, we inferred that there was evidence of the exercise of market power.

The MSP owners, East Australian Pipeline Limited, disputed certain aspects of NERA's analysis. However, there was no dispute over the appropriate approach to asset valuation.

4 THE RELEVANT ASSET BASE

Most regulatory regimes recognise the value to allocative, productive and dynamic efficiency of excluding certain assets (or components of assets) from the asset base. These might be assets that were imprudently acquired, overbuilt or which are not required to provide the regulated services. Whether the Commission chooses an historic cost or ODRC approach to valuation, it will need to make decisions about the range of assets included within the asset base. The Commission has identified that this decision may well depend on the valuation approach selected, ie:

- under historical cost approaches regulators often apply the criteria of 'prudently acquired' and 'used and useful' for assessing whether assets should be included in the asset base; whereas
- under an ODRC approach, the assets may need to be 'optimised' in order to reflect an efficient mix and level of modern assets.

This divergence between the assets that may be included in the asset base further illustrates why it is the ODRC asset value, rather than historical cost, which is appropriate for the Commission's purposes. In a competitive environment, firms earn a return on the current value of their assets, whether or not investment in these assets was appropriate at the time of investing. In a competitive market, businesses bear the risk of technological or market changes that may make their assets more or less valuable. Optimisation, on the basis of existing market conditions and technology, is therefore appropriate in a test for abuse of market power.

The Commission has asked:

36.	What issues arise in relation to optimising gas pipeline assets?

Several issues arise in considering the appropriate gas pipeline assets to be included in the asset base, and many of these need to be addressed irrespective of whether an ODRC or an historical cost approach is used.

The most problematic issue may relate to any "excess" capacity in the pipeline. Gas pipelines are generally under-utilised in their early years but the combination of scale economies in their construction and the long-lived nature of the assets generally makes it cost-effective to build capacity in excess of current demand levels.

In this circumstance, pipeline owners must make a choice between whether to maintain prices (implying lower revenues in the earlier years and higher revenues later) or maintain revenues (implying reasonably constant returns through the life of the asset) or something in between. The Commission will need to take these decisions into account when assessing whether returns are expected to be above or below a reasonable rate in the absence of regulation. It will also need to consider how this should be handled when it determines the

value of assets to be included in the asset base. If the Commission finds that there is an element of "over-build" in a pipeline, even after taking account of capacity needed to meet reasonable expectations of demand growth, scale economies imply the appropriate approach is to consider the less-than-proportionate cost of building a pipeline of smaller capacity, rather than simply scaling down the value of the existing pipeline.

Other issues likely to arise include:

- whether the route of the gas pipeline is the most appropriate or would an alternate route have been more cost effective?
- are there parts of the pipeline network that are not in use, either because of changed circumstances in upstream gas supply, or in end-user demand? and
- are there some parts of the pipeline network for which the services could be more efficiently provided in an alternative manner?

37.	How should gas pipeline businesses be compensated for stranding risk associated with optimisation?

The risk that assets will be stranded – either through technological changes that reduce the cost faced by a new entrant supplying a similar service, or by a reduction in demand for the use of a particular pipeline because of developments in either the upstream or downstream gas market – is a real economic cost of providing gas transport services. Investors must reasonably expect that such costs can be recovered before they will commit capital to building gas transport infrastructure.

Regulatory arrangements that involve ongoing control typically provide compensation for such risks in one or more possible ways, ie:

- through ***ex ante*** adjustment to the regulatory rate of return applied in determining maximum tariffs; or
- by allowing an accelerated rate of regulatory depreciation (or return of capital) in early regulatory periods, thereby reducing the extent of investors' capital that continues to be at risk of optimisation or stranding; or
- ***ex post***, by maintaining regulated tariffs above the (now reduced) new entrant level for a time, effectively taking advantage of any market power that a service provider may continue to enjoy so as to effect compensation for the under-recovery of unexpected stranding or optimisation costs incurred in an earlier regulatory period.

Of these potential options, only the first – the allowance of a margin over the normal rate of return – is practicable in the context of a one-off test for excess returns. Since the Commission's task is to undertake a one-time inquiry into current and expected gas transport tariffs, it is neither appropriate nor practicable to compensate for asset stranding

risk by means that necessarily involve adjustments to maximum tariffs in one regulatory period relative to another.

38-41, 43. Intangible and other assets?

The Commission's paper seeks views on the relevance and valuation of intangible and other assets to the analytical framework for the inquiry.

The system fixed assets of a transmission or distribution pipeline business are not the sum total of such a business' assets at any given point in time. Operation of a complex pipeline business depends on possession of a great deal of information and expertise relating to efficient management of the fixed assets. Businesses must also invest in management systems, intellectual property and a supporting IT structure.

For the most part, the cost of obtaining or developing such expertise will be reflected in the non-system fixed asset costs of the pipeline business that comprise other elements of the building blocks that underpin any assessment of efficient prices. Examples may include the capital cost of IT systems and the labour costs necessary to recruit and retain skilled human resources.

Over and above these identifiable costs, superior efficiency might also be considered an intangible asset of an established pipeline business, as suggested by the Commission. Such capability, however, is more appropriately represented as superior returns, rather than as a separate asset valuation line item in a building blocks calculation.

42. How should easements be valued?

In our view, there is no rationale for treating easements any differently from other assets necessary for the provision of a gas transport service. The concepts of historical cost and ODRC, and their economic or institutional underpinnings, are invariant to the nature of infrastructure assets. There is no economic or legal case to treat the valuation of land or easement assets any differently from other types of system fixed assets. In principle, they can be subjected to the same 'optimisation' or 'used and useful' test that might be applied to any other asset.

The principal practical difference is that land and easement assets do not depreciate through use. Rather, their economic value moves over time, according to supply and demand circumstances in the market for land, or rights over land. Hence, deprecation of land and easements is not normally be expected, other than periodic revisions when current cost valuation concepts are being updated in the context of their ongoing application in a relevant regulatory or institutional regime.

This view is consistent with that expressed by the ACCC in its 1999 ***Draft Statement of Principles for the Regulation of Transmission Services***, where it stated:[24]

> ***"The normal DORC methodology would assign values to such assets reflective of their market value. Given the strong link to real estate values there is a likelihood that the value of easements will escalate continuously over time, at times in excess of the rate of increase in the CPI. The question is how to introduce such assets into the regulatory base in a consistent way. One consistent approach would require:***
>
> - ***The contribution to the RAB be based on the actual cost to the TSNP of obtaining the easement rights updated periodically in line with what would be the DORC based valuation of easements…***
> - ***To the extent easement valuations are judged to vary over time, the variations in value should be reflected in depreciation allowances linked with the asset in precisely the same way as other assets. If the easement appreciates in value over time then the allocated depreciation would be negative…***
>
> ***The advantage of this approach is that the valuation remains comparable to costs faced by a potential entrant…***
>
> ***The Commission is attracted to this approach and proposes to adopt it…"***

[24] pages 45 and 46